SLR-FQ-1

Seat No.	

Set P

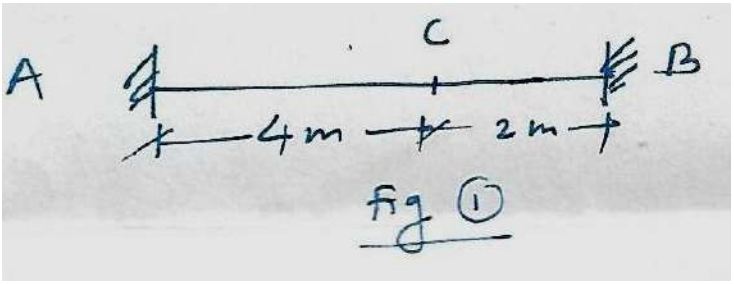
F.Y. (M.Tech.) (Semester - I) (New) (CBCS) Examination Dec-2019
Civil – (Structures Engineering)
ADVANCED STRUCTURAL ANALYSIS

Day & Date: Wednesday, 11-12-2019 Max. Marks: 70
Time: 10:00 AM To 02:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicates full marks.

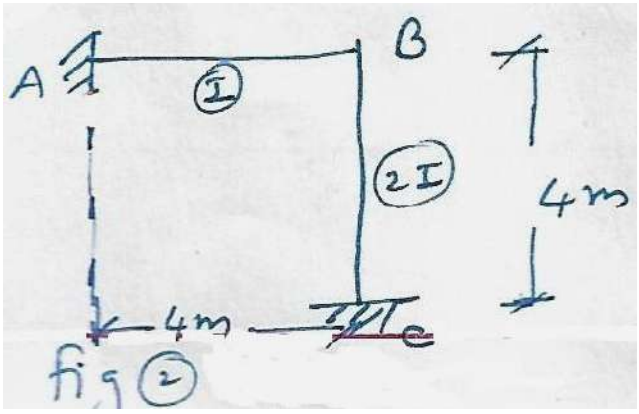
Section – I

Q.1 Draw ILD for SF & BM @ point c of beam shown is fig. (1), Draw ordinate at 1m interval. **12**

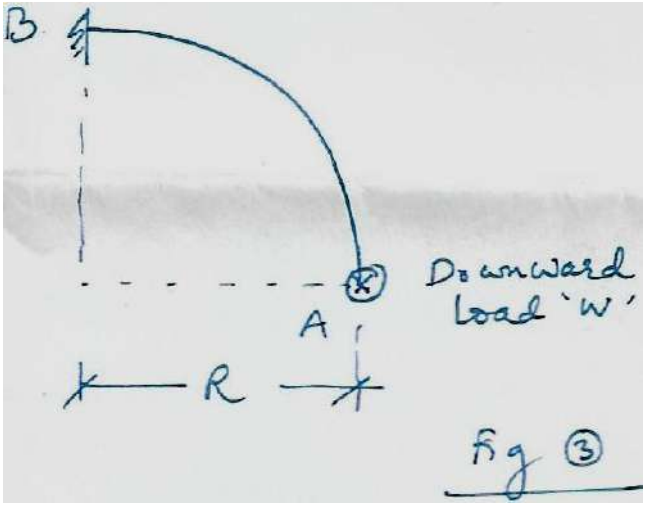


OR

Draw ILD for SF, BM @ midpoint of AB of frame as shown in fig. (2). **12**



Q.2 A quadrant of circle of radius 'R' fixed, at B and free at A as shown in fig. (3). Draw SFD, BMD, TMD, also find vertical deflection of point A. **12**



Q.3 A long beam supported on elastic foundation is subjected to a concentrated clockwise moment 'Mo'. The beam is infinitely long on both the sides of concentrated moment. draw SF and BM diagram. **11**

OR

Draw SF, BM, deflection diagram for a semi-infinite beam on elastic foundation winged at one end and subjected to UDL of 'W' over entire length. **11**

Section – II

Q.4 a propped cantilever beam-column is subjected to an anticlockwise moment 'Mo' at it propped end and an axial compressive force 'P' at both the ends derive expressions for slope at the propped end. **12**

OR

A simply supported beam-column is subjected to an axial compressive force 'P' at both ends and an uniformly distributed load of 'w' throughout its span. Derive expression for maximum deflection and sending moment. **12**

Q.5 Analyze the beam shown in fig. (4) by stiffness method. **12**

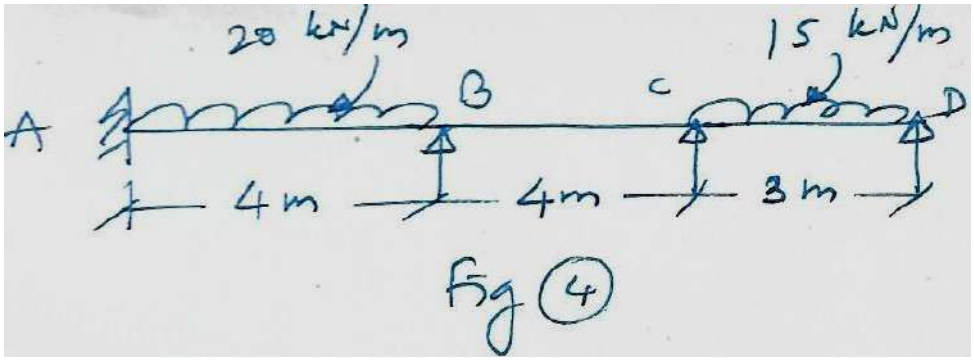


Fig (4)

OR

Analyze frame shown in fig (5) by stiffness method. **12**

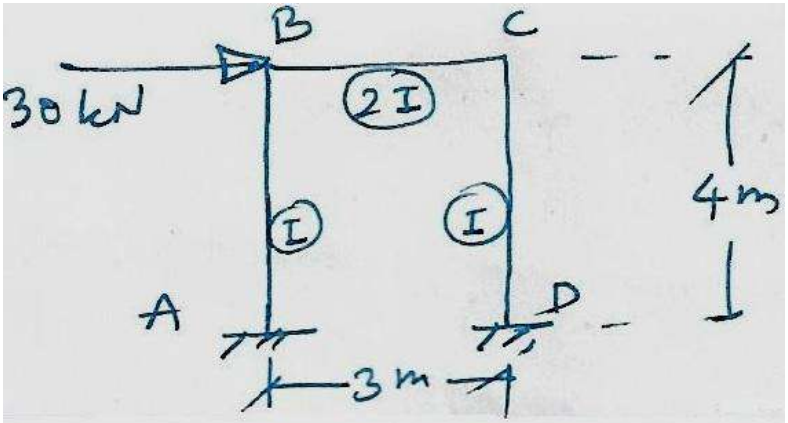


Fig (5)

Q.6 Find forces in all members of pin jointed frame shown in fig (5) by member oriented stiffness method Axial rigidity of all members are indicted in fig (5). **11**

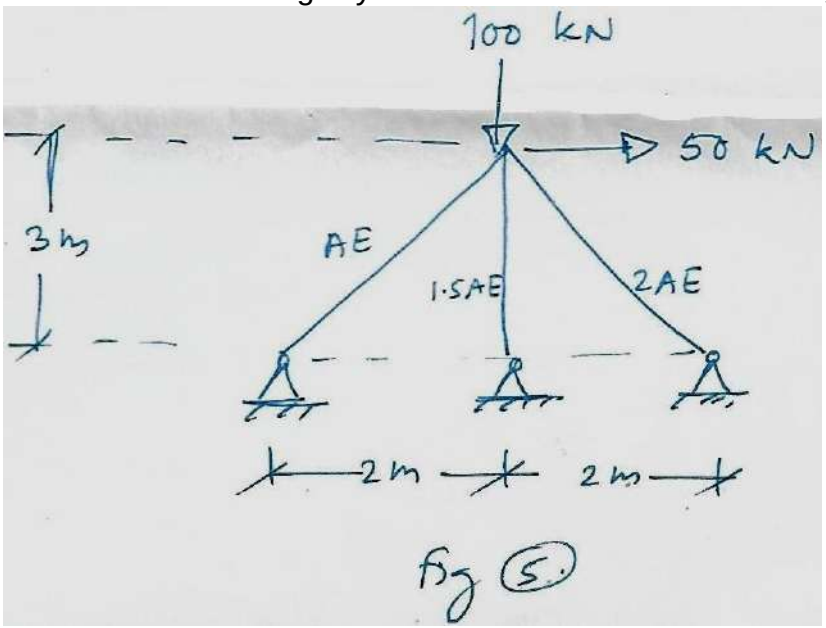


Fig (5)

SLR-FQ-10

Seat No.	

Set P

F.Y. (M.Tech.) (Semester – II) (New) (CBCS) Examination Dec-2019
Civil – (Structures Engineering)
THEORY OF PLATES AND SHELLS

Day & Date: Friday, 06-12-2019 Max. Marks: 70
Time: 10:00 AM To 02:00 PM

Instructions: 1) In section I, Q.No.1 and in Section II, Q.No.4 are compulsory.
2) Solve any one question from remaining two questions from each section.
3) Figures to the right indicate full marks.
4) Assume suitable data, if required and mention it clearly.

Section – I

Q.1	**a)**	Give assumptions in Shell theory. Also define stress resultants.	**06**
	b)	Obtain strain displacement relations for cylindrical shells. Describe boundary conditions.	**12**
Q.2	**a)**	Give classification of plates. Describe plate action against external loading.	**05**
	b)	Obtain fourth degree governing equation for behavior of rectangular plates Under uniformly distributed load of intensity q.	**12**
Q.3	**a)**	Describe Rayleigh-Ritz approach for analysis of plates.	**05**
	b)	Analyse a circular plate of radius ‘a’ supported throughout along its outer edge and subject to uniform moment M.	**12**

Section – II

Q.4	**a)**	Explain Membrane theory of shells.	**08**
	b)	Obtain equations of equilibrium for cylindrical shells using membrane theory.	**10**
Q.5	**a)**	Describe beam theory of bending of shells.	**09**
	b)	Differentiate between beam action and arch action.	**08**
Q.6	**a)**	Write note on Shells of revolution.	**08**
	b)	Describe thermal stresses in plates and shells.	**09**

SLR-FQ-100

Seat No.	

Set P

F.Y. (M.Tech.) (Semester - II) (New) (CBCS) Examination Dec-2019
Computer Science & Engineering
INTERNET OF THINGS

Day & Date: Friday, 06-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Assume suitable data if necessary.
3) Figures to right indicate full marks.

Section - I

Q.1 Attempt any two. **14**

a) What is IoT? List and Explain characteristics of IoT.
b) Describe in detail: IEEE 802.11 WiFi used for IoT.
c) Describe the following terms with their types and examples.
i) Sensors
ii) Actuators

Q.2 Attempt any two **14**

a) Explain IoT Sensor node with the help of block diagram.
b) Draw and Explain Layered/Stack architecture of IoT.
c) Write a note on: Cloud computing for IoT.

Q.3 Describe ZigBee with help of its Architecture and Protocol Layers. **07**

Section – II

Q.4 Attempt any two. **14**

a) Describe the use of IoT in Home Automation.
b) Write a note on: Interfacing of Raspberry pi.
c) How to build a Web API on raspberry pi? Explain.

Q.5 Attempt any two. **14**

a) Write a note on: CISCO M2M platform.
b) Explain and compare between SQL and NoSQL.
c) Describe Axeda and Xively M2M Application development platform.

Q.6 Describe the use of IoT in - Smart Cities. **07**

SLR-FQ-101

Seat No.	

Set P

F.Y. (M. Tech.) (Semester – II) (New) (CBCS) Examination Dec-2019
Computer Science & Engineering
INTERNET ROUTING ALGORITHM

Day & Date: Saturday, 07-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Wherever required draw diagrams and assume data.

Section – I

Q.1 Write answer to any two questions. **10**

a) Draw the diagram depicting protocol layering in IP architecture.

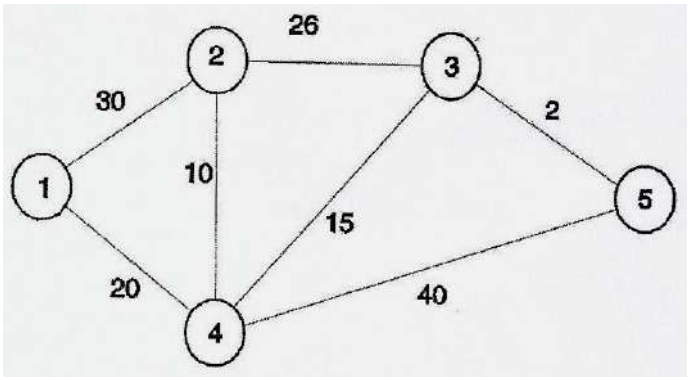
b) What are the main differences between shortest path routing and widest path routing?

c) What is CIDR? Consider IP address 10.21.5.90 that is given to be part of a/17 address block. Determine IP prefix it belongs to in the CIDR notation.

Q.2 Write answer to any two questions. **10**

a) Write a short note on IP Protocol Stack Architecture.

b) Consider the following network topology. The number listed next to the links is assumed to be bandwidth. Determine the widest path from node 2 to node 5 using widest path algorithm, computed at node i (Dijkstra based).



c) Explain working of BGP Protocol

Q.3 a) Explain the concept of widest path Algorithm. **10**

b) What are the primary operational considerations in regard to the RIP protocol? **05**

Section – II

Q.4 Write answer to any two questions: **10**

a) List three differences between a distance vector protocol and a link state protocol.

b) Write a short note on router architecture.

c) What are the possible factors that can cause instability in Internet routing?

Q.5 Write answer to any two questions: **10**

a) What are the basic requirements of Longest Prefix matching algorithm?

b) Write a short note on AS number.

c) List the router bottlenecks and its cause.

Q.6	**a)**	Explain the grid of tries type of two-dimensional packet classification algorithm and state its advantages.	**10**
	b)	Explain shared CPU Architecture.	**05**

SLR-FQ-102

Seat No.	

Set P

F.Y. (M.Tech.) (Semester-II) (New) (CBCS) Examination Dec-2019
Computer Science & Engineering
REINFORCEMENT LEARNING

Day & Date: Monday, 09-12-2019 Max. Marks: 70
Time: 10:00 AM to 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate Full marks.
3) Assume suitable Data where necessary.

Section - I

Q.1 Answer briefly any three. **15**
- **a)** What is Reinforcement learning?
- **b)** List the component of Markov process.
- **c)** Compare between Goal and Reward.
- **d)** Comment on Value function w.r.t Reinforced learning.
- **e)** What are episodes w.r.t Reinforcement learning?

Q.2 Attempt any Two. **10**
- **a)** What is 10 armed Tested problem? Illustrate.
- **b)** What is an action method for Reinforcement learning? How is it carried out?
- **c)** Demonstrate the difference between Reinforcement learning and other learning problems.

Q.3 Attempt any Two. **10**
- **a)** What is the k-armed bandit problem? Derive an expression for expected award.
- **b)** Illustrate the method used for incremental implementation of Reinforcement Learning.
- **c)** Give examples of Reinforcement learning? Illustrate each.

Section – II

Q.4 Answer briefly any Three. **15**
- **a)** What is Dyna? How does it work?
- **b)** How does TD learning work?
- **c)** Define the term ‘Daily double wagering’ and illustrate.
- **d)** Give the exact meanings of the terms ‘Alpha Go’ and ‘Go’.
- **e)** What is Thermal soaring in Reinforcement Learning?

Q.5 Attempt any Two. **10**
- **a)** Compare TD with DP and MC.
- **b)** Explain the steps in modeling a planning process.
- **c)** Give examples of
  1) TD(0)
  2) Wrong model of planning

Q.6 Attempt any Two. **10**
- **a)** Compare TD-Gammon with Samuel’s checker player.
- **b)** What are the key perspectives on machine learning? Elaborate.
- **c)** Define the following w.r.t RL.
  Alpha Go Zero
  Prioritized sweeping
  Trajectory sampling
  On policy TD control

SLR-FQ-103

Seat No.	

Set P

F.Y. (M.Tech.) (Semester-II) (New) (CBCS) Examination Dec-2019
Computer Science & Engineering
ADVANCED CLOUD COMPUTING

Day & Date: Monday, 09-12-2019 Max. Marks: 70
Time: 10:00 AM to 01:00 PM

Instructions: 1) Attempt any five questions from Section I and II.
2) Figures to the right indicate full marks.
3) Assume suitable data if necessary.

Section – I

Q.1	Explain the properties, advantages & disadvantages with respect to Cloud service providers.	**07**
Q.2	Discuses Cloud computing vs. Cluster computing vs. Grid computing.	**07**
Q.3	Explain with example cloud computing Service Models.	**07**
Q.4	Compare public cloud vs. private cloud vs. hybrid cloud.	**07**
Q.5	What is virtualization? Explain different approaches to virtualization.	**07**
Q.6	Explain server, storage, network and virtual machine with respect to resource utilization in cloud computing.	**07**
Q.7	Describe in detail amazon EC2 with EC2 Compute Unit.	**07**

Section – II

Q.1	What is Service Oriented Architecture? Explain different Considerations in SOA.	**07**
Q.2	Elaborate cloud platform and cloud management tasks.	**07**
Q.3	Explain SaaS with Web services, Web 2.0, Web OS.	**07**
Q.4	Write a note on economics of scaling in cloud computing.	**07**
Q.5	Discuss Large Scale Data Processing in cloud computing.	**07**
Q.6	Explain host level and application level security for cloud.	**07**
Q.7	Elaborate the data privacy and security issues in cloud computing.	**07**

SLR-FQ-104

Seat No.	

Set P

F.Y. (M.Tech.) (Semester-II) (New) (CBCS) Examination Dec-2019
Computer Science & Engineering
HIGH PERFORMANCE COMPUTING

Day & Date: Monday, 09-12-2019 Max. Marks: 70
Time: 10:00 AM to 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Section - I

Q.1 Answer any four of the following question. **24**

a) Explain the following models: SIMD and MIMD.
b) Explain the four steps of job of creating a parallel program from a sequential.
c) Write the goals of the parallelization Process.
d) Write a note on Data Parallel Model.
e) What is Concurrent OOP, Actor model and Parallelism in OOP?

Q.2 Answer the following: **06**

Write the Pseudocode describing the sequential equation solver kernel.

Q.3 Answer the following: **05**

With neat diagram explain the two basic mechanism for interprocess communication (IPC).

Section – II

Q.4 Answer any four. **24**

a) What are the three compiler approaches for parallel languages? Explain each of them.
b) Write a note on Atomic Operations, Wait Protocol and Fairness Policies for implementing efficient synchronization schemes.
c) What is cache coherence problem ? Explain with an example.
d) Explain sequential consistency model with neat diagram.
e) Write a note on Latency and Bandwidth .

Q.5 Answer the following: **06**

Explain Binary Semaphores and Counting Semaphores.

Q.6 Answer the following: **05**

What are the three major components of a synchronization event? Explain each one.

SLR-FQ-105

Seat No.	

Set P

F.Y. (M.Tech.) (Semester-II) (New) (CBCS) Examination Dec-2019
Computer Science & Engineering
SOFTWARE DEFINED NETWORK

Day & Date: Monday, 09-12-2019 Max. Marks: 70
Time: 10:00 AM to 01:00 PM

Instructions: 1) Question 1 and 5 are compulsory.
2) Answer any two questions in each Section.
3) Make suitable assumptions if necessary and state them clearly.

Section - I

Q.1 **Answer briefly:** **15**
- **a)** Explain the OSI Layer.
- **b)** Explain the architecture of SDN.
- **c)** Write a note on virtual networking.

Q.2 **a)** Explain distance vector algorithm. **05**
b) Write a short note on different network topologies. **05**

Q.3 **a)** Write a note on OpenFlow. **05**
b) Explain the use case taxonomy. **05**
1) Network Access Control
2) Datacenter Optimization

Q.4 Describe the following properties of SDN. **10**
- **a)** Scalability
- **b)** Reliability

Section - II

Q.5 **Answer briefly:** **15**
- **a)** Explain network as service (NaaS)
- **b)** Explain the following application of SDN: Network Management.
- **c)** Write a note on Network virtual machine.

Q.6 **a)** Explain the following components of virtual machine. **05**
1) DHCP Server
2) Network Adapter
b) Write a short note on bandwidth calendaring. **05**

Q.7 **a)** Write a note on applicability of OpenFlow protocol in SDN controller. **05**
b) Explain network service chaining and network programmability. **05**

Q.8 Write a note on following SDN Controller. **10**
- **a)** POX
- **b)** Floodlight
- **c)** OpenDayLight

SLR-FQ-106

Seat No.	

Set P

F.Y. (M. Tech.) (Semester - II) (New) (CBCS)Examination Dec -2019
Computer Science & Engineering
WIRELESS SENSOR NETWORK

Day & Date: Tuesday,10-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Assume suitable data if necessary.
3) Figures to right indicate full marks.

SECTION - I

Q.1 Solve any three: **24**

a) Discuss hurdles and challenges of Wireless sensor network.
b) Explain sensor node technology.
c) Describe hardware constraints of WSN.
d) Write a note on Campus Applications.

Q.2 **a)** Explain network design issues of wireless sensor network. **03**
b) Write a note on hotspot. **08**

OR

b) Write a note on category 1 wireless sensor network applications. **08**

SECTION – II

Q.3 Solve any three: **24**

a) Explain RF wireless communication in detail.
b) Write a note on block codes.
c) Write a note on demand assigned protocol.
d) Explain Performance Requirements of MAC protocols.

Q.4 **a)** Explain attenuation in detail. **03**
b) What is CODA? Explain in detail. **08**

OR

b) Describe PHY Layer Standards. **08**

SLR-FQ-107

Seat No.	

Set P

F.Y. (M. Tech.) (Semester - II) (New) (CBCS) Examination Dec -2019
Computer Science & Engineering
INFRASTRUCTURE MANAGEMENT

Day & Date: Tuesday,10-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Assume suitable data if necessary.
3) Figures to right indicate full marks.

Section – I

Q.1 Attempt the following questions. **15**
- **a)** Define Infrastructure management. What is the importance of systems management for enterprises?
- **b)** Explain Information technology infrastructure library in detail.
- **c)** What are the different IT services continuity management?

Q.2 Attempt any one of the following questions. **10**
- **a)** Explain the growth of internet, current business demands and IT systems issues.
- **b)** Describe about financial management and costing in service level management.

Q.3 Attempt any one of the following questions. **10**
- **a)** What are IT infrastructure design factors? Also explain about patterns for IT systems management.
- **b)** Explain about capacity management and availability management.

Section – II

Q.4 Attempt the following questions. **15**
- **a)** Explain configuration management in service support and management processes.
- **b)** Describe basics of network security and firewalls.
- **c)** What is Release management?

Q.5 Attempt any one of the following questions. **10**
- **a)** What are incident management and problem management?
- **b)** What are the regulatory issues in infrastructure management? Also explain environmental policies.

Q.6 Attempt any one of the following questions. **10**
- **a)** What is disaster recovery, database & application protection storage and security management?
- **b)** What is urban governance and rural IT infrastructure management?

SLR-FQ-108

Seat No.	

Set P

F.Y. (M. Tech.) (Semester - II) (New) (CBCS) Examination Dec -2019
Computer Science & Engineering
REAL TIME OPERATING SYSTEM

Day & Date: Tuesday, 10-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q.1 from Section – I and Q. 5 from Section –II are compulsory.
2) Attempt any two questions from Q.2 to Q.4 for Section –I and any two questions from Q. 6 to Q.8 for Section –II.
3) Figures to right indicates full marks.

Section – I

Q.1 Give applications of real time systems. **07**

Q.2 **a)** Explain memory access and layout issues. **07**
b) Define CPU utilization factor. Explain example for calculation of CPU Utilization factor. **07**

Q.3 **a)** Explain interrupt only system with example. **07**
b) Explain different types of buffers. **07**

Q.4 **a)** What are coding standards for Real Time operating systems **07**
b) Write short note on exception handling. **07**

Section – II

Q.5 **Define and explain.** **07**
a) Amdahl's law
b) Gustafson's Law

Q.6 **a)** How requirements Validation is done? **07**
b) Explain Petri nets with example. **07**

Q.7 **a)** Explain design using UML. **07**
b) Explain Parnas partitioning. **07**

Q.8 **a)** Explain single server queue model. **07**
b) Analyze memory Utilization giving example. **07**

SLR-FQ-109

Seat No.	

Set P

F.Y. (M.Tech.) (Semester - II) (New) (CBCS) Examination Dec-2019
Computer Science & Engineering
ADVANCES IN DATABASE SYSTEMS

Day & Date: Tuesday,10-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q.No.4 and Q.No.8 are compulsory.
2) Attempt any two from remaining question in each section.
2) Assume suitable data if necessary.
3) Figures to right indicate full marks.

Section – I

Q.1	**a)**	What are the components of workload description?	**06**
	b)	What is index selection and when should we create cluster indexes?	**06**
Q.2	**a)**	What are the choices for managing locks in a distributed DBMS?	**06**
	b)	Discuss deadlock detection in a distributed database. Contrast the centralized, hierarchical and time-out approaches.	**06**
Q.3	**a)**	Explain how the transaction processing monitor manages memory and processor resources more effectively than a typical operating system.	**06**
	b)	Explain the connection between workflow and long-duration transaction.	**06**
Q.4	**a)**	Describe six high-level guidelines for index selection.	**06**
	b)	Why is database tuning important?	**05**

Section – II

Q.5	**a)**	Compare HTML and XML.	**06**
	b)	Explain the structure of an XML document with a simple example.	**06**
Q.6	**a)**	What is spatial index? What are the differences between spatial index and B+ tree?	**06**
	b)	What are the characteristics of spatial data.	**06**
Q.7	**a)**	Explain Hadoop Distributed File System (HDFS).	**06**
	b)	Explain the features of COUCHDB.	**06**
Q.8	**a)**	What are the differences between spatial range queries, nearest neighbour queries and spatial queries?	**06**
	b)	Write a short note on: XSL Transform	**05**

SLR-FQ-11

Seat No.	

Set P

F.Y. (M.Tech.) (Semester – II) (New) (CBCS) Examination Dec-2019
Civil – (Structures Engineering)
SEISMIC DESIGN OF MULTISTORIED BUILDINGS

Day & Date: Saturday, 07-12-2019 Max. Marks: 70
Time: 10:00 AM To 02:00 PM

Instructions: 1) Q. No. 3 and Q. No.6 are compulsory.
2) Solve any one from each section.
2) Figures to the right indicates full marks.
3) Assume suitable data if necessary and state it clearly.
4) Use of IS 1893 is permitted.

Section – I

Q.1 What do you understand by soil liquefaction? What are the factors affecting liquefaction? Explain various remedial to control soil liquefaction. **17**

Q.2 **a)** State and explain the concept of response spectrum & various types of response spectra. **10**
b) What is combined spectrum? What are its characteristics? **07**

Q.3 From first principle derive the governing differential equation for three storied building subjected to ground acceleration $\ddot{y}g$. Idealize & prepare the conceptual model and explain the modal analysis method to solve differential equation. **18**

Section – II

Q.4 What do you understand by a soft storey? How will you reduce failure in soft storey? What are the general code provisions for design of soft storey? **17**

Q.5 Explain the concept of structural health monitoring. What are the systems available for structural health monitoring? **17**

Q.6 A four storied building is to be constructed in a zone IV. For the analysis for earthquake in transverse direction one frame is taken and analyzed as a plane frame as shown in Figure 1. **18**

Determine the lateral forces on this plane frame with the following data:

a) Type of frame: special moment resisting frame.
b) Infill wall: 230 mm thick and its stiffness not considered (Time period without infill's).
c) Imposed load: 2.5 kN/m$^{2.}$
d) Size of columns: 230 mm x 400 mm.
e) Size of beams: 230 mm x 400 mm in both direction.
f) Slab thickness: 125 mm.
g) Foundation: Hard rock.
h) Damping: 5 %.

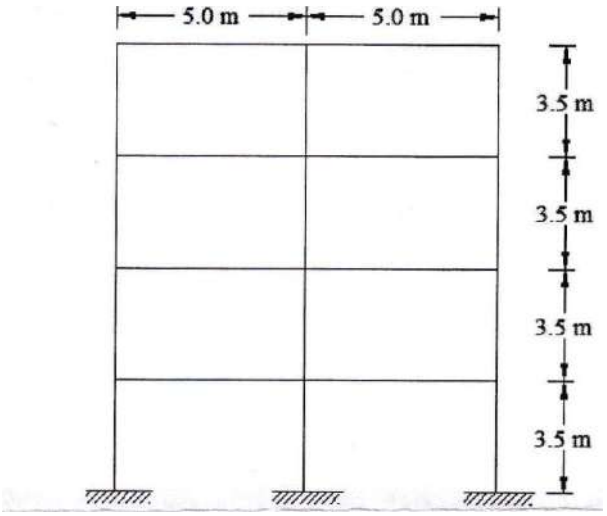


Figure 1

SLR-FQ-110

Seat No.	

Set P

F.Y. M. Tech. (Semester - III) (New) (CBCS) Examination Dec- 2019
Computer Science & Engineering
BUSINESS ANALYTICS

Day & Date: Tuesday, 03-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Assume suitable data if necessary.
3) Figures to right indicate full marks.

Section – I

Q.1 Attempt any two. **14**

a) Explain supervised learning and unsupervised learning with an appropriate example.

b) Write a short note on "Curse of Dimensionality"

c) Describe the concept of multidimensional visualization with an example.

Q.2 Attempt any two. **14**

a) What is dimension reduction? State importance of aggregation and pivot tables.

b) Describe data visualization and state its different uses in details.

c) Explain the concept of data exploration and visualization with an example.

Q.3 What is Business Analytics? State Business analytics process in details. **07**

Section – II

Q.4 Attempt any two. **14**

a) What is classifier? Explain in detail Naive Bayes Classifier.

b) Explain 'K means algorithm' in details.

c) Describe concept of multiple linear regression and state variable selection in linear regression.

Q.5 Attempt any two. **14**

a) State the different advantages and weaknesses of regression trees.

b) Describe performance evaluation and evaluate predictive performance with Naive benchmark.

c) What is clustering? Describe feature selection for clustering by using wrapper models.

Q.6 State the difference between explanatory modelling and predictive modelling of linear regression. **07**

SLR-FQ-111

Seat No.	

Set P

F.Y. M. Tech. (Semester - III) (New) (CBCS) Examination Dec 2019
Computer Science & Engineering
OPERATION RESEARCH

Day & Date: Tuesday, 03-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.No-3 from section-I compulsory. Solve any one questions out of remaining two question from section-I.
2) Q.No-5 from section-II compulsory. Solve any one questions out of remaining two question from section-II.
2) Figures to the right indicate full marks.
3) Assume necessary suitable data, if required.

Section – I

Q.1 a) Explain scope of Operations Research with suitable examples. **05**

b) Determine the Optimal solution to the following LPP using Simples method **12**
Minimise Z = 5× + 3y
Subjected to $2x + 4y \leq 12$
$2x + 2y = 10$
$5x + 2y \geq 10$
x and $y \geq 0$

Q.2 a) Explain Duality in Linear Programming **05**

b) Determine the Optimal solution to the dual of the following LPP. **12**
Maximize Z = 6x + 8y
Subjected to $5x + 2y \leq 20$
$x + 2y \leq 10$
x and $y \geq 0$

Q.3 a) Explain the Monto Carlo Simulation technique. **05**

b) What are the characteristics of the Queuing System? **05**

c) A self service store employs one cashier at its counter. Eight customers arrive on an average every 5 minutes while the cashier can serve 10 customers in the same time. Assuming Poisson distribution for arrival and exponential distribution for service rate, determine: **08**
1) Average number of customers in the queue.
2) Average number of customers in the queue system.
3) Average Waiting time of customers in the queue
4) Probability that there is no customer in the queue.

Section – II

Q.4 a) Explain the various costs associated with Inventory. **05**

b) Write a note on Selective Inventory Management Techniques. **04**

c) A company has a demand of 18000 units per year for a certain item. The company can produce 3000 units per month in its own setup. The setup cost is rupees 500 and holding cost of one unit per month is rupees 0.15. The cost of one unit is rupees 2. Determine; **08**
1) Optimum manufacturing quantity
2) Maximum Inventory Level
3) Total cost of inventory per year

Q.5 **a)** A machine costs rupees 15000. The running cost in rupees over the years of usage is given below. **10**

Year	1	2	3	4	5	6	7
Running cost	2500	3000	4000	5000	6500	8000	10000

Find the Optimum replacement age if the money value is 10% per year.

b) Explain Maximal flow problem with suitable example. **04**

c) Write a note on Group Replacement Policy. **04**

Q.6 **a)** A project consists of the following activities given with their time estimates in weeks. Draw the network and determine the critical path and expected project duration. What is the probability that the project will be completed in expected duration. **12**

Activity	1-2	1-6	2-3	2-4	3-5	4-5	5-8	6-7	7-8
Optimistic time	3	2	6	2	5	3	1	3	4
Most likely time	6	5	12	5	11	6	4	9	19
Pessimistic time	15	14	30	8	17	15	7	27	28

b) Write a note on Resource leveling and Resource Smoothening in project management. **05**

SLR-FQ-112

Seat No.	

Set P

F.Y. M. Tech. (Semester - III) (New) (CBCS) Examination Dec- 2019
Computer Science & Engineering
COST MANAGEMENT OF ENGINEERING PROJECTS

Day & Date: Tuesday, 03-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.1 & Q.5 are compulsory.
2) Solve any 2 questions out of remaining 3 questions from each section.
3) Assume necessary suitable data, if required.

Section – I

Q.1 **a)** Explain Parametric estimating model. **06**
b) Use Three Quarters Rule to estimate the cost of a proposed house with 5 bedrooms. The Current house of 3 bedrooms has a Cost of Rs.3, 75,000/-. **05**

Q.2 **Explain** **12**
a) Cost analysis
b) Two third technique of duration estimate of a proposed project.

Q.3 **Explain** **12**
a) Ration estimating tools.
b) Earned Value Measurement process.

Q.4 **a)** Explain basic administrative structure of a typical cost management system. **06**
b) How to track the Cost and Schedule Performance? **06**

Section – II

Q.5 **Explain**
a) Causes of changes in project. **06**
b) Feed forward techniques. **05**

Q.6 **Write detailed notes on.** **12**
a) Life Cycle Cost
b) Risk management in projects

Q.7 **Explain** **12**
a) Concepts in managing projects for value.
b) Key attributes in value management

Q.8 **Write detailed notes on** **12**
a) Value management process
b) Benefits of Value Management

SLR-FQ-113

Seat No.	

Set P

F.Y. M. Tech. (Semester - III) (New) (CBCS) Examination Dec -2019
Computer Science & Engineering
NON CONVENTIONAL ENERGY

Day & Date: Tuesday, 03-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Section – I

Q.1 Attempt any two of the following. **14**

a) Explain hydroelectric conventional energy source using IGCC power generation?

b) State different types of solar thermal power plant? Explain medium temperature solar power plant?

c) Explain Indian power scenario for hydroelectric power potential?

Q.2 What are the emerging new technologies for the energy conservation and efficiency? **07**

Q.3 Attempt the following. **14**

a) Explain thermal energy storage with sensible heat storage and latent heat storage?

b) What is the transmissivity of cover system of solar thermal energy collector? Derive the derivation of polarization component with its Ray diagram?

Section – II

Q.4 Attempt the following. **14**

a) Explain solar cell efficiency with maximizing the output? What is Fill factor of solar cell?

b) What are the different modes of wind power generation? Explain stand-alone mode of wind power generation?

Q.5 Attempt any one of the following. **07**

a) Explain all types of biomass conversion technologies?

b) Explain estimation of wind energy potential? Also explain its calculation equation?

Q.6 Attempt the following. **14**

a) Explain application of PV system based on PV desalination system?

b) Explain Fuel cell characteristics? And write a note on Alkaline Fuel Cell?

SLR-FQ-12

Seat No.	

Set P

F.Y. (M.Tech.) (Semester-II) (New) (CBCS) Examination Dec-2019
Civil – (Structures Engineering)
DESIGN OF PRESTRESSED CONCRETE STRUCTURES

Day & Date: Monday, 09-12-2019 Max. Marks: 70
Time: 10:00 AM to 02:00 PM

Instructions: 1) Q. No. 3 & Q. No. 5 are compulsory. And solve any one questions from each section.
2) Use of IS 1343 and non- programmable calculator are allowed.
3) Assume suitable data if necessary.
4) Draw neat sketches wherever necessary.

Section – I

Q.1 A pretensioned concrete beam 300 mm x 450 mm in section and is provided with 40 wires of 3 mm diameter distributed uniformly over the section. Initially the wires are tensioned in the prestressing beds with a total pull of 700 kN. Determine the final stress in concrete and the percentage loss of stress in wires. Take E_s = 2.08 x 10^5 N/mm^2, E_c=3.20 x 10^4 N/mm^2, Ultimate creep strain = 32 x 10^{-6} mm/mm per N/mm^2 Shrinkage of concrete = 200 x 10^{-6} Relaxation of steel stress = 4.5% of the initial stress. **17**

Q.2 A PSC beam 400 mm X 800 mm deep. Determine the horizontal, vertical, shear stress and principal stresses. The tendons are placed at an eccentricity of 100 mm. the anchor plate is 300 mm wide and 200 mm deep. Prestressing force in the tendons is 1000 kN. By Magnel's method, find principal stress at Q (600, 600) by considering bottom edge of beam as origin. **17**

x/d	Kq	Kz
0.75	0.251	-2.47
0.76	0.226	-2.33

Q.3 Design a prestressed concrete beam to the following requirements, span=18 m, superimposed load= 32 kN/m and M 35 concrete is used. Safe stress in concrete at transfer of prestress = 0.5f_{ck}, safe stress in concrete due to final prestress fc = 0.4 f_{ck} , total loss of prestress is 18%, allowable tensile stress in concrete = 0.129 $\sqrt{f_{ck}}$, ultimate stress in steel = 1500 N/mm^2, safe stress in steel is 60% of ultimate stress. **18**

Section – II

Q.4 A composite prestressed concrete beam section consisting of a prefabricated stem 300 mm x 800 mm and a cast-in-situ slab of 800 mm x 150 mm. if the differential shrinkage is 1.2 x mm/mm, find the shrinkage stress at the extreme edges of the slab and the stem. Take Ec = 2.75 x 10^{-4} N/mm^2. **17**

Q.5 A post tensioned continuous beam consist of two spans each of 22 meters long. The external loading other than the dead load of the beam is 20.5 kN/m. Design the beam. **18**

Q.6 Design a non - cylinder prestressed concrete pipe of 800 mm and 1000 mm internal diameter to withstand a working hydrostatic pressure of 1.05 N/mm^2, using a 2.5 mm high tensile wire stressed to 1000 N/mm^2 at transfer. Permissible maximum and minimum stresses in concrete at transfer and service loads are 14 and 0.7 N/ mm^2. The loss ratio is 0.8. Calculate also the test pressure required to produce a tensile stress of 0.7 N/ mm^2 in concrete when applied immediately after tensioning and also the winding stress in steel if Es = 210 kN/ mm^2 and Ec = 35kN/mm^2. For both cases motioned above **17**

SLR-FQ-14

Seat No.	

Set P

F.Y (M. Tech.) (Semester-II) (New) (CBCS) Examination Dec-2019
Civil – (Structures Engineering)
CONCRETE COMPOSITES

Day & Date: Monday, 09-12-2019 Max. Marks: 70
Time: 10:00 AM to 02:00 PM

Instructions: 1) Answer any two full questions from each Section.
2) Figures to the right indicate full marks.

Section - I

Q.1 State and explain.
- **a)** Properties of freshly mixed FRC. **09**
- **b)** Mechanical properties of FRC. **09**

Q.2
- **a)** Explains the Advantages and Disadvantages of Ferro cement. **06**
- **b)** Why should FRC be used only with regular reinforcement? **06**
- **c)** Write a note on Workability test on FRC. **06**

Q.3
- **a)** Enlist different methods of construction of Ferro cement concrete. Explain any one in detail. **06**
- **b)** What are the applications of Ferro cement concrete? **06**
- **c)** What are the differences between Fiber Reinforced Concrete and Ferro cement concrete? **06**

Section – II

Q.4
- **a)** State the applications of Silica Fume Concrete. **09**
- **b)** Explain the comparison of important properties of normal concrete with those of polymer concrete. **08**

Q.5
- **a)** Write on Classification of polymer concrete. **06**
- **b)** Explain properties of constituent materials of Polymer Concrete. **05**
- **c)** Write a note on Application of Polymer concrete. **06**

Q.6 What is Silica Fume Concrete and explain in detail its properties with respect to
- **a)** Physical properties **06**
- **b)** Properties of fresh concrete **06**
- **c)** Durability of concrete **05**

SLR-FQ-17

Seat No.	

Set P

F.Y. (M. Tech.) (Semester - II) (New) (CBCS) Examination Dec-2019
Civil – (Structures Engineering)
DESIGN OF RCC BRIDGES

Day & Date: Tuesday, 10-12-2019 Max. Marks: 70
Time: 10:00 AM To 02:00 PM

Instructions: 1) Q. no. 3 and Q. no. 5 are compulsory.
2) Answer any two question from each section.
3) Assume suitable data if necessary.
4) Figures to the right indicate full marks.

Section – I

Q.1 Answer the following.

a) Discuss the importance of bridge. **06**

b) What is economical span? Derive the equation for the same. **05**

Q.2 Design a solid deck slab for Two lane bridge for following data: **11**

a) Effective span- 8 m
b) Carriage way width - 9 m
c) Kerb- 600 x 275 on both side
d) Live load- IRC Class A (Two lane)
e) Wearing coat - 100 mm thick
f) Use M-25 concrete and Fe- 415 steel
g) Use $\alpha = 2.74$

Q.3 A RCC T beam type bridge having deck slab of 225 mm thick, wearing coat of 90 mm thick, three longitudinal girders and five cross girders. Determine the Design bending moment for all the longitudinal girders. Use following additional data, **13**

a) Carriage way width -7.5 m
b) Span of bridge - 14 m
c) Live Load - IRC class AA Tracked
d) Kerb - 600 mm wide, 400 mm deep
e) Web thickness for Longitudinal and cross girder- 300 mm
f) Longitudinal Girder spacing - 2.5m
g) Use M-25 concrete and Fe -415 steel

Q.4 Design a slab panel having size of 3 m x 4 m. Consider IRC class AA tracked loading. Use Pigeaud's chart. Consider thickness of slab as 200 mm and wearing coat thickness as80 mm. Use M- 25 concrete and Fe- 415 steel. Take Pigeuad's coefficient, m1= 0.049, m2= 0.015 for Dead Load case and m1= 0.085, m2= 0.024 for Live Load case. **11**

Section - II

Q.5 Verify the adequacy of pier for the following data: **11**
Top width of pier- 1.8 m, Height of pier upto springing level -8 m, C/C distance of bearing-1.2 m, Side batter 1:14, HFL-1.5 m below the bearing level, Span of bridge-14 m, Self weight of the superstructure =250kN/m, Live load- IRC class AA tracked, Material of pier = M20 concrete.

Q.6 Verify the suitability of abutment as shown in the fig 7.1. Use following data **12**
Density of soil - 17 kN/m^3, Friction angle of soil (Ø) = 30^o. Coefficient of friction - 0.6, Live load IRC class AA tracked.

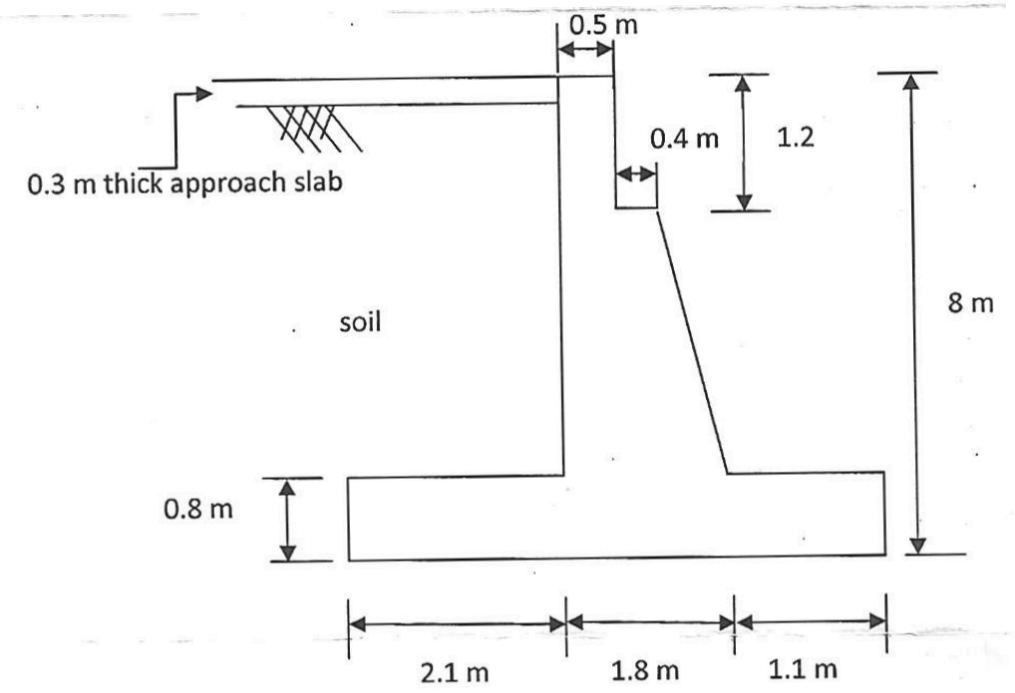


Fig no 7.1

Q.7 **a)** Design a elastomeric unreinforced bearing pad for following data **07**
Vertical load (sustained) = 195 kN,
Vertical load (dynamic) = 100 kN,
Horizontal force = 95 kN
Modulus of rigidity of elastomer- 1 N/mm^2
coefficient of friction = 0.35

b) Write a note on types of expansion joints **05**

Q.8 **Write a note on following (Any three)** **12**

a) Reinforced earth retaining wall
b) Cantilever method of construction
c) Functions of bearing
d) Approach slab
e) Types of bridge inspection

SLR-FQ-2

Seat No.	

Set P

F.Y. (M.Tech.) (Semester - I) (New) (CBCS) Examination Dec- 2019
Civil - (Structures Engineering)
ADVANCED SOLID MECHANICS

Day & Date: Friday, 13-12-2019 Max. Marks: 70
Time: 10:00 AM To 02:00 PM

Instructions: 1) In Section I, Q No. 1 is compulsory. Solve any two from remaining questions.
2) In Section II, Q No. 5 is compulsory. Solve any two from remaining questions.
3) Use of non-programmable calculator is allowed.
4) Numbers to the right hand indicate full marks.
5) Use suitable data if necessary and mention it clearly.

Section – I

Q.1 **a)** State the assumptions made in theory of elasticity. **03**
b) Obtain differential equations of equilibrium for three dimensional problems of elasticity in the Cartesian Coordinate System. **08**

Q.2 **a)** Obtain the Strain compatibility equations for three dimensional problems of elasticity. **07**
b) Explain Plane strain condition. **05**

Q.3 **a)** Write a short note on Airy's stress function **06**
b) Examine whether following functions are Airy's stress functions: **06**
1) $\phi = Ax^2 - By^2$
2) $\phi = A(x^4 - 3x^2y^2)$

Q.4 Derive differential equations of equilibrium for 3-D problems in cylindrical coordinate system. **12**

Section – II

Q.5 **Write short notes on:** **11**
a) Strain hardening
b) Tresca's yield criteria

Q.6 **Explain** **12**
1) Prandtl's Membrane Analogy
2) Saint Venant's Method

Q.7 **a)** Draw bending stress distribution for rectangular beam section in Elastic, Elasto- plastic and Plastic condition. Show the stresses. **06**
b) State & explain Von Mises Criteria. **06**

Q.8 **a)** Describe idealized stress strain curves with neat sketches. **06**
b) Write a note on plastic potential. **06**

SLR-FQ-20

Seat No.	

Set P

F.Y. M. Tech. (Semester - III) (New) (CBCS) Examination Dec- 2019
Civil – Structures Engineering
BUSINESS ANALYTICS

Day & Date: Tuesday, 03-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Assume suitable data if necessary.
3) Figures to right indicate full marks.

Section – I

Q.1 Attempt any two. **14**
- **a)** Explain supervised learning and unsupervised learning with an appropriate example.
- **b)** Write a short note on "Curse of Dimensionality"
- **c)** Describe the concept of multidimensional visualization with an example.

Q.2 Attempt any two. **14**
- **a)** What is dimension reduction? State importance of aggregation and pivot tables.
- **b)** Describe data visualization and state its different uses in details.
- **c)** Explain the concept of data exploration and visualization with an example.

Q.3 What is Business Analytics? State Business analytics process in details. **07**

Section – II

Q.4 Attempt any two. **14**
- **a)** What is classifier? Explain in detail Naive Bayes Classifier.
- **b)** Explain 'K means algorithm' in details.
- **c)** Describe concept of multiple linear regression and state variable selection in linear regression.

Q.5 Attempt any two. **14**
- **a)** State the different advantages and weaknesses of regression trees.
- **b)** Describe performance evaluation and evaluate predictive performance with Naive benchmark.
- **c)** What is clustering? Describe feature selection for clustering by using wrapper models.

Q.6 State the difference between explanatory modelling and predictive modelling of linear regression. **07**

SLR-FQ-21

Seat No.	

Set P

F.Y. M. Tech. (Semester - III) (New) (CBCS) Examination Dec 2019
Civil – Structures Engineering
OPERATION RESEARCH

Day & Date: Tuesday, 03-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.No-3 from section-I compulsory. Solve any one questions out of remaining two question from section-I.
2) Q.No-5 from section-II compulsory. Solve any one questions out of remaining two question from section-II.
2) Figures to the right indicate full marks.
3) Assume necessary suitable data, if required.

Section – I

Q.1 a) Explain scope of Operations Research with suitable examples. **05**

b) Determine the Optimal solution to the following LPP using Simples method **12**

Minimise $Z = 5x + 3y$

Subjected to $2x + 4y \leq 12$

$2x + 2y = 10$

$5x + 2y \geq 10$

x and $y \geq 0$

Q.2 a) Explain Duality in Linear Programming **05**

b) Determine the Optimal solution to the dual of the following LPP. **12**

Maximize $Z = 6x + 8y$

Subjected to $5x + 2y \leq 20$

$x + 2y \leq 10$

x and $y \geq 0$

Q.3 a) Explain the Monto Carlo Simulation technique. **05**

b) What are the characteristics of the Queuing System? **05**

c) A self service store employs one cashier at its counter. Eight customers arrive on an average every 5 minutes while the cashier can serve 10 customers in the same time. Assuming Poisson distribution for arrival and exponential distribution for service rate, determine: **08**

1) Average number of customers in the queue.
2) Average number of customers in the queue system.
3) Average Waiting time of customers in the queue
4) Probability that there is no customer in the queue.

Section – II

Q.4 a) Explain the various costs associated with Inventory. **05**

b) Write a note on Selective Inventory Management Techniques. **04**

c) A company has a demand of 18000 units per year for a certain item. The company can produce 3000 units per month in its own setup. The setup cost is rupees 500 and holding cost of one unit per month is rupees 0.15. The cost of one unit is rupees 2. Determine; **08**

1) Optimum manufacturing quantity
2) Maximum Inventory Level
3) Total cost of inventory per year

Q.5 **a)** A machine costs rupees 15000. The running cost in rupees over the years of usage is given below. **10**

Year	1	2	3	4	5	6	7
Running cost	2500	3000	4000	5000	6500	8000	10000

Find the Optimum replacement age if the money value is 10% per year.

b) Explain Maximal flow problem with suitable example. **04**

c) Write a note on Group Replacement Policy. **04**

Q.6 **a)** A project consists of the following activities given with their time estimates in weeks. Draw the network and determine the critical path and expected project duration. What is the probability that the project will be completed in expected duration. **12**

Activity	1-2	1-6	2-3	2-4	3-5	4-5	5-8	6-7	7-8
Optimistic time	3	2	6	2	5	3	1	3	4
Most likely time	6	5	12	5	11	6	4	9	19
Pessimistic time	15	14	30	8	17	15	7	27	28

b) Write a note on Resource leveling and Resource Smoothening in project management. **05**

SLR-FQ-22

Seat No.	

Set P

F.Y. M. Tech. (Semester - III) (New) (CBCS) Examination Dec- 2019
Civil - Structures Engineering
COST MANAGEMENT OF ENGINEERING PROJECTS

Day & Date: Tuesday, 03-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.1 & Q.5 are compulsory.
2) Solve any 2 questions out of remaining 3 questions from each section.
3) Assume necessary suitable data, if required.

Section – I

Q.1 **a)** Explain Parametric estimating model. **06**
b) Use Three Quarters Rule to estimate the cost of a proposed house with 5 bedrooms. The Current house of 3 bedrooms has a Cost of Rs.3, 75,000/-. **05**

Q.2 **Explain** **12**
a) Cost analysis
b) Two third technique of duration estimate of a proposed project.

Q.3 **Explain** **12**
a) Ration estimating tools.
b) Earned Value Measurement process.

Q.4 **a)** Explain basic administrative structure of a typical cost management system. **06**
b) How to track the Cost and Schedule Performance? **06**

Section – II

Q.5 **Explain**
a) Causes of changes in project. **06**
b) Feed forward techniques. **05**

Q.6 **Write detailed notes on.** **12**
a) Life Cycle Cost
b) Risk management in projects

Q.7 **Explain** **12**
a) Concepts in managing projects for value.
b) Key attributes in value management

Q.8 **Write detailed notes on** **12**
a) Value management process
b) Benefits of Value Management

SLR-FQ-23

Seat No.	

Set P

F.Y. M. Tech. (Semester - III) (New) (CBCS) Examination Dec -2019
Civil – Structures Engineering
NON CONVENTIONAL ENERGY

Day & Date: Tuesday, 03-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Section – I

Q.1 Attempt any two of the following. **14**

a) Explain hydroelectric conventional energy source using IGCC power generation?

b) State different types of solar thermal power plant? Explain medium temperature solar power plant?

c) Explain Indian power scenario for hydroelectric power potential?

Q.2 What are the emerging new technologies for the energy conservation and efficiency? **07**

Q.3 Attempt the following. **14**

a) Explain thermal energy storage with sensible heat storage and latent heat storage?

b) What is the transmissivity of cover system of solar thermal energy collector? Derive the derivation of polarization component with its Ray diagram?

Section – II

Q.4 Attempt the following. **14**

a) Explain solar cell efficiency with maximizing the output? What is Fill factor of solar cell?

b) What are the different modes of wind power generation? Explain stand-alone mode of wind power generation?

Q.5 Attempt any one of the following. **07**

a) Explain all types of biomass conversion technologies?

b) Explain estimation of wind energy potential? Also explain its calculation equation?

Q.6 Attempt the following. **14**

a) Explain application of PV system based on PV desalination system?

b) Explain Fuel cell characteristics? And write a note on Alkaline Fuel Cell?

SLR-FQ-24

Seat No.	

Set P

F.Y. (M. Tech.) (Semester - I) (New) (CBCS) Examination Dec 2019
Mechanical – (Design Engineering)
ADVANCED STRESS ANALYSIS

Day & Date: Wednesday, 11-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q.3 and Q.5 are compulsory
2) Solve any one questions from each section
3) Figures to the right indicate full marks
4) Make necessary assumptions if required.

Section – I

Q.1 a) Explain the plane stress and plane strain problem with suitable examples. **05**

b) Derive the compatibility equation for plane stress problem in Cartesian coordinate. **12**

Q.2 a) Explain the importance of Airy stress function in stress analysis. **05**

b) Investigate what problem of plane stress can be solved by using the following Airy stress function $\emptyset = \frac{3F}{4h}\left[xy - \frac{xy^3}{3h^2}\right] + \frac{P}{2}y^2$ for the region included by $y = \pm h$ and $0 \leq x \leq 1$ **12**

Q.3 a) Derive the equation of equilibrium in polar coordinates for a plane stress problem. **06**

b) Derive the expression for stresses induced in thick cylinder subjected to both internal pressure and external pressure. **12**

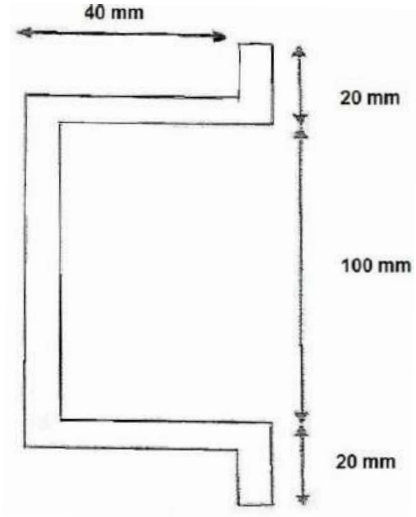
Section – II

Q.4 a) State the assumptions made in theory of contact stresses? **05**

b) Derive the expression for pressure and area of contact in case of two cylindrical rollers in contact subjected to compressive load. **12**

Q.5 a) Explain membrane analogy. **06**

b) Locate the shear centre for the following section having uniform thickness of 4mm. **12**



Q.6 a) Write a note on Rayleigh - Ritz method **05**

b) Derive the expression for torque and angle of twist for a prismatic bar having elliptical cross section. **12**

SLR-FQ-25

Seat No.	

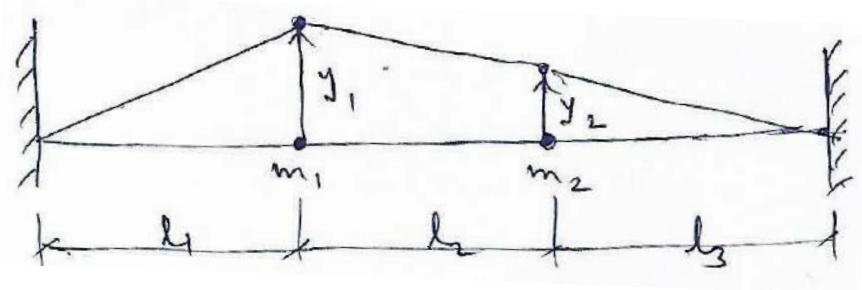
Set P

F.Y (M.Tech.) (Semester-I) (New) (CBCS) Examination Dec-2019
Mechanical – (Design Engineering)
ADVANCED VIBRATIONS AND ACOUSTICS

Day & Date: Friday, 13-12-2019 Max. Marks: 70
Time: 10:00 AM to 01:00 PM

Instructions: 1) Solve any five questions.
2) Figures to the right indicate full marks.
3) Make suitable assumptions if necessary and state them clearly.

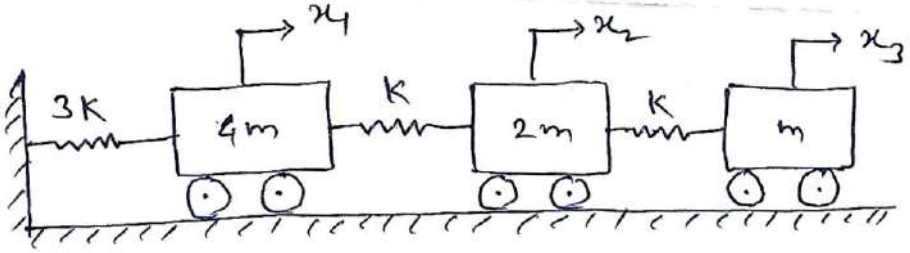
Q.1 **a)** Find out the two natural frequencies and corresponding mode shapes for the system with two masses fixed on a tightly stretched string shown in figure. Here $m_1 = m_2$ & $l_1=l_2=l_3$ **07**



b) Write a note on undamped dynamic vibration absorber. **07**

Q.2 **a)** Derive an equation for the response of a damped system subjected to an impulsive input. **07**

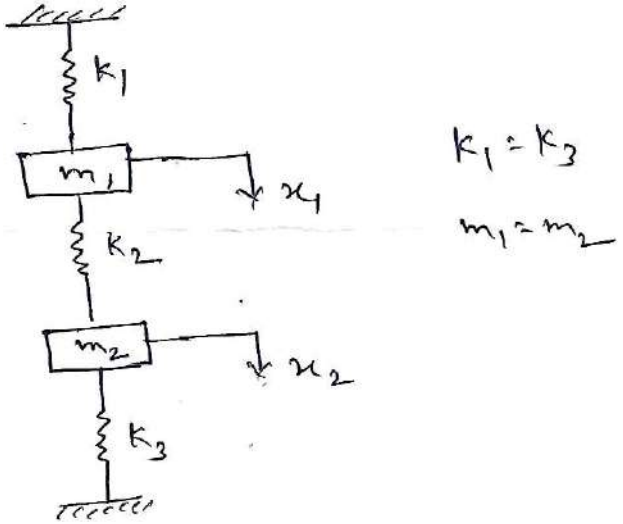
b) A three degree of freedom system is as shown below. Write the equations of motions & represent these equations in matrix form. **07**



Q.3 **a)** Explain forced vibrations with constant harmonic excitation for a single degree of system with damper. What are steady state vibrations & transient vibrations? **07**

b) Explain Matrix iteration method to find natural frequency of multi-degree freedom system. **07**

Q.4 **a)** Derive differential equation of motion for a two degree of freedom system shown in figure. Draw mode shapes. **07**



b) Write a note on longitudinal Vibrations of Bars (a continuous system). **07**

Q.5 **a)** Explain perturbation method for obtaining solutions of nonlinear system. **07**

b) Explain power spectrum & power spectral density in case of random vibrations. **07**

Q.6 **a)** Write a note on forced vibrations with nonlinear spring forces. **07**

b) What are random vibrations? Explain the terms time averaging & expected value. **07**

Q.7 **a)** Explain construction & working of Frahm's reed tachometer. **07**

b) Write note on sound fields. **07**

SLR-FQ-26

Seat No.	

Set P

F.Y. (M.Tech.) (Semester - I) (New) (CBCS) Examination Dec-2019
Mechanical – (Design Engineering)
INDUSTRIAL INSTRUMENTATION

Day & Date: Monday, 16-12-2019 Max. Marks: 70
Time:10:00 AM To 01:00 PM

Instructions: 1) Q.1 and Q.4 are compulsory. Solve any one questions from sections - I.
2) Q.5 and Q.8 are compulsory. Solve any one questions from section - II.
3) Figures to the right indicate full marks.
4) Draw neat sketches wherever necessary.

Section – I

Q.1 **a)** Explain typical applications of instrument systems. **06**
b) Define Resolution, Dead band, Repeatability, back lash, drift and linearity characteristics of the measuring instruments. **06**

Q.2 **a)** Explain use of filters in the instruments. **05**
b) Explain Electromagnetic and Eddy current transducer with neat sketch. **06**

Q.3 **a)** Explain Pneumatic Load Cell with neat sketch. **05**
b) Explain with neat sketch Electromagnetic flow meter. **06**

Q.4 **Write Short notes. (Any Three)** **12**
a) Photo emissive and photo conductive transducers
b) Vibrating string transducer
c) Counting type A-D converter
d) Strain gauge torque transducer

Section – II

Q.5 **a)** Explain elastic force measurement devices. **06**
b) Explain the Knudsun gauge with neat sketch. **06**

Q.6 **a)** Explain Real Time Parallel Analyzer with neat sketch. **05**
b) Explain with neat sketch lobed impeller flow meter. **06**

Q.7 **a)** Explain with neat sketch Resistance Temperature Detectors. **06**
b) Explain with neat sketch sound level meter. **05**

Q.8 **Write short notes. (Any Three)** **12**
a) Data Acquisition System
b) Frequency response characteristics by Transient Testing
c) Atomic Emission spectrometer
d) Electrodynamic micro-phone

SLR-FQ-27

Seat No.	

Set P

F.Y. (M. Tech.) (Semester-I) (New) (CBCS) Examination Dec-2019
Mechanical – (Design Engineering)
RESEARCH METHODOLOGY AND IPR©

Day & Date: Wednesday, 18-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q.No.3 and Q.No.6 are compulsory and solve any one question from remaining question from each section.
2) Figures to right indicate full marks.
3) Make suitable assumptions if required.

Section - I

Q.1 **a)** Explain literature survey in detail. **09**
b) What are different types of research? Explain experimental research with suitable examples. **08**

Q.2 **a)** Explain types of problem solving processes. **09**
b) Define research and explain steps in research. **08**

Q.3 **Write short notes. (Any Three)** **18**
a) Hypothesis
b) Selection of samples
c) Brain Storming
d) Types of data

Section – II

Q.4 **a)** What is patent? And what are rights of patentee? **08**
b) How a patent is granted? **09**

Q.5 **a)** Explain the working of patents and compulsory licensing. **08**
b) Explain the role of WTO in promoting IPR. **09**

Q.6 **Write short notes. (Any Three)** **18**
a) Inventions which are not patentable in India
b) Right arising from trade mark registration
c) PCT application
d) Geographical Indication

SLR-FQ-28

Seat No.	

Set P

F.Y. (M.Tech.) (Semester – I) (New) (CBCS) Examination Dec-2019
Mechanical - (Design Engineering)
COMPUTATIONAL TECHNIQUES IN DESIGN ENGINEERING

Day & Date: Friday, 20-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No.1 and Q. No.4 are compulsory.
2) Solve any one question from each section.
3) Figures to the right indicate full marks.
4) Assume suitable data if required and mention it clearly.
5) Use of non-programmable calculator is allowed.

Section – I

Q.1 a) Find the relative error if the number X = 0.004997 is, **06**
1) truncated to three decimal digits
2) round off to three decimal digits

b) A curve passes through the points (0,18), (1,10), (3,-18) and (6,90). Find the slope of the curve at x = 2. **06**

c) Apply factorization method to solve the equation. **06**

$$3x + 2y + 7z = 4, \quad 2x + 3y + z = 5, \quad 3x + 4y + z = 7$$

Q.2 a) Apply Bessel's formula to find the value of f (27.5) from the table. **09**

x :	25	26	27	28	29	30
f(x) :	4.00	3.846	3.704	3.571	3.448	3.333

b) Predict the mean radiation does at an altitude of 3000 feet by fitting an exponential curve to the given data. **08**

Altitude (x) :	50	450	780	1200	4400	4800	5300
Dose of radiation (y) :	28	30	32	36	51	58	69

The exponential curve is $y=ab^x$.

Q.3 a) Explain weighted least square methods. **05**

b) Explain with suitable example use of mathematical modeling in research problem. **06**

c) Enlist difference between Gauss Seidal and Gauss Jacobi method. **06**

Section – II

Q.4 a) Evaluate $\int_{0.2}^{1.5} e^{-x^2 dx}$ using 3 point Gaussian quadrature. **06**

b) Using Runge Kutta method of order 4, find y for x = 0.1, 0.2, 0.3 given that $\frac{dy}{dx} = xy + y^2,\ y(0) = 1$, continue the solution at x = 0.4 using Milne's method. **12**

Q.5 a) Explain standard five point formula and diagonal five point formula with suitable figure. **06**

b) Using Romberg's method to compute $\int_0^1 \frac{dx}{1+x^2}$ **06**

Correct to 4 decimal places. Take n = 0.5, 0.25 and 0.125

c) Using Picard's process of successive approximations, obtain a solution upto fifth approximation of the equation $\frac{dy}{dx} = y + x$, such that $y = 1$ when $x = 0$ **05**

Q.6 **a)** Solve $U_{xx} + U_{yy} = 0$ over the square mesh of side 4 units, satisfying the following boundary conditions. **09**

1) $u(0, y) = 0$ for $0 \leq y \leq 4$
2) $u(4, y) = 12 + y$ for $0 \leq y \leq 4$
3) $u(x, 0) = 3x$ for $0 \leq x \leq 4$
4) $u(x, 4) = x^2$ for $0 \leq x \leq 4$

b) Compute the value $\int_{0.2}^{1.4} (\sin x - \log x + e^x) dx$ using Simpson's 3/8th rule. **04**

c) Explain Explicit formula to solve the wave equation in hyperbolic formula with suitable figure. **04**

SLR-FQ-3

Seat No.	

Set P

F.Y. (M. Tech.) (Semester - I) (New) (CBCS) Examination Dec-2019
Civil Structural Engineering
STRUCTURAL DYNAMICS

Day & Date: Monday, 16-12-2019 Max. Marks: 70
Time: 10:00 AM To 02:00 PM

Instructions: 1) Solve any five questions.
2) Figures to the right indicate full marks.
3) Assume suitable data if necessary and assume it clearly.

Q.1 Derive an expression for force transmitted to foundation by a reciprocating type of machine exerting an external force $F(t) = F_0 \sin(\omega t)$. Plot the graph of transmissibility vs frequency ratio for the damping ratio R = 5% and 10%. **14**

Q.2 **a)** A sensitive instrument of weight 440 N is to be installed at a location where the vertical acceleration of the ground is 0.1 g at a frequency of 10 Hz. The instrument is mounted on a rubber pad of Stiffeness 15.1 N/mm and damping such that the damping ratio of the system is 10%. Determine. What acceleration is transmitted to the instrument? **10**

b) Write a note of Critical Damping. **04**

Q.3 A SDOF system is subjected to a transient force as shown in the following figure 1. Derive the expression for Magnification factor for the forced as well as free vibration phases. **14**

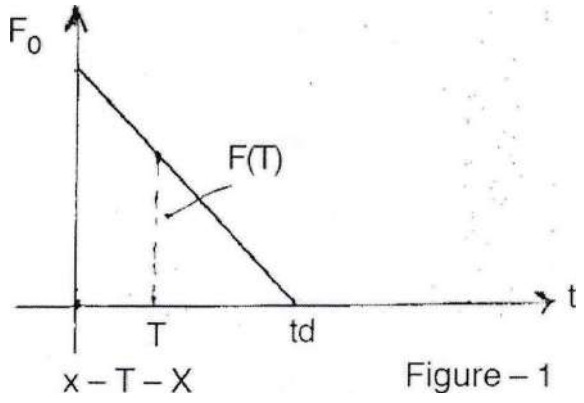


Figure – 1

Q.4 From the first principle derive the governing differential equation of damped forced vibration of a four storey building. **14**

Q.5 A two degree of freedom system has properties as shown in Figure 2. Determine the natural frequency and mode shapes of the system. **14**
Consider $k_1 = 1$ kN/m; $k_2 = 2$ kN/m ; $k_3 = 1.5$kN/m
$m_1 = 100$kg $m_2 = 200$kg

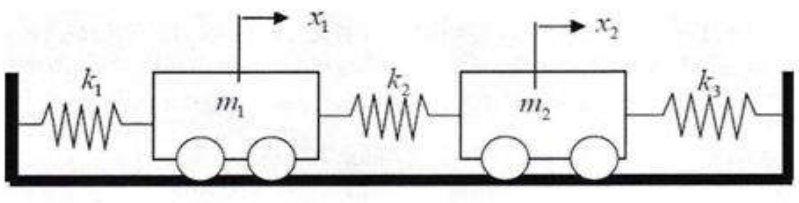


Figure 2

Q.6 Determine first three frequencies and mode shapes for a simply supported continuous beam. **14**

Q.7 **Write notes. (Any Two)** **14**

a) Rayleigh method
b) Orthogonality conditions
c) Mode superposition Method

SLR-FQ-30

Seat No.	

Set P

F.Y. (M.Tech.) (Semester – I) (New) (CBCS) Examination Dec-2019
Mechanical – (Design Engineering)
MECHANICAL SYSTEM DESIGN

Day & Date: Friday, 20-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q.No.1 and Q.No.4 are compulsory and Attempt any one question from Section I.
2) Q.No.5 and Q.No.8 are compulsory and Attempt any one question from section II.
3) Figures to the right indicate full marks.
4) Draw neat sketches wherever necessary.
5) Use of Non-programmable calculator is allowed.

Section – I

Q.1	**a)**	Explain different types of systems based on characteristics in mechanical system design.	**06**
	b)	Explain the terms Need statement and Nature of Engineering Problem.	**06**
Q.2	**a)**	Explain Black Box Approach for system analysis and design.	**05**
	b)	Explain different types of models for mechanical system design.	**06**
Q.3	**a)**	Explain graph modeling and analysis process.	**05**
	b)	Explain the role of models in engineering design.	**06**
Q.4	**a)**	Explain different applications of systems concepts in engineering.	**06**
	b)	Explain system analysis view point and techniques in system analysis.	**06**

Section – II

Q.5	**a)**	What is meant by optimization concept? Explain the optimization process.	**06**
	b)	What is meant by planning horizon?	**06**
Q.6	**a)**	Explain model with two decision variable with no constraints.	**06**
	b)	Explain with block diagram scientific approach to the decision process.	**05**
Q.7	**a)**	What is meant by simulation and when to use simulation?	**06**
	b)	A speaks truth in 75% cases and B in 80% cases. In what percent of cases are they likely to contradict each other in narrating the same incident.	**05**
Q.8	**a)**	Explain solution by the method of Lagrange with a Two decision variable.	**06**
	b)	Consider a function in two variables X_1 and X_2 given as $F(X_1, X_2) = {X_1}^2 - 8X_2 + 2{X_2}^2 - 6X_1 + 30$ Find the optimal values of X_1 and X_2 and verify the values obtained for maxima/minima.	**06**

SLR-FQ-32

Seat No.	

Set P

F.Y. (M.Tech.) (Semester – II) (New) (CBCS) Examination Dec-2019
Mechanical – (Design Engineering)
FINITE ELEMENT METHOD

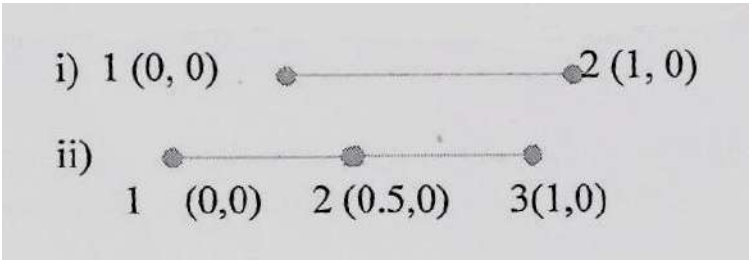
Day & Date: Thursday, 05-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q.3 and Q.4 are compulsory and Attempt any one question from section-I.
2) Q.7 and Q.8 are compulsory and attempt any one question from section – II.
2) Figures to the right indicate full marks.
3) Make suitable assumptions if necessary and state them clearly.

Section – I

Q.1 **a)** Explain the factors affecting accuracy of finite element analysis. **05**
b) Obtain shape functions of following elements **06**

1)



Q.2 **a)** What is meant by discretization of a structure? Discuss the various aspects to be considered while discretising a structure for finite element analysis. **05**
b) Obtain solution of differential equation by using Least Square method. **06**

$$\frac{\partial^2 u}{\partial x^2} + x = 0$$

Take boundary conditions f (0) =f (1) =1

Q.3 **a)** Derive element stiffness matrix and element equation for simple bar element using potential energy method. **08**
b) Explain general procedure of finite element analysis. **04**

Q.4 **Write short note. (any two)** **12**
a) Global stiffness matrix
b) Softwares in FEA
c) Solving and Post processing in Finite element analysis

Section – II

Q.5 **a)** Using Lagrangian Polynomial, find shape function for two noded and four noded bar element. Plot the variation of shape function. **05**
b) Discuss one dimensional, two dimensional and three dimensional elements and their properties. **06**

Q.6 **a)** Compare lumped mass and consistent mass formulation of internal properties. **05**
b) Write short note on Jacobian matrix. **06**

Q.7 **a)** Explain in brief transient analysis and its importance with suitable example. **06**
b) Explain modal analysis using finite element method with suitable example. **06**

Q.8 Write short note. **12**

a) Mesh design
b) Element
c) Convergence requirement

SLR-FQ-33

Seat No.	

Set P

F.Y. (M.Tech.) (Semester - II) (New) (CBCS) Examination Dec-2019
Mechanical – (Design Engineering)
ADVANCED DESIGN ENGINEERING

Day & Date: Friday, 06-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 & Q. No.4 are compulsory. Solve any one question from section - I.
2) Q. No. 5 & Q. No.8 are compulsory. Solve any one question from section - II.
2) Figures to the right indicated full marks.
3) Assume necessary data, if required.

Section – I

Q.1 **a)** Describe the cam mechanism and explain any two types of cams with neat sketches and applications. **04**

b) Plot SVAJ diagram of cycliodal cam and find the maximum value of each function for the following data. **08**
Low dwell at zero displacement in 90^o
Rise of 25 mm for 90^o
High dwell at 25 mm for 90^o
Fall by 25 mm for 90^o
cam velocity = 2π radians/sec

Q.2 **a)** Explain the effect of temperature and pressure on viscosity. **04**

b) The following data refers to a 360° hydrodynamic journal bearing. **07**

Radial load	= 3200 N
journal speed	=1490 rpm
Radial clearance	= 50 microns
diameter of the journal	= 50 mm
length of bearing	= 50 mm
viscosity of lubricant	= 25 cP

Calculate
i) The Sommerfeld number
ii) The minimum oil film thickness
iii) The co-efficient of friction
iv) Power lost in friction
Use the standard data as : For S = 0.121, ho/c = 0.4, (r/c)f = 3.22

Q.3 **a)** Derive the Reynold's equation for two dimensional flow. **06**

b) Explain the importance of tribology in design. **05**

Q.4 **Write short notes.** **12**
a) Archard's theory of Adhesive wear
b) Bowden and Tabor's theory of friction of simple adhesion

Section – II

Q.5 **a)** Explain high cycle and low cycle fatigue with practical applications. **04**

b) The work cycle of a mechanical component subjected to completely reversed bending stresses consists of the following three elements. **08**

i) 350 N/mm^2 for 85% of time

ii) 400 N/mm^2 for 12% of time

iii) 500 N/mm^2 for 3% of time

The material for the component is steel (Sut=660N/mm^2) and corrected endurance strength of the component is 280N/mm^2. Determine the life of the component.

Q.6 **a)** Derive the expression Z(t) R(t) = f(t) with usual notation. **05**

b) Explain working of hydrostatic bearing with its advantages and disadvantages. State the applications. **06**

Q.7 In the reliability testing of 100 specimen components, following failure frequencies were observed. The total test period was of 8 hours. **11**

Time interval	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8
No. of failures	4	15	20	34	11	9	4	3

Find the values of failure density, hazard rates and reliability.

Q.8 **Write notes.** **12**

i) Design for manufacturing

ii) Systems reliability

SLR-FQ-34

Seat No.	

Set P

F.Y. (M.Tech.) (Semester – II) (New) (CBCS) Examination Dec-2019
Mechanical – (Design Engineering)
INDUSTRIAL PRODUCT DESIGN

Day & Date: Saturday, 07-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Attempt any five questions.
2) Figures to the right indicate full marks.
3) Make suitable assumptions if required.

Q.1	**a)**	Explain in detail the process of concept development**.**	**07**
	b)	How to assess the quality of Industrial design?	**07**
Q.2	**a)**	Compare requirements of industrial products with consumer products. In what way they differ from each other?	**07**
	b)	Explain role of setting specification and market requirements in product design.	**07**
Q.3	**a)**	Explain the methodology for adopting anthropometric data for various product design.	**07**
	b)	Discuss the visual effect of line and form for cars and sport vehicles.	**07**
Q.4	**a)**	Discuss the aspect of ergonomic design of radial drilling machine.	**07**
	b)	How the creative ideas are generated with the help of brain storming session? How it is effectively conducted?	**07**
Q.5	**a)**	List the aspects of manufacturing operations that will lower the cost of products.	**07**
	b)	Write short note on Value Analysis and Cost reduction.	**07**
Q.6	**a)**	What is concept of Design for environment? Explain ‘Design for recycling’.	**07**
	b)	What is meant by rapid prototyping? What are different methods of rapid prototyping?	**07**
Q.7	**Write short note (any two)**		**14**
	a)	Creative thinking.	
	b)	Mechanics of seeing with suitable examples.	
	c)	Quality Function Deployment (QFD)	

SLR-FQ-35

Seat No.	

Set P

F.Y. (M.Tech.) (Semester-II) (New) (CBCS) Examination Dec-2019
Mechanical – (Design Engineering)
THEORY AND ANALYSIS OF COMPOSITE MATERIALS

Day & Date: Monday, 09-12-2019 Max. Marks: 70
Time: 10:00 AM to 01:00 PM

Instructions: 1) Q. No. 3 & Q. No. 6 are compulsory. And solve any one questions from each section.
2) Figures to right indicate full marks.
3) Make suitable assumptions if required.

Section - I

Q.1 Solve the following questions.

a) Write the elements of the transformed reduced stiffness matrix for a 60^o angle lamina of graphite/epoxy. **09**

b) Write the compliance and stiffness matrix for monoclinic material. **05**

c) A displacement field in a body is given by **03**

$u = 10^{-5}(x^2 + 6y + 7xy)$

$v = 10^{-5}(yz)$

$w = 10^{-5}(xy + yz^2)$

Find the statement of strain at (x,y,z) = (1,2,3).

Q.2 Solve the following questions.

a) Find the in-plane shear modulus of a glass/epoxy lamina with a 70% fiber volume fraction. Use properties of glass and epoxy as (E_f= 85GPa., E_m = 3.4GPa, μ_f=0.2, μ_m= 0.3) **07**

b) Explain in detail Tsa-Hill theory and Tsai, Wu tensor theory. **07**

c) Evaluate the elastic moduli for orthotropic material. **03**

Q.3 Write short notes.

a) Selection of composite material **05**

b) Two - dimensional relationship of compliance and stiffness matrix **05**

c) Stress-strain relations for Plane Stress in an Orthotropic material **05**

d) Pre-pegs **03**

Section – II

Q.4 Solve the following questions.

a) Derive stress-strain relations for a composite laminate. **07**

b) Write the steps for analyzing a laminated composite subjected to the applied forces and moments **07**

c) Explain open and closed mould processing. **03**

Q.5 Solve the following questions.

a) Describe the fracture Analysis of Composite Materials. **07**

b) Derive the governing equations for bending **06**

c) Explain the Inter-laminar Stresses. **04**

Q.6 Write short notes.

a) Classical Lamination Theory **05**

b) Open and closed mould processing **03**

c) Principles of fracture mechanics **05**

d) Introduction to Design of Composite Structures **05**

SLR-FQ-36

Seat No.	

Set P

F.Y. (M.Tech.) (Semester-II) (New) (CBCS) Examination Dec-2019
Mechanical – (Design Engineering)
ENGINEERING DESIGN OPTIMIZATION

Day & Date: Monday, 09-12-2019 Max. Marks: 70
Time: 10:00 AM to 01:00 PM

Instructions: 1) Assume suitable data wherever necessary
2) Figures to the right indicate full marks.
3) Solve any five questions out of the following.

Q.1	**a)**	Explain in detail parameter (static) & trajectory (dynamic) optimization problems. Also explain integer programming problem.	**07**
	b)	Determine the maximum & minimum values of the function. $f(x) = 12x^5 - 45x^4 + 40x^3 + 5$	**07**
Q.2	**a)**	Give engineering applications of optimization.	**07**
	b)	Explain necessary conditions for a single variable optimization problem. Discuss about this theorem.	**07**
Q.3	**a)**	Explain solution of a system of linear simultaneous equations.	**07**
	b)	Write a note on exhaustive search of nonlinear programming problem -one dimensional methods.	**07**
Q.4	**a)**	Explain standard form of linear programming problem.	**07**
	b)	Explain the procedure of unrestricted search of nonlinear programming problem - one dimensional methods.	**07**
Q.5	**a)**	Explain random search method for nonlinear programming problem-constrained optimization techniques.	**07**
	b)	Explain purpose and applications of optimum design.	**07**
Q.6	**a)**	Explain grid search method.	**07**
	b)	Write a note on sequential linear programming problem.	**07**
Q.7	**a)**	Write a note on global optimization concepts and methods for optimum design.	**07**
	b)	Write a note on optimization of design of mechanical systems.	**07**

SLR-FQ-37

Seat No.		Set	P

F.Y. (M.Tech.) (Semester - II) (New) (CBCS) Examination Dec-2019
Mechanical – (Design Engineering)
INDUSTRIAL TRIBOLOGY

Day & Date: Monday, 09-12-2019 Max. Marks: 70
Time: 10:00 AM to 01:00 PM

Instructions: 1) Question 1 and Question 5 are compulsory.
2) Solve any two questions from each section.
3) Figures to the right indicate full marks.
4) Assume necessary data, if required.

Section - I

Q.1 a) **Write short notes.** **08**
1) Magnet Bearing
2) Rolling Element Bearing

b) Using Stribeck's curve explain range and types of lubrication modes. **05**

Q.2 a) Derive Petroff's equation. What are its limitations? **07**

b) Explain Principle of hydrodynamic lubrication in journal bearing. **04**

Q.3 a) Derive an expression for flow rate through rectangular slot. What are assumptions made while deriving the equation? **07**

b) Discuss different types of energy losses in hydrostatic bearings. **04**

Q.4 **Explain the following.**
1) Significance of Somerfield Number. **04**
2) Tribological properties of lubricants. **04**
3) Piston Pin lubrication. **03**

Section - II

Q.5 a) Derive an expression for pressure distribution of squeeze film lubrication between parallel rectangular plates. Also evaluate instantaneous load carrying capacity for given parallel rectangular plates. **08**

b) Differentiate between squeeze film lubrication and hydrodynamic lubrication. **05**

Q.6 a) Derive Reynolds equation for aerodynamic bearings under steady state. **07**

b) Analysis of short Bearing under dynamic condition. **04**

Q.7 Using ErtelGrubin theory derive relation **11**

$$\frac{h_0}{R} = 1.19\left[\frac{\mu_o U\alpha}{R}\right]^{\frac{8}{11}}\left[\frac{ELR}{W}\right]^{\frac{1}{11}}$$

Q.8 **Briefly discuss.**
a) Mechanics of tyre road interactions. **06**
b) Lubrication of gear. **05**

SLR-FQ-38

Seat No.	

Set P

F.Y. (M.Tech.) (Semester-II) (New) (CBCS) Examination Dec-2019
Mechanical – (Design Engineering)
ADVANCED ENGINEERING MATERIALS

Day & Date: Monday, 09-12-2019 Max. Marks: 70
Time: 10:00 AM to 01:00 PM

Instructions: 1) Q. No. 3 & Q. No. 6 are compulsory. And solve any one questions from each section.
2) Figures to right indicate full marks.
3) Make suitable assumptions if required.

Section - I

Q.1 **a)** Draw neat sketch of Fe-Fe3C diagram. Explain all the important temperatures, reactions and phases. **09**

b) What are different types of heat treatment? Explain hardening in detail. **08**

Q.2 **a)** Explain mechanical, thermal and thermo-mechanical compacting process. **09**

b) Explain effect of particle size on thermal, mechanical, electrical, magnetic and optical properties of the nanomaterial. **08**

Q.3 **Write short notes. (Any Three)** **18**

a) Sintering theories and mechanisms
b) Classification of composite materials
c) Soft lithography
d) Copper alloy

Section – II

Q.4 a) Explain factors affecting on electrical resistivity with Resistivity Mixture rule. **08**

b) Explain Shape Memory alloys with properties and applications. **09**

Q.5 a) Explain Effect of Chemical Forces on Physical properties in ceramic materials. **09**

b) Give the significance of Natural polymers with application. **08**

Q.6 **Write short notes. (Any Three)** **18**

a) Soft and Hard Magnetic materials
b) Thermal Expansion & Surface Energy of ceramic material
c) Epoxy resins and Polyurethanes
d) Types, properties and applications of Plastics

SLR-FQ-39

Seat No.	

Set P

F.Y. (M. Tech.) (Semester-II) (New) (CBCS) Examination Dec-2019
Mechanical – (Design Engineering)
ENGINEERING FRACTURE MECHANICS

Day & Date: Tuesday, 10-12-2019 Max. Marks: 70
Time: 10:00 AM to 01:00 PM

Instructions: 1) Q. No. 1 and Q. No. 5 is compulsory.
2) Answer any one questions from each section.
3) Neat diagrams must be drawn wherever necessary.
4) Figures to right indicate full marks.
5) Use of electronic calculator is allowed.
6) Assume suitable data if necessary.

Section - I

Q.1 **a)** Discuss on the different modes of crack opening. **08**

b) A 75 cm wide steel plate has a central crack of length 2a = 10 cm. The plate is 5 mm thick. The plate is pulled to fracture and the fracture load is 800 KN. Determine **10**
1) The stress intensity factor assuming a/W as small.
2) The value of fracture resistance R. Take E = 207 GPa
3) Using these results, calculate the residual strength of a plate with an edge of crack length a = 5 cm. The width of the plate W = 12.5 cm. Check for collapse. Use $\alpha = 2.1$, and $б_{yp}$ = 480 MPa.

Q.2 **a)** Explain the Griffith's energy balance approach to identify catastrophic failure of a material. **06**

b) Explain Irwin's Fracture Criterion. **06**

c) Explain microscopic and macroscopic failure mode related to fracture mechanics. **05**

Q.3 **a)** Draw and enlist the Stress Intensity Factor (SIF) for different geometry. **05**

b) Estimate the failure load under uniaxial tension for centre cracked panel of aluminum alloy of width 500 mm and thickness 4 mm for the following values of crack length 2a = 20 mm, 2a = 100 mm. Yield stress $б_y$= 350 MPa and fracture toughness K_{Ic} =70 MPa $\sqrt{m}$. **08**

c) Differentiate between ductile and brittle fracture. **04**

Section – II

Q.4 **a)** A large thick plate contains a crack of length $2a_0$ and is subjected to a constant amplitude tensile cyclic stress normal to the crack with maximum stress σ_{max} = 200 MPa and stress range $\Delta\sigma = \sigma_{max} - \sigma_{min}$, $\sigma_{min} = 0$. **10**

The fatigue crack growth is governed by equation $\frac{da}{dN} = 3.9 \times 10^{-14}(\Delta k)^{3.7}$ where $\frac{da}{dN}$ is expressed in m/cycle and ΔK in $\text{MPa}\sqrt{m}$.
Determine.
1) a_f
2) Determine the fatigue lifetime of the plate for $2a_0$ = 2 mm. Use KIc = 24 MPa√m, and use units Δσ MPa, K : MPa√ m, length: m in all your calculations.

b) Differentiate between 'safe life' and 'damage tolerance' design methodologies. **07**

Q.5 Write short note on following. **18**

a) J integral

b) Paris law

c) Crack tip opening displacement (CTOD)

Q.6 **a)** A large centre-cracked plate containing an initial crack of length $2a_0$ =10 mm is subjected to constant amplitude cyclic tensile stress ranging between a minimum value of 100 MPa and maximum value of 200 MPa. Assuming fatigue crack growth rate is governed by equation $\frac{da}{dN} = 0.42 \times 10^{-11}(\Delta k)^3\ (m/cycle)$. **10**

1) calculate crack growth rate when crack length has the following values 2a = 10mm, 30mm, 50mm. Assuming further that the relevant fracture toughness is 60 MPa, $\sqrt{m}$, estimate the number of cycles to failure.

b) Explain with suitable figures different stages of fatigue crack initiation and propagation. **07**

SLR-FQ-4

Seat No.	

Set P

F.Y. (M. Tech.) (Semester-I) (New) (CBCS) Examination Dec-2019
Civil – (Structures Engineering)
RESEARCH METHODOLOGY AND IPR©

Day & Date: Wednesday, 18-12-2019 Max. Marks: 70
Time: 10:00 AM To 02:00 PM

Instructions: 1) Q.No.3 and Q.No.6 are compulsory and solve any one question from remaining question from each section.
2) Figures to right indicate full marks.
3) Make suitable assumptions if required.

Section - I

Q.1 **a)** Explain literature survey in detail. **09**
b) What are different types of research? Explain experimental research with suitable examples. **08**

Q.2 **a)** Explain types of problem solving processes. **09**
b) Define research and explain steps in research. **08**

Q.3 **Write short notes. (Any Three)** **18**
a) Hypothesis
b) Selection of samples
c) Brain Storming
d) Types of data

Section – II

Q.4 **a)** What is patent? And what are rights of patentee? **08**
b) How a patent is granted? **09**

Q.5 **a)** Explain the working of patents and compulsory licensing. **08**
b) Explain the role of WTO in promoting IPR. **09**

Q.6 **Write short notes. (Any Three)** **18**
a) Inventions which are not patentable in India
b) Right arising from trade mark registration
c) PCT application
d) Geographical Indication

SLR-FQ-41

Seat No.	

Set P

F.Y. (M. Tech.) (Semester-II) (New) (CBCS) Examination Dec-2019
Mechanical – (Design Engineering)
DESIGN FOR MANUFACTURE AND ASSEMBLY

Day & Date: Tuesday, 10-12-2019 Max. Marks: 70
Time: 10:00 AM to 01:00 PM

Instructions: 1) Attempt any five questions from the following
2) Figures to the right indicate full marks.
3) Support the answer by neat sketches wherever necessary.

Q.1	**a)**	Distinguish between the following with suitable sketch. 1) Recycling 2) Remanufacturing	**07**
	b)	Explain with suitable example about the environmental objective in DFMA.	**07**
Q.2	**a)**	Explain in brief various elements of the manufacturing cost of product.	**07**
	b)	Elaborate in detail design for energy efficiency with one example.	**07**
Q.3	**a)**	Describe in detail about design features to facilitate machining drill and milling cutters.	**07**
	b)	Explain with one suitable example design consideration in casting and forging.	**07**
Q.4	**a)**	Is it practical to design a product with 100% assembly efficiency what conditions would have to be met. Can you think of any products with very high (greater than 75%) assembly efficiency - explain in brief.	**07**
	b)	Explain in brief about computer applications for DEMA.	**07**
Q.5	**a)**	Explain in brief about multi station assembly and automated assembly with one example.	**07**
	b)	Explain component design for blanking and pricing operation.	**07**
Q.6	**a)**	Sketch and explain how to choose parting line for forging design	**07**
	b)	Discuss the effect of thermal stress in weld joints and importance of pre and post treatment for the same joints.	**07**
Q.7	**a)**	List out and explain the effect of casting discontinuities on the properties of a casted product.	**07**
	b)	Explain in brief about. 1) Identification of uneconomical design 2) Modifying the design 3) Group Technology	**07**

SLR-FQ-42

Seat No.	

Set P

F.Y. (M. Tech.) (Semester - II) (New) (CBCS) Examination Dec-2019
Mechanical – (Design Engineering)
ANALYSIS AND SYNTHESIS OF MECHANISMS AND MACHINE

Day & Date: Tuesday, 10-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 and Q. No. 6 are compulsory. Attempt any two questions from remaining questions of each section.
2) Assume suitable data if necessary and mention it clearly.
3) Figures to the right indicates full marks.
4) Use non programmable calculators is allowed.

Section – I

Q.1 **a)** Explain Kutzbach & Grubler criteria. **05**
b) A bar mechanism is to be designed to generate the function $y=x^{1.8}$ for an interval in x from 1 to 5 .The input link is to start from $315^{o}$and is to range of 90^{o}, the output link is to start from 20^{o} and is to have a range of 70^{o} .Use three point Chebyshev spacing by algebraic method. **08**

Q.2 **a)** Explain cam & follower synthesis by three accuracy point. **05**
b) Explain Algebraic method of synthesis using complex number. **06**

Q.3 **a)** Explain pole triangle. **05**
b) Explain the procedure to find circle point and circle point curves. **06**

Q.4 **Write notes on the following:** **11**
a) Task of kinematic synthesis
b) Roberts – Chebyshev theorem

Section – II

Q.5 **a)** Explain the symmetrical coupler curve. **05**
b) Explain the procedure for construction of circle point. **06**

Q.6 **a)** Discuss the analysis of spatial linkage by matrix method. **07**
b) Derive Euler-Savary equation for a Four-bar linkage. **06**

Q.7 **a)** Explain cubic of stationary curvature. **05**
b) Explain Bobillier construction. **06**

Q.8 **Write notes on the following:** **11**
a) Computer added design of Mechanism used in synthesis
b) Denavit -Harternberg Parameter

SLR-FQ-43

Seat No.	

Set P

F.Y. M. Tech. (Semester - III) (New) (CBCS) Examination Dec- 2019
Mechanical – Design Engineering
BUSINESS ANALYTICS

Day & Date: Tuesday, 03-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Assume suitable data if necessary.
3) Figures to right indicate full marks.

Section – I

Q.1 Attempt any two. **14**
- **a)** Explain supervised learning and unsupervised learning with an appropriate example.
- **b)** Write a short note on "Curse of Dimensionality"
- **c)** Describe the concept of multidimensional visualization with an example.

Q.2 Attempt any two. **14**
- **a)** What is dimension reduction? State importance of aggregation and pivot tables.
- **b)** Describe data visualization and state its different uses in details.
- **c)** Explain the concept of data exploration and visualization with an example.

Q.3 What is Business Analytics? State Business analytics process in details. **07**

Section – II

Q.4 Attempt any two. **14**
- **a)** What is classifier? Explain in detail Naive Bayes Classifier.
- **b)** Explain 'K means algorithm' in details.
- **c)** Describe concept of multiple linear regression and state variable selection in linear regression.

Q.5 Attempt any two. **14**
- **a)** State the different advantages and weaknesses of regression trees.
- **b)** Describe performance evaluation and evaluate predictive performance with Naive benchmark.
- **c)** What is clustering? Describe feature selection for clustering by using wrapper models.

Q.6 State the difference between explanatory modelling and predictive modelling of linear regression. **07**

SLR-FQ-44

Seat No.	

Set P

F.Y. M. Tech. (Semester - III) (New) (CBCS) Examination Dec 2019
Mechanical – Design Engineering
OPERATION RESEARCH

Day & Date: Tuesday, 03-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.No-3 from section-I compulsory. Solve any one questions out of remaining two question from section-I.
2) Q.No-5 from section-II compulsory. Solve any one questions out of remaining two question from section-II.
2) Figures to the right indicate full marks.
3) Assume necessary suitable data, if required.

Section – I

Q.1 a) Explain scope of Operations Research with suitable examples. **05**

b) Determine the Optimal solution to the following LPP using Simples method **12**

Minimise $Z = 5x + 3y$

Subjected to $2x + 4y \leq 12$

$2x + 2y = 10$

$5x + 2y \geq 10$

x and $y \geq 0$

Q.2 a) Explain Duality in Linear Programming **05**

b) Determine the Optimal solution to the dual of the following LPP. **12**

Maximize $Z = 6x + 8y$

Subjected to $5x + 2y \leq 20$

$x + 2y \leq 10$

x and $y \geq 0$

Q.3 a) Explain the Monto Carlo Simulation technique. **05**

b) What are the characteristics of the Queuing System? **05**

c) A self service store employs one cashier at its counter. Eight customers arrive on an average every 5 minutes while the cashier can serve 10 customers in the same time. Assuming Poisson distribution for arrival and exponential distribution for service rate, determine: **08**

1) Average number of customers in the queue.
2) Average number of customers in the queue system.
3) Average Waiting time of customers in the queue
4) Probability that there is no customer in the queue.

Section – II

Q.4 a) Explain the various costs associated with Inventory. **05**

b) Write a note on Selective Inventory Management Techniques. **04**

c) A company has a demand of 18000 units per year for a certain item. The company can produce 3000 units per month in its own setup. The setup cost is rupees 500 and holding cost of one unit per month is rupees 0.15. The cost of one unit is rupees 2. Determine; **08**

1) Optimum manufacturing quantity
2) Maximum Inventory Level
3) Total cost of inventory per year

Q.5 **a)** A machine costs rupees 15000. The running cost in rupees over the years of usage is given below. **10**

Year	1	2	3	4	5	6	7
Running cost	2500	3000	4000	5000	6500	8000	10000

Find the Optimum replacement age if the money value is 10% per year.

b) Explain Maximal flow problem with suitable example. **04**

c) Write a note on Group Replacement Policy. **04**

Q.6 **a)** A project consists of the following activities given with their time estimates in weeks. Draw the network and determine the critical path and expected project duration. What is the probability that the project will be completed in expected duration. **12**

Activity	1-2	1-6	2-3	2-4	3-5	4-5	5-8	6-7	7-8
Optimistic time	3	2	6	2	5	3	1	3	4
Most likely time	6	5	12	5	11	6	4	9	19
Pessimistic time	15	14	30	8	17	15	7	27	28

b) Write a note on Resource leveling and Resource Smoothening in project management. **05**

SLR-FQ-45

Seat No.	

Set P

F.Y. M. Tech. (Semester - III) (New) (CBCS) Examination Dec- 2019
Mechanical – Design Engineering
COST MANAGEMENT OF ENGINEERING PROJECTS

Day & Date: Tuesday, 03-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.1 & Q.5 are compulsory.
2) Solve any 2 questions out of remaining 3 questions from each section.
3) Assume necessary suitable data, if required.

Section – I

Q.1 **a)** Explain Parametric estimating model. **06**
b) Use Three Quarters Rule to estimate the cost of a proposed house with 5 bedrooms. The Current house of 3 bedrooms has a Cost of Rs.3, 75,000/-. **05**

Q.2 **Explain** **12**
a) Cost analysis
b) Two third technique of duration estimate of a proposed project.

Q.3 **Explain** **12**
a) Ration estimating tools.
b) Earned Value Measurement process.

Q.4 **a)** Explain basic administrative structure of a typical cost management system. **06**
b) How to track the Cost and Schedule Performance? **06**

Section – II

Q.5 **Explain**
a) Causes of changes in project. **06**
b) Feed forward techniques. **05**

Q.6 **Write detailed notes on.** **12**
a) Life Cycle Cost
b) Risk management in projects

Q.7 **Explain** **12**
a) Concepts in managing projects for value.
b) Key attributes in value management

Q.8 **Write detailed notes on** **12**
a) Value management process
b) Benefits of Value Management

SLR-FQ-46

Seat No.	

Set P

F.Y. M. Tech. (Semester - III) (New) (CBCS) Examination Dec -2019
Mechanical – Design Engineering
NON CONVENTIONAL ENERGY

Day & Date: Tuesday, 03-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Section – I

Q.1 Attempt any two of the following. **14**

a) Explain hydroelectric conventional energy source using IGCC power generation?

b) State different types of solar thermal power plant? Explain medium temperature solar power plant?

c) Explain Indian power scenario for hydroelectric power potential?

Q.2 What are the emerging new technologies for the energy conservation and efficiency? **07**

Q.3 Attempt the following. **14**

a) Explain thermal energy storage with sensible heat storage and latent heat storage?

b) What is the transmissivity of cover system of solar thermal energy collector? Derive the derivation of polarization component with its Ray diagram?

Section – II

Q.4 Attempt the following. **14**

a) Explain solar cell efficiency with maximizing the output? What is Fill factor of solar cell?

b) What are the different modes of wind power generation? Explain stand-alone mode of wind power generation?

Q.5 Attempt any one of the following. **07**

a) Explain all types of biomass conversion technologies?

b) Explain estimation of wind energy potential? Also explain its calculation equation?

Q.6 Attempt the following. **14**

a) Explain application of PV system based on PV desalination system?

b) Explain Fuel cell characteristics? And write a note on Alkaline Fuel Cell?

SLR-FQ-47

Seat No.	

Set P

F.Y. (M.Tech.) (Semester - I) (New)(CBCS) Examination Dec-2019
Electronics Engineering
DIGITAL DESIGN AND VERIFICATION

Day & Date: Wednesday,11-12-2019 Max. Marks: 70
Time:10:00 AM To 01:00 PM

Instructions: 1) All question are compulsory.
2) Assume necessary suitable data, if required.
3) Figures to the right indicate full marks.

Section – I

Q.1 Attempt any two of the following question. **14**

a) While randomizing the stimulus to a design which factors are to be considered? Explain in brief.

b) Explain in brief how to use static variable in system verilog.

c) Explain with suitable example the procedural statements.

Q.2 Write short note on Barrel shifter. **05**

Q.3 Attempt following questions. **16**

a) Write verilog code for modeling 3 bit counter. Also write the testbench for testing the design.

b) Write verilog code for modeling 4:1 multiplexer. Also write the testbench for testing the design.

Section – II

Q.4 Attempt following question. **14**

a) What is soft IP? Explain with suitable example.

b) Explain in brief the Built in Self-Test (BIST).

Q.5 Attempt any one of the following question. **07**

a) Explain in brief different challenges of a physical design flow.

b) Explain in brief different steps in physical design flow.

Q.6 Attempt following question. **14**

a) Differentiate PLA & PAL devices along with their architecture.

b) Explain EPROM based FPGA in brief.

SLR-FQ-48

Seat No.	

Set P

F.Y. (M.Tech.) (Semester - I) (New) (CBCS) Examination Dec- 2019
Electronics Engineering
ADVANCED DIGITAL SIGNAL PROCESSING

Day & Date: Friday, 13-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable data if necessary.

Section – I

Q.1	**a)**	Explain optimal equiripple linear phase FIR filter design.	**06**
	b)	Explain the lattice structure for an all pole IIR system.	**06**
Q.2	**a)**	Explain the process of Interpolation by a factor 'I'. Draw the spectra of signals in decimation of x(n) and v(n).	**06**
	b)	Explain different categories of digital filter banks with suitable diagram. Also state their application.	**06**
Q.3	**a)**	What are Winer filters? Explain the FIR Winer filter in detail.	**05**
	b)	What is linear prediction? Explain forward linear prediction and derive the normal equation for coefficient of linear predictor using p stage lattice filter.	**06**

Section – II

Q.4	**a)**	Explain the application of adaptive filtering to system identification.	**06**
	b)	Explain the basic properties of LMS Algorithm.	**06**
Q.5	**a)**	Explain the relation between the autocorrelation and Model parameters.	**06**
	b)	Discuss the method useful for minimum variance spectral estimation.	**05**
Q.6	**a)**	Explain the application of wavelet transform to Image processing.	**06**
	b)	Explain the application of DSP in the design of phase shifters.	**06**

SLR-FQ-49

Seat No.	

Set P

F.Y. (M.Tech.) (Semester - I) (New) (CBCS) Examination Dec-2019
Electronics Engineering
VOICE AND DATA NETWORKS

Day & Date: Monday, 16-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Section – I

Q.1 Answer following questions. **12**

a) Describe different network performance issues.

b) Draw and discuss cross layer architecture.

c) For the following, assume that no data compression is done. For (a) to (c), calculate the bandwidth necessary for transmitting in real time:

a) Video at a resolution of 640 × 480, 3 bytes/pixel, 30 frames/second.
b) Video at a resolution of 160 ×120, 1 byte/pixel, 5 frames/second.
c) CD-ROM music, assuming one CD holds 75 minutes' worth and takes 650 MB.
d) Assume a fax transmits an 8 × 10-inch black-and-white image at a resolution of 72 pixels per inch. How long would this take over a 14.4-kbps modem?

Q.2 Answer any two from following questions **12**

a) Describe operations mechanism of circuit switching. Which control signals are used in circuit switching?

b) What are data link protocols? What are different modes of data transfer in HDLC? Draw frame format for information transmission in case of HDLC.

c) Draw IEEE 802.3 frame format and describe importance of each field during communication.

Q.3 Answer following questions:

a) Compare between packet and circuit switching. List different control signal used in circuit switching. **06**

b) Describe Go_ Back_N and selective repeat ARQ mechanism in details. **05**

OR

Discuss statistical multiplexing in detail.

Section – II

Q.4 Answer following questions: **12**

a) What is three-way handshake in case of TCP? What is the significance of URG, PSH and FIN flags in TCP communication?

b) What is congestion? List various congestion control policies at transport layer, network layer and data link layer.

c) Which different services are expected to provide by end to end communication protocols? Discuss different end to end communication issues.

Q.5 Answer any two from following questions: **12**

a) What is silly window syndrome in TCP? What is R_{TT} in TCP communication? Explain adaptive re-transmission in TCP.

b) Draw and describe IPv4 header format.

c) What is OSPF? Explain working mechanism of OSPF.

Q.6 Answer following questions:

a) Describe RSA algorithm in detail. **06**

b) Explain DES bit and source-based congestion avoidance policies. **05**

OR

How disciplined queuing avoids congestion?

SLR-FQ-5

Seat No.	

Set P

F.Y. (M.Tech.) (Semester - I) (New) (CBCS)Examination Dec-2019
Civil – (Structures Engineering)
ADVANCED DESIGN OF CONCRETE STRUCTURES

Day & Date: Friday, 20-12-2019 Max. Marks: 70
Time: 10:00 AM To 02:00 PM

Instructions: 1) Q.no.2 and Q.no.5 are compulsory. Solve any one from remaining questions from each section.
2) Use of IS 456 and IS 3370 part IV are allowed.
3) Assume suitable data if necessary.
4) Draw neat sketches wherever necessary.

SECTION – I

Q.1 **a)** A circular of diameter 6m is subjected to a super imposed load of 4 kN/m^2. It may considered as simply supported. Use M_{25} grade of concrete and Fe_{500} steel. Design the slab and sketch the reinforcement details. Assume Poisson's ratio as zero. **13**

b) Draw a neat sketch showing top and bottom reinforcement arrangement in case of trapezoidal combined footing. **04**

Q.2 **a)** A simply supported deep beam is 300 mm wide, 4200 mm deep and has a clear span of 6m. The carries a superimposed load of 300 kN/m. The beam has a bearing of 450 mm at each end. Design a the beam with M_{20} concrete and Fe_{500} steel. **14**

b) Draw the neat sketches showing reinforcement arrangement in middle and column strips of flat slab subjected to U.D.L. **04**

Q.3 **a)** Design a raft foundation supporting the columns of a building having size 9 m x 9 m along centre line with column having size 450 mm x 300 mm spaced at 3 m centre to centre along the two mutual peripheral perpendicular faces. The load on each column is 400kN. Use M_{20} grade of concrete and Fe_{500} steel. Safe bearing capacity of soil is 120 kN/m^2. **13**

b) Explain imperial design method for shear wall subjected to in plane vertical loads. **04**

SECTION – II

Q.4 **a)** Design a top slab by assuming simply supported at edges, vertical walls by assuming top free and bottom hinged. The bottom slab is supported by beams resting on four peripheral columns. The circular ESR is having capacity 40,000 litres. The depth of water may be kept as 3.2 m with free board 0.3m. Adopt IS code method of design and use M_{25} grade of concrete and Fe_{500} Steel. **14**

b) Draw a sketch of bunker and show its components. **03**

Q.5 **a)** A silo with internal diameter 5.5 m, height of cylindrical portion 18 m and central opening with 0.5 m is to be built to store wheat. Design the silo using M_{25} concrete and Fe_{500} steel. **14**

b) Write on temperature stresses developed in chimney. **04**

Q.6 **a)** Design a R.C chimney using M_{25} concrete and Fe_{500} steel for the following requirement and check the stresses at a depth 50m below the top. **13**
External Diameter 4.3 m and internal diameter 4.0 m.
Thickness of fire brick lining 100 mm and air gap is 100 mm.
Temperature difference is 80^{o} C. Assume missing data suitably.

b) Explain wind load analysis of tank supported on four identical columns with their lower ends fixed and braced at intermediate levels considering the braces at ground, first staging and tank bottom levels. **04**

SLR-FQ-50

Seat No.	

Set P

F.Y. (M. Tech.) (Semester – I) (New) (CBCS) Examination Dec-2019
Electronics Engineering
MACHINE LEARNING©

Day & Date: Wednesday, 18-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable data if required.

Section – I

Q.1 Attempt any three **15**
- **a)** What is Machine learning?
- **b)** Generate a diagrammatic representation of a learning network.
- **c)** Compare between Supervised and Unsupervised learning.
- **d)** Comment on Logistic regression.
- **e)** What is recursive induction w.r.t 'Decision trees'?

Q.2 Attempt any two **10**
- **a)** List and elaborate on different Linear Regression models.
- **b)** How is machine learning carried out?
- **c)** Demonstrate a WELL-POSED learning problem.

Q.3 Attempt any two **10**
- **a)** What are the steps in designing a regression model?
- **b)** Illustrate Bagging and Boosting methods.
- **c)** What are the types of machine learning? Illustrate each.

Section – II

Q.4 Attempt any three **15**
- **a)** Define the term 'Deep Neural Network' and illustrate.
- **b)** How do Support Vector Machines work?
- **c)** Define the term 'Optimization' and illustrate how it is done in ML.
- **d)** Give the exact meanings of the terms 'Training' and 'Testing'.
- **e)** How are number of hidden layers decided in Neural Networks?

Q.5 Attempt any two **10**
- **a)** List and illustrate the applications of deep Learning.
- **b)** How does the Error Back-propagation Algorithm work?
- **c)** Develop an output for Hierarchical clustering.

Q.6 Attempt any two **10**
- **a)** What are the applications of 'Machine Learning'? Illustrate one application.
- **b)** What are the basic features of Neural Networks? Elaborate.
- **c)** List the different types of Clustering. Illustrate one of these.

SLR-FQ-51

Seat No.	

Set P

F.Y. (M.Tech.) (Semester – I) (New) (CBCS) Examination Dec-2019
Electronics Engineering
WIRELESS SENSOR NETWORKS

Day & Date: Friday, 20-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable data if required.

Section – I

Q.1 **a)** What are different energy based metrics used to evaluate routing protocols? **07**

b) Discuss categories of WSN routing protocols with example protocols and features for each type. **06**

Q.2 **Solve Any Two.**

a) Explain any one hardware platform available for WSN. **06**

b) Discuss any one application of WSN in detail. **06**

c) Justify - MAC mechanisms used for other wireless networks may fail for WSN. **06**

Q.3 **Solve Any Two.**

a) What are different challenges involved in design of WSN MAC? **05**

b) Explain destination sequenced distance vector routing protocol. **05**

c) Explain directed diffusion. **05**

Section – II

Q.4 **a)** With suitable example explain classification of power management techniques used in WSN. **07**

b) Explain triangulation technique. **06**

Q.5 **Solve Any Two**

a) Explain data transfer in beckon enabled networks. **06**

b) Explain flooding time synchronization protocol. **06**

c) Explain SPI bus. **06**

Q.6 **Solve Any Two**

a) Explain Ad hoc positioning system (APS). **05**

b) Give overview of IEEE 802.15.4. **05**

c) Explain LTS protocol. **05**

SLR-FQ-52

Seat No.	

Set P

F.Y. (M. Tech.) (Semester – I) (New) (CBCS) Examination Dec-2019
Electronics Engineering
ANALOG & DIGITAL CMOS VLSI DESIGN

Day & Date: Friday, 20-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q.1 and Q.5 are compulsory.
2) Solve any two questions from Q.2 to Q.4 for Section I.
3) Solve any two questions from Q.6 to Q.8 for Section II.
4) Figures to the right indicate full marks.

Section – I

Q.1 **a)** What is robustness of CMOS inverter? **05**
b) Explain power dissipation of CMOS inverter. **06**

Q.2 **a)** Design universal gates using pass transistor logic. **06**
b) Explain dynamic CMOS logic with suitable example. **06**

Q.3 **a)** What is C^2MOS master-slave positive edge triggered register? Draw the circuit and explain. **06**
b) Explain pulse registers. **06**

Q.4 **Write short note. (Any Two)** **12**
a) Giga-scale dilemma
b) Cascading dynamic gates
c) Switching threshold of CMOS inverter

Section – II

Q.5 **a)** What is CS stage with current source load? Explain in detail. **06**
b) Explain common mode response of differential amplifier. **05**

Q.6 **a)** Draw circuits of cascode current mirror and explain. **06**
b) Explain frequency response of source follower stage. What is it's application? **06**

Q.7 **a)** Explain telescopic and folded cascode OPAMP topologies. **06**
b) Draw circuit of two stage OPAMP with single ended output and explain it's design procedure. **06**

Q.8 **Write short note. (Any Two)** **12**
a) Gilbert cell
b) PSRR for OPAMP
c) Common gate stage

SLR-FQ-53

Seat No.	

Set P

F.Y. (M.Tech.) (Semester - I) (New) (CBCS) Examination Dec-2019
Electronics Engineering
IMAGE AND VIDEO PROCESSING

Day & Date: Friday, 20-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 Solve any four Questions **20**

a) Write short note on sampling in 2 & 3-dimension image.
b) Explain Karhunen-Loeve transform.
c) Discuss the properties and applications of
1) Hadamard transforms
2) Discrete Cosine Transforms
d) Explain frame rate conversion and deinterlacing.
e) Write note on maximum entropy restoration.

Q.2 Solve the following Questions

a) Explain the following : **08**
1) Inverse & Wiener filtering
2) Multi frame restoration
b) Explain and perform K-L transform for the following Matrix. **07**

X=

4	-2
-1	3

Q.3 Solve any four Questions **20**

a) Explain any two method of edge detection.
b) Explain semantic video object segmentation.
c) Explain Lossless image compression including entropy coding.
d) Explain H.264 and HEVC in details.
e) Write short note on scene matching & detection.

Q.4 Solve the following Questions

a) Explain video compression technique. **08**
b) Explain the following : **07**
1) Spatial feature extraction
2) Image segmentation

SLR-FQ-54

Seat No.	

Set P

F.Y. (M. Tech.) (Semester – I) (New) (CBCS) Examination Dec-2019
Electronics Engineering
NEURAL NETWORKS & FUZZY CONTROL SYSTEMS

Day & Date: Friday, 20-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable data if required.

Section – I

Q.1 **a)** Explain any two variants of back propagation. **07**
b) Explain Hopfield ANN. **06**

Q.2 **Solve any two.**
a) Explain one application of ANN in detail. **06**
b) With suitable example explain any one learning rule for ANN. **06**
c) Explain ARMA model. **06**

Q.3 **Solve any Two.**
a) With suitable example explain independent component analysis. **05**
b) Explain a method for linear system identification. **05**
c) Explain effect of any one learning factor on learning in ANN. **05**

Section – II

Q.4 **a)** With suitable diagram explain typical fuzzy controllers. **07**
b) Explain Fuzzy associative memory. **06**

Q.5 **Solve any two**
a) With suitable example explain fuzzification process. **06**
b) With suitable example explain knowledge based system for process control. **06**
c) Explain PID like fuzzy controller. **06**

Q.6 **Solve any two**
a) With suitable example explain relational equations. **05**
b) With suitable example explain any fuzzy relations. **05**
c) With suitable example explain fuzzy controller from industrial perspective. **05**

SLR-FQ-55

Seat No.	

Set P

F.Y. (M.Tech.) (Semester – II) (New) (CBCS) Examination Dec-2019
Electronics Engineering
RESEARCH METHODOLOGY & IPR©

Day & Date: Thursday, 05-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable data if required.

Section – I

Q.1 **Answer the following questions.** **12**
- **a)** Discuss research design. What are its features?
- **b)** Explain ethical issues in research.
- **c)** Explain objectives of research.

Q.2 **Answer any three from the following questions:** **18**
- **a)** What are different types of research? Explain any two with suitable examples.
- **b)** What is a need of literature review? What are steps to carry it?
- **c)** Explain writing technical research paper for publication.
- **d)** Write a comprehensive note on the “writing research proposal (synopsis)”.

Q.3 With suitable example, explain research problem formulation. **05**

Section – II

Q.4 **Write short notes on:** **12**
- **a)** Need of simulation in research
- **b)** Copyright-IPR
- **c)** Scope of patent rights

Q.5 **Answer any three from the following questions:** **18**
- **a)** Explain need and techniques of Mathematical modeling.
- **b)** Write about procedure for grants of patents.
- **c)** Explain in brief about “Geographical Indications”.
- **d)** Explain trademarks for identification of products or services.

Q.6 Explain Monte Carlo Simulation. **05**

SLR-FQ-56

Seat No.	

Set P

F.Y. (M.Tech.) (Semester – II) (New) (CBCS) Examination Dec-2019
Electronics Engineering
COMMUNICATION BUSES & INTERFACES

Day & Date: Friday, 06-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Figures to right indicates full marks.
2) Assume suitable data if necessary.

Section – I

Q.1 Answer any three from following question. **12**

a) Draw RS 232 connections with no flow control, with flow control and flow control with feedback control.

b) Draw various network topologies using RS 485 standard and describe them.

c) Why termination is required? Discuss termination in RS 485 standard.

d) Explain I^2C communication protocol in detail.

Q.2 Answer any two from following question. **12**

a) Draw waveform showing valid start & stop condition, single byte data transfer and ACK & NAK in case of I^2C communication.

b) Describe Single master multiple slave SPI implementation in detail.

c) Discuss different real world applications of CAN protocols.

Q.3 Answer the following question.

a) Specify different serial buses used in data communication. What are general features of these buses? **06**

OR

What is CAN? Draw CAN protocol architecture and explain in detail.

b) Draw standard CAN frame format and describe functioning of each field. **05**

Section – II

Q.4 Answer any three of the following question. **12**

a) Draw timing diagram of PCI Read cycle and describe it in detail.

b) What are the features of PCI -express?

c) What are the tasks of USB host controllers? What are four basic types of data transaction that can be made within USB?

d) What is the need of FPDP? What is serial and expanded processing flow in FPDP?

Q.5 Answer any two of the following question. **12**

a) What are USB descriptors? What are configuration, interfaces and endpoint related to USB?

b) List different packets used in USB. Draw packet format for data transfer in USB and describe.

c) What is the concept of SFPDP for fiber optics?

Q.6 Answer the following question.

a) What are different data speeds in USB? Describe general USB operation **06**

OR

Draw PCI bus architecture and topologies and describe in detail.

b) What is bus arbitration in PCI? Explain it in detail **05**

SLR-FQ-57

Seat No.	

Set P

F.Y. (M.Tech.) (Semester – II) (New) (CBCS) Examination Dec-2019
Electronics Engineering
ADVANCED IOT

Day & Date: Saturday, 07-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable data if required.

Section – I

Q.1 Explain in detail IoT Architecture layers. **10**

Q.2 Explain wireless sensor networks. **10**

Q.3 **Answer any ONE.** **15**
a) Explain in detail fog computing.
b) Explain IoT protocol stack.

Section – II

Q.4 Write note on smart transportation. **15**

Q.5 What are the key motivations for cloud-enabled environments? **10**

Q.6 What is importance of big data analytics? **10**

SLR-FQ-58

Seat No.	

Set P

F.Y. (M.Tech.) (Semester-II) (New) (CBCS) Examination Dec-2019
Electronics Engineering
PLC, SCADA AND DISTRIBUTED CONTROL SYSTEMS

Day & Date: Monday, 09-12-2019 Max. Marks: 70
Time: 10:00 AM to 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Section - I

Q.1 What are expectations of automation? What are applications of automation? Explain any one application with block schematic. **11**

Q.2 **a)** Draw architecture of PLC and explain. **06**
b) What are discrete I/O modules for PLC? **06**

Q.3 **a)** What are different programming languages for PLC? **12**

OR

b) Explain PLC timers and counters.

Section – II

Q.4 **a)** What is Distributed control system? **05**
b) Explain data communication techniques used in DCS. **06**

Q.5 **a)** Draw block schematic of SCADA and explain. **06**
b) Explain Data Highway used in DCS. **06**

Q.6 **a)** Explain automation of bottle filling plant using PLC. **12**

OR

b) Explain material flow measurement system using PLC.

SLR-FQ-59

Seat No.	

Set P

F.Y. (M.Tech.) (Semester-II) (New) (CBCS) Examination Dec-2019
Electronics Engineering
MOBILE TECHNOLOGY

Day & Date: Tuesday, 10-12-2019 Max. Marks: 70
Time: 10:00 AM to 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable data if necessary.

Section - I

Q.1 **a)** Explain the architecture of GSM, describe the functions of each component. **08**
b) Explain the architecture of GPRS, describe the functions of each component. **08**
c) Explain in detail WAP protocol. **07**

OR

c) Explain any two algorithms of VLR overflow control. **07**

Q.2 **Attempt any three.** **12**
a) Explain the process of MS registration and call termination.
b) Explain the Gn and Gp GPRS interfaces.
c) Explain a note on WAP markup language.
d) Briefly explain GSM security technique implemented in mobile station.

Section – II

Q.3 **a)** Describe UTRAN architecture. **08**
b) Briefly explain down channelization and scrambling. **08**
c) What is EVDO? Explain EVDO reverse link. **07**

OR

c) Explain in details public key cryptography. **07**

Q.4 **Attempt any three.** **12**
a) Draw radio network forward channel in CDMA.
b) Explain TLS (Transport Layer Security) in security protocols.
c) Briefly write about CDMA evolution.
d) Write a note on Multifactor security.

SLR-FQ-60

Seat No.	

Set P

F.Y. (M.Tech.) (Semester - II) (New) (CBCS) Examination Dec -2019
Electronics Engineering
REAL TIME SYSTEMS

Day & Date: Tuesday, 10-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 Solve any four Questions. **20**

a) Explain issues in real time computing.
b) Explain Uniprocessor scheduling of IRIS Tasks.
c) Describe desired language characteristic used for Real Time Systems.
d) Explain the concept of package used in Real Time System.
e) Explain task Scheduling mechanism in programming of Real Time Systems.

Q.2 Solve the following Questions.

a) Discuss in detail classification of task with example. **08**
b) Explain with examples data type used in various programming tools. **07**

OR

c) Explain multitasking used in various programming language. **07**

Q.3 Solve any four Questions. **20**

a) Explain the difference between Real Time databases and general purpose databases.
b) Explain transaction priorities used in Real Time database.
c) Explain integrated failure handling in real time communication.
d) Explain network topologies protocols.
e) Explain tolerant synchronization in hardware and software.

Q.4 Solve the following Questions.

a) Discuss one method of disk scheduling algorithms used in Real Time data base. **08**
b) Discuss different communication media and their protocol used in Real Time Systems. **07**

OR

c) Explain any one reliability model for Hardware Redundancy. **07**

SLR-FQ-61

Seat No.	

Set P

F.Y. (M.Tech.) (Semester - II) (New) (CBCS) Examination Dec-2019
Electronics Engineering
VLSI IN SIGNAL PROCESSING

Day & Date: Tuesday, 10-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable data if required.

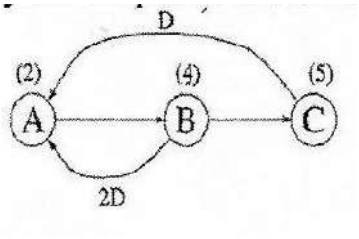
SECTION – I

Q.1 Solve any Two. **14**

a) Draw the Block diagram, SFG and DFG for
$y(n) = ax(n) + bx(n-1) + cx(n-2)$.

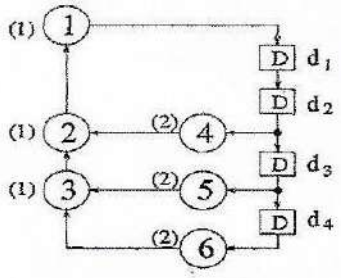
b) What is retiming of DFG? Explain properties of retiming.

c) Find the loop bound & iteration bound for the DFG shown below. Also examine the precedence constraints & justify the loop bound calculated above.



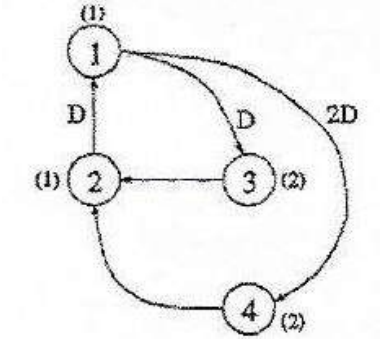
Q.2 Solve any Two. **14**

a) For DFG shown below find iteration bound using MCM algorithm:



b) Explain the concept of pipelining with the help of example.

c) Perform the retiming for the following DFG shown in fig.



Q.3 Write a note on. **07**

a) LPM algorithm

b) Parallel Processing

SECTION – II

Q.4 Solve any Two. **14**

a) State the properties of unfolding. Explain unfolding algorithm.

b) Draw the constraint graph & use it to determine if the following system inequalities have a solution & find the solution if one exists using Floyd Warshall algorithm.

$r_1 - r_2 \leq 0, r_3 - r_1 \leq 5, r_4 - r_1 \leq 4, r_4 - r_3 \leq -1, r_3 - r_2 \leq 2.$

c) Design Bl filter for FIR systolic array.

Q.5 Solve any Two. **14**

a) Write a note on systolic design for matrix-matrix multiplication.

b) Draw the circular life time chart for following with period N = 9:

Variable name	Tin
a	0
b	1
c	2
d	3
e	4
f	5
g	6
h	7
i	8

c) Explain parallel multipliers with modified booth recoding.

Q.6 Write a note on. **07**

a) Parallel carry ripple array multipliers

b) Parallel carry save array multipliers

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Seat No.	

Set P

F.Y. (M.Tech.) (Semester-II) (New) (CBCS) Examination Dec-2019
Electronics Engineering
ADVANCED CONTROL SYSTEMS

Day & Date: Tuesday, 10-12-2019 Max. Marks: 70
Time: 10:00 AM to 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Section - I

Q.1 Solve any one of the following question. **07**
- **a)** Explain transfer function of Z domain and find it for sin(wt).
- **b)** Derive expression for pulse transfer function of closed loop system.

Q.2 Solve any two of the following questions. **14**
- **a)** Explain steps to draw root locus and explain each rule in detail for discrete time control system.
- **b)** Write note on design of robust control system.
- **c)** Explain steps in designing lag compensator using bode plot using example.

Q.3 Solve any two of the following questions. **14**
- **a)** State and explain role of bode plot in stability analysis for discrete control system.
- **b)** Explain Bilinear transformation coupled with Routh criteria for discrete time control system.
- **c)** Write note on steady state error and error constants.

Section – II

Q.4 Solve any one of the following question. **07**
- **a)** Explain various models of multivariable system.
- **b)** Explain servo system.

Q.5 Solve any two of the following questions. **14**
- **a)** Explain Liapuno stability.
- **b)** Explain in brief pole placement technique for design of observer by direct substation method.
- **c)** Write note on basics of MIMO control loop.

Q.6 Solve any two of the following questions. **14**
- **a)** Explain close loop stability in perspective of MIMO plot.
- **b)** Explain pairing of MIMO and SISO system.
- **c)** Explain state observer in detail.

SLR-FQ-63

Seat No.	

Set P

F.Y. M. Tech. (Semester - III) (New) (CBCS) Examination Dec- 2019
Electronics Engineering
BUSINESS ANALYTICS

Day & Date: Tuesday, 03-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Assume suitable data if necessary.
3) Figures to right indicate full marks.

Section – I

Q.1 Attempt any two. **14**
- **a)** Explain supervised learning and unsupervised learning with an appropriate example.
- **b)** Write a short note on “Curse of Dimensionality”
- **c)** Describe the concept of multidimensional visualization with an example.

Q.2 Attempt any two. **14**
- **a)** What is dimension reduction? State importance of aggregation and pivot tables.
- **b)** Describe data visualization and state its different uses in details.
- **c)** Explain the concept of data exploration and visualization with an example.

Q.3 What is Business Analytics? State Business analytics process in details. **07**

Section – II

Q.4 Attempt any two. **14**
- **a)** What is classifier? Explain in detail Naive Bayes Classifier.
- **b)** Explain ‘K means algorithm’ in details.
- **c)** Describe concept of multiple linear regression and state variable selection in linear regression.

Q.5 Attempt any two. **14**
- **a)** State the different advantages and weaknesses of regression trees.
- **b)** Describe performance evaluation and evaluate predictive performance with Naive benchmark.
- **c)** What is clustering? Describe feature selection for clustering by using wrapper models.

Q.6 State the difference between explanatory modelling and predictive modelling of linear regression. **07**

SLR-FQ-64

Seat No.	

Set P

F.Y. M. Tech. (Semester - III) (New) (CBCS) Examination Dec 2019
Electronics Engineering
OPERATION RESEARCH

Day & Date: Tuesday, 03-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.No-3 from section-I compulsory. Solve any one questions out of remaining two question from section-I.
2) Q.No-5 from section-II compulsory. Solve any one questions out of remaining two question from section-II.
2) Figures to the right indicate full marks.
3) Assume necessary suitable data, if required.

Section – I

Q.1 a) Explain scope of Operations Research with suitable examples. **05**

b) Determine the Optimal solution to the following LPP using Simples method **12**

Minimise $Z = 5x + 3y$

Subjected to $2x + 4y \leq 12$

$2x + 2y = 10$

$5x + 2y \geq 10$

x and $y \geq 0$

Q.2 a) Explain Duality in Linear Programming **05**

b) Determine the Optimal solution to the dual of the following LPP. **12**

Maximize $Z = 6x + 8y$

Subjected to $5x + 2y \leq 20$

$x + 2y \leq 10$

x and $y \geq 0$

Q.3 a) Explain the Monto Carlo Simulation technique. **05**

b) What are the characteristics of the Queuing System? **05**

c) A self service store employs one cashier at its counter. Eight customers arrive on an average every 5 minutes while the cashier can serve 10 customers in the same time. Assuming Poisson distribution for arrival and exponential distribution for service rate, determine: **08**

1) Average number of customers in the queue.
2) Average number of customers in the queue system.
3) Average Waiting time of customers in the queue
4) Probability that there is no customer in the queue.

Section – II

Q.4 a) Explain the various costs associated with Inventory. **05**

b) Write a note on Selective Inventory Management Techniques. **04**

c) A company has a demand of 18000 units per year for a certain item. The company can produce 3000 units per month in its own setup. The setup cost is rupees 500 and holding cost of one unit per month is rupees 0.15. The cost of one unit is rupees 2. Determine; **08**

1) Optimum manufacturing quantity
2) Maximum Inventory Level
3) Total cost of inventory per year

Q.5 **a)** A machine costs rupees 15000. The running cost in rupees over the years of usage is given below. **10**

Year	1	2	3	4	5	6	7
Running cost	2500	3000	4000	5000	6500	8000	10000

Find the Optimum replacement age if the money value is 10% per year.

b) Explain Maximal flow problem with suitable example. **04**

c) Write a note on Group Replacement Policy. **04**

Q.6 **a)** A project consists of the following activities given with their time estimates in weeks. Draw the network and determine the critical path and expected project duration. What is the probability that the project will be completed in expected duration. **12**

Activity	1-2	1-6	2-3	2-4	3-5	4-5	5-8	6-7	7-8
Optimistic time	3	2	6	2	5	3	1	3	4
Most likely time	6	5	12	5	11	6	4	9	19
Pessimistic time	15	14	30	8	17	15	7	27	28

b) Write a note on Resource leveling and Resource Smoothening in project management. **05**

SLR-FQ-65

Seat No.	

Set P

F.Y. M. Tech. (Semester - III) (New) (CBCS) Examination Dec- 2019
Electronics Engineering
COST MANAGEMENT OF ENGINEERING PROJECTS

Day & Date: Tuesday, 03-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.1 & Q.5 are compulsory.
2) Solve any 2 questions out of remaining 3 questions from each section.
3) Assume necessary suitable data, if required.

Section – I

Q.1 **a)** Explain Parametric estimating model. **06**
b) Use Three Quarters Rule to estimate the cost of a proposed house with 5 bedrooms. The Current house of 3 bedrooms has a Cost of Rs.3, 75,000/-. **05**

Q.2 **Explain** **12**
a) Cost analysis
b) Two third technique of duration estimate of a proposed project.

Q.3 **Explain** **12**
a) Ration estimating tools.
b) Earned Value Measurement process.

Q.4 **a)** Explain basic administrative structure of a typical cost management system. **06**
b) How to track the Cost and Schedule Performance? **06**

Section – II

Q.5 **Explain**
a) Causes of changes in project. **06**
b) Feed forward techniques. **05**

Q.6 **Write detailed notes on.** **12**
a) Life Cycle Cost
b) Risk management in projects

Q.7 **Explain** **12**
a) Concepts in managing projects for value.
b) Key attributes in value management

Q.8 **Write detailed notes on** **12**
a) Value management process
b) Benefits of Value Management

SLR-FQ-66

Seat No.	

Set P

F.Y. M. Tech. (Semester - III) (New) (CBCS) Examination Dec -2019
Electronics Engineering
NON CONVENTIONAL ENERGY

Day & Date: Tuesday, 03-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Section – I

Q.1 Attempt any two of the following. **14**

a) Explain hydroelectric conventional energy source using IGCC power generation?

b) State different types of solar thermal power plant? Explain medium temperature solar power plant?

c) Explain Indian power scenario for hydroelectric power potential?

Q.2 What are the emerging new technologies for the energy conservation and efficiency? **07**

Q.3 Attempt the following. **14**

a) Explain thermal energy storage with sensible heat storage and latent heat storage?

b) What is the transmissivity of cover system of solar thermal energy collector? Derive the derivation of polarization component with its Ray diagram?

Section – II

Q.4 Attempt the following. **14**

a) Explain solar cell efficiency with maximizing the output? What is Fill factor of solar cell?

b) What are the different modes of wind power generation? Explain stand-alone mode of wind power generation?

Q.5 Attempt any one of the following. **07**

a) Explain all types of biomass conversion technologies?

b) Explain estimation of wind energy potential? Also explain its calculation equation?

Q.6 Attempt the following. **14**

a) Explain application of PV system based on PV desalination system?

b) Explain Fuel cell characteristics? And write a note on Alkaline Fuel Cell?

SLR-FQ-7

Seat No.	

Set P

F.Y (M. Tech.) (Semester - I) (New) (CBCS) Examination Dec-2019
Civil – (Structures Engineering)
ADVANCED DESIGN OF FOUNDATION

Day & Date: Friday, 20-12-2019 Max. Marks: 70
Time: 10:00 AM To 02:00 PM

Instructions: 1) All questions are compulsory.
2) Make suitable assumption if necessary and mention it clearly.
3) Figures to the right indicate full marks.

Section – I

Q.1 **a)** Explain various types of shear failure of soil with neat sketch. **05**

b) A strip footing 2 m wide carries a load intensity of 400 kN/m^2 at a depth of 1.2 m in sand. The saturated unit weight of sand is 19.5 kN/m^3 and unit weight above water table is 16.8 kN/m^3. The shear strength parameters are c = 0 and $\Phi = 36^0$. Determine F.O.S w.r.t shear failure for the water table 4 m below G.L.? Use Terzaghi's equation. Take N_c=60, N_q=42, N_γ=47. **08**

Q.2 **a)** Discuss the necessity of combined footing with examples. **05**

b) Discuss various types of settlements under footing. **03**

c) A footing 4 m x 2 m in plan transmits a pressure of 150 kN/m^2 on a cohesive soil having E = 6 x 10^4 kN/m^2 and μ = 0.50. Determine the immediate settlement of the footing at the centre. Assuming it to be a flexible footing and rigid footing? **04**

Q.3 Design a raft foundation (beam column type) for 4 columns spaced at a distance of 4 m center to center in either direction (square pattern). All four columns carry an equal load of 1000 kN. Assume SBC = 120 kN/m^2. Use M-20 concrete and Fe-415 steel. **10**

Section – II

Q.4 A column carrying load of 1000 kN has to be supported by four piles each of size 300 mm x 300mm arranged in square pattern. Piles are spaced I m centre to centre. Column size is 500 x 500 mm. Design pile cap. Use M-25 concrete and Fe-415 steel. **12**

Q.5 **a)** Discuss various forces acting on well foundation. **06**

b) Discuss in detail working of pneumatic caisson. **05**

Q.6 **a)** Draw the sketch of block foundation with all 6 degrees of freedom (3 translation and 3 rotation). **04**

b) Describe various types of machine foundation. **04**

c) Write short note on permissible amplitude of vibration for machine. **04**

SLR-FQ-70

Seat No.	

Set P

F.Y. (M.Tech.) (Semester - I) (New) (CBCS) Examination Dec- 2019
Electronics & Telecommunication Engineering
RESEARCH METHODOLOGY & IPR

Day & Date: Wednesday, 11-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to right indicate full mark.

Section – I

Q.1 Attempt any Four. **16**

a) With suitable example explain applied Vs fundamental research.
b) Distinguish between Research methods and Research methodology.
c) What are the problems encountered by researchers in India?
d) With suitable example, explain objective, sub objective and scope in a typical engineering research synopsis.
e) What is a need of literature review? What are steps to carry it?

Q.2 a) Attempt any Two. **12**

1) What are motivational factors for carrying research?
2) Discuss a structure of a typical research paper with suitable example.
3) Explain types of errors in design of experiments.

b) Explain a general structure of an engineering research project report. How it differs from similar report of other disciplines like social science. **07**

Section – II

Q.3 Solve any Four. **16**

a) Discuss role of ICT at different stages of research.
b) Write a note on ethical research in engineering.
c) What is the difference between copyright and patent?
d) Explain characteristics of good hypothesis.
e) Explain mechanics of writing a research report.

Q.4 a) Attempt any Two. **12**

1) Discuss Copy right.
2) Explain bibliography, references and footnotes.
3) Explain significance of E books and E journals in modern research.

b) For a hypothetical engineering Research Project Report, write a ‘Conclusion’. Explain its salient features. **07**

SLR-FQ-71

Seat No.	

Set P

F.Y. (M.Tech.) (Semester - I) (New) (CBCS) Examination Dec- 2019
Electronics & Telecommunication Engineering
ANTENNA DESIGN AND APPLICATION

Day & Date: Friday,13-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable data if required.

Section – I

Q.1 Solve any two questions.

a) Discuss different conditions are to be satisfied to get end fire radiation pattern. **10**

b) What is meant by pattern multiplication and explain how it can be achieved. **07**

c) Stale different feeding mechanism of microstrip antenna and explain any one in detail.

Q.2 Solve any one question.

a) Draw and explain radiation pattern when two isotropic Sources of equal Amplitude and placed out of phase to each other.

b) Explain the characteristics of Microstrip antenna and also mention its advantages and Limitations.

Q.3 Attempt any three questions. **18**

a) State methods used for analysis of microstrip antenna. Explain any one in detail.

b) Explain the steps to be followed for design of Rectangular microstrip patch antenna.

c) State different microstrip antenna configuration and explain any one in detail.

d) What is array factor? Explain role of array factor in pattern multiplication with an example.

Section – II

Q.4 Solve any two questions. **10**

a) Define various definitions of Bandwidth. State different parameters affects on bandwidth.

b) Explain broad banding using coplanar parasitic elements.

c) State and explain the design considerations for terrestrial mobile communication systems.

Q.5 Solve any one question. **07**

a) State different methods used for Linear array design. Explain Series feed arrays.

b) Explain various substrate Categories and desirable substrate characteristics for antenna fabrication.

Q.6 Attempt any three questions. **18**

a) Write a note on Ferimagnetic substrate

b) Explain transmission line modeling for aperture coupled microstrip antenna

c) Explain series feed excitation method for microstrip antenna

d) Which parameters are considered at the time of designing antenna for Bluetooth and Zigbee applications and explain each.

SLR-FQ-72

Seat No.	

Set P

F.Y. (M.Tech.) (Semester - I) (New) (CBCS) Examination Dec- 2019
Electronics & Telecommunication Engineering
SOFT COMPUTING METHODS

Day & Date: Monday, 16-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to right indicate full mark.
3) Use of non programmable calculator is allowed.
4) Assume necessary data if necessary.

Section – I

Q.1 Attempt any four. **16**

a) What is fuzzy logic? Describe one of the application of it?
b) Explain fuzzification and defuzzification.
c) Explain the terms of exploitation and exploration?
d) Enumerate steps followed by GA.
e) Explain the Tournament Selection.

Q.2 A) Attempt any two. **12**

1) What are the different applications of Fuzzy logic concepts in Engineering problems?
2) Explain the Term
i) Cross Over Rate
ii) Mutation Rate
3) Consider the following two discrete fuzzy sets, which are defined on universe X = {-5, 5} :

$$\underset{\sim}{A} = \text{"zexo"} = \left\{\frac{0}{-2} + \frac{0.5}{-1} + \frac{1.0}{0} + \frac{0.5}{1} + \frac{0}{2}\right\}$$

$$\underset{\sim}{B} = \text{"positive medium"} = \left\{\frac{0}{0} + \frac{0.5}{1} + \frac{1.0}{2} + \frac{0.5}{3} + \frac{0}{4}\right\}$$

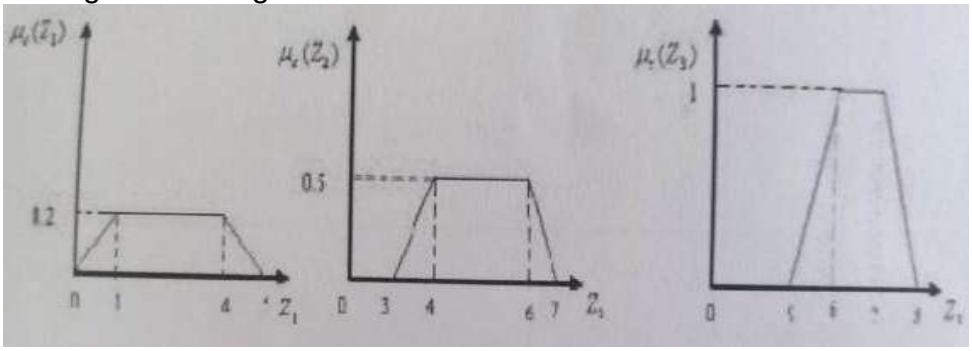
Construct the relation for the rule IF $\underset{\sim}{A}$ THEN $\underset{\sim}{B}$

B) Solve any one. **07**

1) Use Genetic algorithm to find maximum value of f(x).

$$\max f(x) = 5x_1^5 - 2x_2^4 + 2x_3^3$$
$$S.t. 1 \le x_1 \le 5$$
$$2 \le x_2 \le 6$$
$$5 \le x_3 \le 10$$

2) The results of three implication processes arc as shown in fig. Find the aggregated output and the defuzzified output using the
i) Center of gravity
ii) Weighted average method



Section – II

Q.3 Solve any four. **16**

a) Distinguish between artificial neuron & biological neuron.
b) Sketch and Explain in detail the model of artificial neuron.
c) Explain Deep learning technique.
d) Explain McCuIloch - Pitts Model of ANN.
e) Explain the Perceptron learning algorithm.

Q.4 A) Attempt any two. **12**

1) Write a short note on Genetic Algorithms for Neural Network.
2) What is a back propagation NN? Explain in details with neat diagram.
3) Discuss in detail various types of activation functions used in neural network with the aid of graphical as well as mathematical representation and output.

B) Solve any one. **07**

1) Describe the structure of back propagation neural network and derive the learning rule for the back propagation algorithm.
2) Elaborate on Neuro-fuzzy Inference systems.

SLR-FQ-73

Seat No.	

Set P

F.Y. (M. Tech.) (Semester – I) (New) (CBCS) Examination Dec-2019
Electronics & Telecommunication Engineering
ADVANCED NETWORK SYSTEM

Day & Date: Wednesday,18-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Section – I

Q.1 Answer any two **10**
- **a)** What is DNS? How domain names are assigned?
- **b)** Explain internetworking with ATM.
- **c)** Differentiate between layer 2 and layer3 VPN services.

Q.2 Answer any one **07**
- **a)** Explain the difference between packet switching and circuit switching with example.
- **b)** Explain in detail remote access and IP integration with MPLS VPN.

Q.3 Write short notes on any three **18**
- **a)** DWDM
- **b)** Domain mapping
- **c)** Management Control in ATM
- **d)** QoS in MPLS

Section – II

Q.4 Answer any two **10**
- **a)** Discuss NGN in brief.
- **b)** Write a short note on smart mobiles.
- **c)** Discuss accounting technique in network management.

Q.5 Attempt any one **07**
- **a)** Discuss various methods of ensuring quality of service.
- **b)** Discuss smart devices and services.

Q.6 Attempt any three **18**
- **a)** Which are the next generation networks?
- **b)** Explain in detail Traffic engineering with reference of QoS.
- **c)** Write a short note on QoS.
- **d)** Discuss the adaptive self healing network.

SLR-FQ-74

Seat No.	

Set P

F.Y. (M. Tech.) (Semester – I) (New) (CBCS) Examination Dec-2019
Electronics & Telecommunication Engineering
BIOMEDICAL SIGNAL PROCESSING

Day & Date: Friday, 20-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable data if required.

Section – I

Q.1 Explain the WIDROW-HOFF LMS adaptive algorithm. **11**

Q.2 **Solve any two.** **24**

a) Discuss in detail ECG lead system. Distinguish between precordial leads and limb leads.

b) Explain the Biomedical signals PCG, CP, EGG, EEG.

c) With the help of block diagram explain the concept of adaptive noise cancellation. How cancellation of high frequency noise in Electro-surgery can be done using a dual reference adaptive noise canceller?

Section – II

Q.3 What are advantages of pole zero modeling over all-pole modeling? Discuss Pole zero modeling in detail. **11**

Q.4 **Solve any two.** **24**

a) How filtering can be done in frequency domain? Discuss frequency domain filters for noise removal.

b) Explore the possibilities of parametric modeling of signal characteristics using general liner system model.

c) Explain advancement in healthcare with CT, PET and SPECT.

SLR-FQ-75

Seat No.	

Set P

F.Y. (M. Tech.) (Semester - I) (New) (CBCS) Examination Dec- 2019
Electronics & Telecommunication Engineering
ADVANCED EMBEDDED SYSTEM

Day & Date: Friday, 20-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to right indicate full mark.

Section – I

Q.1 Attempt any two **10**

a) Write a note on embedded memories.
b) How does power management takes place in MP 11?
c) Draw and explain register structure of ARM 11.

Q.2 Attempt any one. **07**

a) Describe the challenges in embedded computing system design.
b) Explain the features of ARM 11 MPcore processor with the help of block diagram.

Q.3 Solve any three. **18**

a) Write a note on embedded system development life cycle.
b) Explain various modes of ARM 11 core.
c) What are different types of address that exist in MPcore system? Explain with an example.
d) Write a note on register structure of control coprocessor CP15.

Section – II

Q.4 Attempt any two. **10**

a) What is real time OS? Describe various functions of it.
b) What are different software development tools?
c) Explain software design process and lifecycle.

Q.5 Attempt any one. **07**

a) Explain the use of pipes and filters.
b) Explain in brief interfacing components with Raspberry Pi board.

Q.6 Attempt any three. **18**

a) Write a note on μCos-11
b) Describe software architecture of an embedded system.
c) Write a note on Task scheduling in RTOS.
d) Write a note on Semaphors.

SLR-FQ-77

Seat No.	

Set P

F.Y. (M.Tech.) (Semester – II) (New) (CBCS) Examination Dec-2019
Electronics & Telecommunication Engineering
ADVANCED INTERNET OF THINGS

Day & Date: Thursday, 05-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable data if required.

Section – I

Q.1 Attempt any two of the following questions. **10**
- **a)** Explain the reference architecture of Industrial IOT.
- **b)** What is IOT? What are the different components of IOT system?
- **c)** Explain the stack and its operations in ARM cortex processor.

Q.2 Attempt any one of the following questions. **07**
- **a)** What are the applications of IOT in various domains? Explain any one.
- **b)** What are different addressing modes of ARM CORTEX processor? Explain any one with the help of its instructions.

Q.3 Attempt any three of the following questions. **18**
- **a)** Cloud and its role in IOT
- **b)** Industrial Internet of Things
- **c)** LEAN Production Systems
- **d)** ARM architecture

Section – II

Q.4 Attempt any two of the following questions. **10**
- **a)** Write a short note on- Survey of various IOT cloud platforms.
- **b)** Write a short note on RFID.
- **c)** Write a note on Application Programming Interface (API).

Q.5 Attempt any one of the following questions. **07**
- **a)** What are the criteria for selecting right Cloud IOT platform?
- **b)** Explain the cost types included in Cloud Computing Services and describe it in detail.

Q.6 Attempt any three of the following questions. **18**
- **a)** Explain the application protocol COAP for IOT.
- **b)** What are the different challenges and barriers are observed in the development of the IOT?
- **c)** Write a note on communication technologies used in IOT.
- **d)** What is MQTT? Describe its features.

SLR-FQ-78

Seat No.	

Set P

F.Y. (M.Tech.) (Semester – II) (New) (CBCS) Examination Dec-2019
Electronics & Telecommunication Engineering
RF CIRCUIT DESIGN

Day & Date: Friday, 06-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Figures to right indicates full marks.
2) Assume suitable data if necessary.
3) All questions are compulsory.

Section – I

Q.1 Attempt any three of the following question. **18**

1) Derive the expression for voltage gain & current gain of two port network.

2) Determine the insertion loss in terms of Z_o & Z_d for series & shunt PIN diode.

3) Explain the basic frequency conversion operations using Schottky diode.

4) Check the stability of the transistor in conjugately matched amplifier design at 5 GHz frequency
Where $S_{11} = 0.66\angle\text{-}142^\circ$, $S_{21} = 2.39\angle 54^\circ$, $S_{12} = 0.03\angle 62^\circ$, $S_{22} = 0.72\angle\text{-}68^\circ$

Q.2 Attempt any one of the following question. **10**

a) Calculate upper frequency limit FT, where the short circuit currant gain of Bipolar junction transistor is unity given that base resistance $= 7\Omega$, equivalent π resistance$= 110\Omega$, equivalent π capacitance$= 18$ PF, Collector capacitance $= 18$ PF, transconductance = 900ms. Also draw the π equivalent circuit diagram of microwave bipolar transistor.

b) Explain the concept of noise figure circles for an amplifier design.

c) The s parameters for the HP HFET-102 GaASFET at 2GHz with a bias voltage Vgs=o are given as follows $S_{11} = 0.894\angle 60.6^\circ$, $S_{21} = 3.122\angle 123.6°$, $S_{12} = 0.020\angle 62.4°$, $S_{22} = 0.781\angle -27.6°$. Determine the stability of this transistor by using k-Δ test & μ test.

Q.3 Attempt any one of the following question. **07**

a) Calculation the maximum unilateral transducer gain for a specified gain amplifier design at 3 GHz frequency for $S_{11} = 0.80\angle -90°$, $S_{21} = 2.8\angle 100°$, $S_{12} = 0$, $S_{22} = 0.66\angle -50°$

b) Draw the equivalent circuit diagram of a microware FET in the common source configuration & derive the expression for the short circuit current gain of transistor.

Section – II

Q.4 Attempt any three of the following question. **18**

a) What & explain the importance of k-β diagram.

b) What are the problems of constant k section filter & explain how it can be overcome by m-derived filter section.

c) Explain the design producer of two port oscillator with flow chart.

d) State the basic dielectric materials used for MMIC. Also state the characteristics of dielectric materials.

Q.5 Attempt any two of the following question. **10**

a) Explain the role of Richard's Transformation in filter implementation with an example.

b) Draw a circuit for two port transistor oscillators and calculate Γ_{out} in terms of S parameters.

c) State MMIC fabrication techniques & explain any one technique in detail.

Q.6 Attempt any one of the following question. **07**

a) Derive the expression for maximum oscillators output power & also plot maximum oscillator power versus small signal transducer power gain.

b) State the method used for filter design. Explain filter design by the insertion loss method.

SLR-FQ-79

Seat No.	

Set P

F.Y. (M.Tech.) (Semester – II) (New) (CBCS) Examination Dec-2019
Electronics & Telecommunication Engineering
ARTIFICIAL INTELLIGENCE & MACHINE LEARNING

Day & Date: Saturday, 07-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate Maximum marks.
3) Assume suitable data if required.

Section – I

Q.1 Answer any three. **15**

a) What is Artificial Intelligence?
b) What are learning agents?
c) List the criteria to measure the performance of different search strategies.
d) What are the goals of knowledge representation?

Q.2 Answer any two. **20**

a) Explain with suitable example the concept of First order logic.
b) Define in your own words the following terms: State, State space, Search tree, Search node, Goal, Action.
c) Define Depth-first-search and explain it with algorithm.

Section – II

Q.3 Answer any three. **15**

a) What is the objective of cluster analysis?
b) Explain the concept of Maximum-Margin Hyper planes.
c) What is meant by Dimensionality Reduction?
d) Write down equations for different distance measures in k-means clustering.

Q.4 Answer any two. **20**

a) Explain with suitable example the concept of Machine Learning.
b) Explain Expectation Maximization (EM).
c) Explain in detail Ensemble Methods.

SLR-FQ-80

Seat No.	

Set P

F.Y (M. Tech.) (Semester-II) (New) (CBCS) Examination Dec-2019
Electronics & Telecommunication Engineering
CRYPTOGRAPHY AND NETWORK SECURITY

Day & Date: Monday, 09-12-2019 Max. Marks: 70
Time: 10:00 AM to 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Section - I

Q.1 Solve any Three. **24**
- **a)** Explain components of OSI Security Architecture.
- **b)** Explain blowfish algorithm.
- **c)** Explain advanced encryption standard
- **d)** Explain RSA algorithm with suitable example.

Q.2 **a)** Explain Avalanche Effect. **03**
b) Write a note on symmetric cipher model. **08**

OR

Explain different modes of operations in block ciphers.

Section – II

Q.3 Solve any Three. **24**
- **a)** Write a note on message authentication requirement.
- **b)** Explain PGP in detail.
- **c)** Write a note on X. 509 certificates.
- **d)** What is Kerberos? Explain in detail.

Q.4 **a)** Explain Brute-Force Attacks. **03**
b) Write a note on Secure Hash Algorithm **08**

OR

Describe public-key infrastructure in detail

SLR-FQ-81

Seat No.	

Set P

F.Y. (M.Tech.) (Semester - II) (New) (CBCS) Examination Dec -2019
Electronics & Telecommunication Engineering
COMMUNICATION SYSTEM DESIGN

Day & Date: Tuesday, 10-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figure to the right indicate full marks.
3) Assume suitable data if necessary.

Section – I

Q.1 **Write short notes.** **12**

a) AM and FM radio broadcasting systems

b) Television broadcasting system

OR

a) List the various channels used for communication. Explain characteristics of each channel in detail.

b) Write a note on Mobile radio broadcasting systems.

Q.2 Explain different types of quantization. **12**

Q.3 What is necessity of channel coding? What is importance of channel capacity in channel coding? **11**

Section – II

Q.4 Explain loop antenna. What are the types of loop antennas? Determine radiation resistance of ferrite loop antenna. **12**

OR

Explain in short Helical, Biconical and Sleeve antennas.

Q.5 Explain Woodward-Lawson sampling method. **12**

Q.6 Explain differential coding for MIMO antennas. Explain Multiuser MIMO. **11**

SLR-FQ-82

Seat No.	

Set P

F.Y. (M. Tech.) (Semester - II) (New) (CBCS) Examination Dec-2019
Electronics & Telecommunication Engineering
MULTIMEDIA PROCESSING

Day & Date: Tuesday, 10-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable data, if necessary.

SECTION – I

Q.1 Attempt any Two. **15**

a) Briefly explain, in your own words, “Memex” and its role regarding hypertext. Could we carry out the Memex task today? How do you use Memex ideas in your own work?

b) Briefly explain why we need to be able to have less than 24-bit color and why this makes for a problem. Generally, what do we need to do to adaptively transform 24-bit color values to 8-bit ones?

c) Suppose we have a 5-bit grayscale image. What size of ordered dither matrix do we need to display the image on a 1-bit printer?

Q.2 Attempt any Two. **12**

a) Suppose we have available 24 bits per pixel for a color image. However, we notice that humans are more sensitive to R and G than to B in fact, 1.5 times more sensitive to R or G than to B. How could we best make use of the bits available?

b) Explain in detail YIQ Color Model?

c) Consider the following set of color-related terms:

1) Wavelength
2) Color level
3) Brightness
4) Whiteness

How would you match each of the following (more vaguely stated) characteristics to each of the above terms?

5) Luminance
6) Hue
7) Saturation
8) Chrominance?

Q.3 Attempt any One. **08**

a) NTSC video has 525 lines per frame and 63.6 μsec per line, with 20 lines per field of vertical retrace and 10.9 μsec horizontal retrace.

1) where does the 63.6 μsec come from?
2) Which takes more time, horizontal retrace or vertical retrace? How much more time?

b) Suppose the alphabet is [A,B,C] and the known probability distribution is P(A) = 0.5, P(B) = 0.4, P(C) = 0.1. For simplicity, let's also assume that both encoder and decoder know that the length of the messages is always 3, so there is no need for a terminator.

1) How many bits are needed to encode the message BBB by Huffman coding?
2) How many bits are needed to encode the message BBB by arithmetic coding?

SECTION – II

Q.4 Attempt any Two. **15**

a) Suppose we view a decompressed 512 x 512 JPEG image but use only the *color* part of the stored image information, not the luminance part, to decompress. What does the.512 x 512 color image look like? Assume JPEG is compressed using a 4:2:0 scheme.

b) Could we use wavelet-based compression in ordinary JPEG? How?

c) Explain I-frame coding in H.261?

Q.5 Attempt any Two. **12**

a) Draw block diagrams for an MPEG-2 encoder and decoder for

1) SNR and spatial hybrid scalability
2) SNR and temporal hybrid scalability?

b) What is the main difference between the OSI and TCP/IP reference models?

c) Several protocols, such as Ethernet, Token ring, and FDDI, are commonly used in LAN. differentiate the functionalities of these three technologies and differences among them?

Q.6 Attempt any One. **08**

a) What is the difference between switching and routing? Are routing algorithms specific to a switching technology?

b) Write short note on C-BIRD Case Study?

SLR-FQ-83

Seat No.	

Set P

F.Y. (M.Tech.) (Semester - II) (New) (CBCS)Examination Dec-2019
Electronics & Telecommunication Engineering
AUTOMATION AND INDUSTRIAL ROBOTICS

Day & Date: Tuesday,10-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Use of non- programmable calculator are allowed.
3) Assume suitable data if necessary.
4) Figures to right indicate full marks.

Section – I

Q.1 Answer any three. **15**

a) Discuss different strategies of automation.
b) Explain ladder logic with one suitable example.
c) Write a short note on Memory types used in PLC.
d) Explain in detail LAN/WAN Communication for SCADA Systems.

Q.2 a) Answer any two. **10**

1) What is USA principle in automation?
2) Show different wiring symbols for PLC.
3) Discuss DNP 3.0 protocol

b) Answer any one. **10**

1) Sketch the wiring for PLC outputs that are listed below.
   - a double acting hydraulic solenoid valve (with two coils)
   - a 24Vdc lamp
   - a 120 Vac high current lamp
   - a low current 12Vdc motor
2) A new production machine costs $85,000 installed and is expected to generate revenues of $55,000 per year for 7 years. It will cost $30,000 per year to operate the machine. At the end of 7 years, the machine will be scrapped at zero salvage value. Determine
   i) the payback period for this investment.
   ii) equivalent present worth of the proposal.
   iii) equivalent uniform annual cost for the project.
   iv) the rate of return

Section – II

Q.3 Answer any four. **20**

a) Explain in detail Types of industrial robot and their methods of operation.
b) Explain in detail Hydraulic actuation.
c) Explain the Concepts of ON-LINE Programming.
d) Explain NEURO-FUZZY Control Systems.
e) Write a short note on application of robot in Investment Casting.

Q.4 Answer any three. **15**

a) Discuss the MODBUS protocol

b) Explain in detail basic architecture of the robot controller.

c) Explain in detail Hydrostatic circuits.

d) Write a short note on application of robot in Spraying.

SLR-FQ-84

Seat No.	

Set P

F.Y. M. Tech. (Semester - III) (New) (CBCS) Examination Dec- 2019
Electronics – Telecommunication Engineering
BUSINESS ANALYTICS

Day & Date: Tuesday, 03-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Assume suitable data if necessary.
3) Figures to right indicate full marks.

Section – I

Q.1 Attempt any two. **14**
- **a)** Explain supervised learning and unsupervised learning with an appropriate example.
- **b)** Write a short note on "Curse of Dimensionality"
- **c)** Describe the concept of multidimensional visualization with an example.

Q.2 Attempt any two. **14**
- **a)** What is dimension reduction? State importance of aggregation and pivot tables.
- **b)** Describe data visualization and state its different uses in details.
- **c)** Explain the concept of data exploration and visualization with an example.

Q.3 What is Business Analytics? State Business analytics process in details. **07**

Section – II

Q.4 Attempt any two. **14**
- **a)** What is classifier? Explain in detail Naive Bayes Classifier.
- **b)** Explain 'K means algorithm' in details.
- **c)** Describe concept of multiple linear regression and state variable selection in linear regression.

Q.5 Attempt any two. **14**
- **a)** State the different advantages and weaknesses of regression trees.
- **b)** Describe performance evaluation and evaluate predictive performance with Naive benchmark.
- **c)** What is clustering? Describe feature selection for clustering by using wrapper models.

Q.6 State the difference between explanatory modelling and predictive modelling of linear regression. **07**

SLR-FQ-85

Seat No.	

Set P

F.Y. M. Tech. (Semester - III) (New) (CBCS) Examination Dec 2019
Electronics – Telecommunication Engineering
OPERATION RESEARCH

Day & Date: Tuesday, 03-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.No-3 from section-I compulsory. Solve any one questions out of remaining two question from section-I.
2) Q.No-5 from section-II compulsory. Solve any one questions out of remaining two question from section-II.
2) Figures to the right indicate full marks.
3) Assume necessary suitable data, if required.

Section – I

Q.1 a) Explain scope of Operations Research with suitable examples. **05**

b) Determine the Optimal solution to the following LPP using Simples method **12**
Minimise Z = 5× + 3y
Subjected to $2x + 4y \leq 12$
$2x + 2y = 10$
$5x + 2y \geq 10$
x and $y \geq 0$

Q.2 a) Explain Duality in Linear Programming **05**

b) Determine the Optimal solution to the dual of the following LPP. **12**
Maximize Z = 6x + 8y
Subjected to $5x + 2y \leq 20$
$x + 2y \leq 10$
x and $y \geq 0$

Q.3 a) Explain the Monto Carlo Simulation technique. **05**

b) What are the characteristics of the Queuing System? **05**

c) A self service store employs one cashier at its counter. Eight customers arrive on an average every 5 minutes while the cashier can serve 10 customers in the same time. Assuming Poisson distribution for arrival and exponential distribution for service rate, determine: **08**
1) Average number of customers in the queue.
2) Average number of customers in the queue system.
3) Average Waiting time of customers in the queue
4) Probability that there is no customer in the queue.

Section – II

Q.4 a) Explain the various costs associated with Inventory. **05**

b) Write a note on Selective Inventory Management Techniques. **04**

c) A company has a demand of 18000 units per year for a certain item. The company can produce 3000 units per month in its own setup. The setup cost is rupees 500 and holding cost of one unit per month is rupees 0.15. The cost of one unit is rupees 2. Determine; **08**
1) Optimum manufacturing quantity
2) Maximum Inventory Level
3) Total cost of inventory per year

Q.5 **a)** A machine costs rupees 15000. The running cost in rupees over the years of usage is given below. **10**

Year	1	2	3	4	5	6	7
Running cost	2500	3000	4000	5000	6500	8000	10000

Find the Optimum replacement age if the money value is 10% per year.

b) Explain Maximal flow problem with suitable example. **04**

c) Write a note on Group Replacement Policy. **04**

Q.6 **a)** A project consists of the following activities given with their time estimates in weeks. Draw the network and determine the critical path and expected project duration. What is the probability that the project will be completed in expected duration. **12**

Activity	1-2	1-6	2-3	2-4	3-5	4-5	5-8	6-7	7-8
Optimistic time	3	2	6	2	5	3	1	3	4
Most likely time	6	5	12	5	11	6	4	9	19
Pessimistic time	15	14	30	8	17	15	7	27	28

b) Write a note on Resource leveling and Resource Smoothening in project management. **05**

SLR-FQ-86

Seat No.	

Set P

F.Y. M. Tech. (Semester - III) (New) (CBCS) Examination Dec- 2019
Electronics – Telecommunication Engineering
COST MANAGEMENT OF ENGINEERING PROJECTS

Day & Date: Tuesday, 03-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.1 & Q.5 are compulsory.
2) Solve any 2 questions out of remaining 3 questions from each section.
3) Assume necessary suitable data, if required.

Section – I

Q.1 **a)** Explain Parametric estimating model. **06**
b) Use Three Quarters Rule to estimate the cost of a proposed house with 5 bedrooms. The Current house of 3 bedrooms has a Cost of Rs.3, 75,000/-. **05**

Q.2 **Explain** **12**
a) Cost analysis
b) Two third technique of duration estimate of a proposed project.

Q.3 **Explain** **12**
a) Ration estimating tools.
b) Earned Value Measurement process.

Q.4 **a)** Explain basic administrative structure of a typical cost management system. **06**
b) How to track the Cost and Schedule Performance? **06**

Section – II

Q.5 **Explain**
a) Causes of changes in project. **06**
b) Feed forward techniques. **05**

Q.6 **Write detailed notes on.** **12**
a) Life Cycle Cost
b) Risk management in projects

Q.7 **Explain** **12**
a) Concepts in managing projects for value.
b) Key attributes in value management

Q.8 **Write detailed notes on** **12**
a) Value management process
b) Benefits of Value Management

SLR-FQ-87

Seat No.	

Set P

F.Y. M. Tech. (Semester - III) (New) (CBCS) Examination Dec -2019
Electronics – Telecommunication Engineering
NON CONVENTIONAL ENERGY

Day & Date: Tuesday, 03-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Section – I

Q.1 Attempt any two of the following. **14**

a) Explain hydroelectric conventional energy source using IGCC power generation?

b) State different types of solar thermal power plant? Explain medium temperature solar power plant?

c) Explain Indian power scenario for hydroelectric power potential?

Q.2 What are the emerging new technologies for the energy conservation and efficiency? **07**

Q.3 Attempt the following. **14**

a) Explain thermal energy storage with sensible heat storage and latent heat storage?

b) What is the transmissivity of cover system of solar thermal energy collector? Derive the derivation of polarization component with its Ray diagram?

Section – II

Q.4 Attempt the following. **14**

a) Explain solar cell efficiency with maximizing the output? What is Fill factor of solar cell?

b) What are the different modes of wind power generation? Explain stand-alone mode of wind power generation?

Q.5 Attempt any one of the following. **07**

a) Explain all types of biomass conversion technologies?

b) Explain estimation of wind energy potential? Also explain its calculation equation?

Q.6 Attempt the following. **14**

a) Explain application of PV system based on PV desalination system?

b) Explain Fuel cell characteristics? And write a note on Alkaline Fuel Cell?

SLR-FQ-9

Seat No.	

Set P

F.Y. (M.Tech.) (Semester – II) (New) (CBCS) Examination Dec-2019
Civil – (Structures Engineering)
FEM IN STRUCTURAL ENGINEERING

Day & Date: Thursday, 05-12-2019 Max. Marks: 70
Time: 10:00 AM To 02:00 PM

Instructions: 1) Q. No. 1 & Q. No. 5 are compulsory.
2) Solve any two questions from each section.
3) Use of non-programmable calculator is allowed.
4) Figures to the right indicate full marks.
5) Assume suitable data if required and mention clearly.

Section – I

Q.1	**a)**	Write principle of potential energy of a structural system?	**06**
	b)	Write the potential energy for cantilever beam of span L, subjected to a concentrated load P at free end of span. Assume EI constant.	**07**
Q.2	**a)**	Write a short note on weighted residuals method.	**05**
	b)	State and explain generalized Hooke's law.	**07**
Q.3	**a)**	Explain Pascal's triangle for polynomial function.	**05**
	b)	A beam is subjected to a uniformly distributed load of intensity w per unit length (in -y direction). Derive equivalent nodal force vector.	**07**
Q.4		Develop a shape function for serendipity 8-noded element in natural co-ordinate system.	**12**

Section – II

Q.5		For the element having nodes 1(0,0), 2(1,0), 3(1,1) and 4(0,1), evaluate K11 and K33, assume plain strain condition. Take E = 200 GPa, v = 0.25. (consider the global co-ordinate in meter).	**13**
Q.6		Assemble Jacobian matrix of a 4 node isoparametric quadrilateral element with nodes (0,0),(60,0), (65.7735,10),(5.7735,10) at Gauss point (0.57735, 0.57735)	**12**
Q.7	**a)**	What is axis symmetric problem, explain with various examples?	**05**
	b)	Write a note on iso-parametric, sub-parametric and super-parametric element.	**07**
Q.8		Write lumped mass matrix and consistent mass matrix of a 2 node bar element. Using shape functions of a 2 node bar element, derive consistent mass matrix of a 2 node bar element.	**12**

SLR-FQ-91

Seat No.	

Set P

F.Y. (M.Tech.) (Semester - I) (New)(CBCS) Examination Dec-2019
Computer Science & Engineering
APPLIED ALGORITHMS

Day & Date: Wednesday,11-12-2019 Max. Marks: 70
Time:10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicates full marks.

Section – I

Q.1 Solve **15**
- **a)** Explain Asymptotic notation.
- **b)** Compare the two function n^2 and 2^n /4 for various values of n. Analyze them.

Q.2 Solve any one **10**
- **a)** Explain All Pair shortest path with example.
- **b)** Prove that -Prims algorithm finds a minimum spanning tree.

Q.3 Solve any one **10**
- **a)** Explain optimal binary search trees.
- **b)** Explain reliability design.

Section – II

Q.4 Solve **15**
- **a)** Write Graham's scan method to solve convex hull problem.
- **b)** Explain problem to finding the closest pair of points.

Q.5 Solve any one **10**
- **a)** The traveling salesman problem is NP-complete - Prove it.
- **b)** Explain subset sum problem.

Q.6 Solve any one **10**
- **a)** Explain linear time string matching algorithm i.e. Knuth -Morris-Pratt algorithm.
- **b)** Explain Chinese remainder theorem with example step by step.

SLR-FQ-92

Seat No.	

Set P

F.Y. (M.Tech.) (Semester- I) (New) (CBCS) Examination Dec-2019
Computer Science & Engineering
THEORY OF COMPUTATION

Day & Date: Friday, 13-12-2019 Max. Marks: 70
Time: 10:00 AM to 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Section - I

Q.1 Answer any four. **24**

a) Give the equivalence of deterministic and non deterministic FA. Design the NDFA for the string (00+11)*101(0+1)
b) Design the PDA accepting the string $a^1b^mC^nd^m$ of palindromes of the alphabet (a,b,c,d).
c) Define nondeterministic TM? Prove that every nondeterministic TM has an equivalent deterministic TM.
d) Illustrate A_{NFA}& A_{DFA} in decidability & prove that they are decidable languages.
e) Prove that EQ_{DFA} is a decidable language using Symmetric Difference.

Q.2 What is diagonalization? Prove that R is uncountable where R is a set of real numbers. **06**

Q.3 Design a TM for accepting the strings palindromes with an alphabet (a,b). Give its formal definition with example input illustration. **05**

Section - II

Q.4 Answer any four. **24**

a) Elaborate recursion theorem & prove that MIN_{TM} is not turing recognizable.
b) List & explain growth rate functions.
c) Define mapping reducibility & prove that if $A <_m B$ & B is decidable then A is decidable.
d) Elaborate the time complexity of a TM.
e) Explain tractable & intractable problems.

Q.5 State base functions & strategy sets of primitive recursive functions. **06**

Q.6 Define PCP problem & prove its undecidabilty. **05**

SLR-FQ-93

Seat No.	

Set P

F.Y. (M.Tech.) (Semester - I) (New) (CBCS) Examination Dec-2019
Computer Science & Engineering
DATA MINING

Day & Date: Monday, 16-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Attempt any five questions from each Section questions.
2) Assume suitable data if needed questions.
3) Figures to the right indicate full marks.

Section – I

Q.1	Describe the steps involved in data mining when viewed as a process of knowledge discovery.	**07**
Q.2	Explain with example stars schema, snowflakes schema and fact constellations schema.	**07**
Q.3	Discuss OLAP operations in multidimensional data model.	**07**
Q.4	Elaborate Distance Based Algorithms.	**07**
Q.5	Explain K-Means Clustering Algorithm in details.	**07**
Q.6	Explain various components of data warehouse architecture.	**07**

Section – II

Q.7	Explain with the help of example Attribute-Oriented Induction for Data Characterization.	**07**
Q.8	Explain Spatial Queries.	**07**
Q.9	Explain Time series Analysis with suitable example.	**07**
Q.10	What do you mean by web content mining?	**07**
Q.11	List and explain the applications of data mining.	**07**
Q.12	Explain and define Markov Model.	**07**

SLR-FQ-94

Seat No.	

Set P

F.Y. (M. Tech.) (Semester – I) (New) (CBCS) Examination Dec-2019
Computer Science & Engineering
MACHINE LEARNING©

Day & Date: Wednesday, 18-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable data if required.

Section – I

Q.1 Attempt any three **15**
- **a)** What is Machine learning?
- **b)** Generate a diagrammatic representation of a learning network.
- **c)** Compare between Supervised and Unsupervised learning.
- **d)** Comment on Logistic regression.
- **e)** What is recursive induction w.r.t 'Decision trees'?

Q.2 Attempt any two **10**
- **a)** List and elaborate on different Linear Regression models.
- **b)** How is machine learning carried out?
- **c)** Demonstrate a WELL-POSED learning problem.

Q.3 Attempt any two **10**
- **a)** What are the steps in designing a regression model?
- **b)** Illustrate Bagging and Boosting methods.
- **c)** What are the types of machine learning? Illustrate each.

Section – II

Q.4 Attempt any three **15**
- **a)** Define the term 'Deep Neural Network' and illustrate.
- **b)** How do Support Vector Machines work?
- **c)** Define the term 'Optimization' and illustrate how it is done in ML.
- **d)** Give the exact meanings of the terms 'Training' and 'Testing'.
- **e)** How are number of hidden layers decided in Neural Networks?

Q.5 Attempt any two **10**
- **a)** List and illustrate the applications of deep Learning.
- **b)** How does the Error Back-propagation Algorithm work?
- **c)** Develop an output for Hierarchical clustering.

Q.6 Attempt any two **10**
- **a)** What are the applications of 'Machine Learning'? Illustrate one application.
- **b)** What are the basic features of Neural Networks? Elaborate.
- **c)** List the different types of Clustering. Illustrate one of these.

SLR-FQ-95

Seat No.	

Set P

F.Y. (M. Tech.) (Semester – I) (New) (CBCS) Examination Dec-2019
Computer Science & Engineering
NATURAL LANGUAGE PROCESSING

Day & Date: Friday, 20-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable data if required.

Section – I

Q.1 Answer briefly any three. **15**
- **a)** What is Arg-Max computation?
- **b)** Generate a Word Net application in Query expansion.
- **c)** Compare between Robust and scalable parsing.
- **d)** Comment on Measures of similarity used in Word net Theory.
- **e)** What is Finite state Machine based Morphology?

Q.2 Attempt any two. **10**
- **a)** List and elaborate on different theories used in parsing.
- **b)** How is automatic morphology learning dealt with?
- **c)** Demonstrate HMM with an illustration.

Q.3 Attempt any Two. **10**
- **a)** What are the paradigms used for Morphological analysis?
- **b)** Demonstrate the use of scope ambiguity and attachment ambiguity.
- **c)** How is sequence labeling used in parsing?

Section – II

Q.4 Answer briefly any three. **15**
- **a)** List the Machine learning tools.
- **b)** How is semantic extraction dealt with?
- **c)** Define the term ‘Speech Synthesis’ and illustrate.
- **d)** Give the exact meanings of the terms ‘Precision’ and ‘Recall’.
- **e)** Why is text entailment required?

Q.5 Attempt any two. **10**
- **a)** Illustrate the basic properties of Baum Welch Algorithm.
- **b)** How does Text entailment work? Illustrate.
- **c)** Compare HMM and CLIR.

Q.6 Attempt any two. **10**
- **a)** How does Viterbi Algorithm work?
- **b)** What is POS tagging? Where is it used?
- **c)** List the different applications of NLP. Illustrate one o.

SLR-FQ-96

Seat No.	

Set P

F.Y. (M. Tech.) (Semester – I) (New) (CBCS) Examination Dec-2019
Computer Science & Engineering
SOFT COMPUTING

Day & Date: Friday, 20-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable data if required.

Section – I

Q.1 **Attempt any two.** **14**
- **a)** What is need of Soft Computing? Explain and compare between Conventional AI and Computational Intelligence.
- **b)** Describe Fuzzy reasoning in detail.
- **c)** Explain back propagation algorithm used in supervised learning neural networks.

Q.2 **Attempt any two.** **14**
- **a)** What is Soft Computing? Describe use of Machine Learning in soft computing.
- **b)** What is Fuzzy Sets? Explain any five operations on Fuzzy Sets.
- **c)** Compare between Supervised and Unsupervised Learning. Explain the methods used in Unsupervised Learning Neural Networks.

Q.3 What is Adaptive Networks? Explain recurrent and feed forward adaptive network with the help of diagram. **07**

Section – II

Q.4 **Attempt any two.** **14**
- **a)** What is GA? Explain One point and Two point crossover used in GA.
- **b)** Explain Classification and regress trees, used in Advanced Neuro-Fuzzy modeling.
- **c)** List and explain different techniques recently used in soft computing.

Q.5 **Attempt any two** **14**
- **a)** List and explain applications of GA in machine learning.
- **b)** What is ANFIS? Explain ANFIS Architecture with the help of diagram.
- **c)** What is deep learning? Explain recent trends' in deep learning.

Q.6 Explain Hybrid Learning Algorithm used in ANFIS. **07**

SLR-FQ-97

Seat No.	

Set P

F.Y. (M.Tech.) (Semester - I) (New) (CBCS) Examination Dec-2019
Computer Science & Engineering
Computer Vision

Day & Date: Friday, 20-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q.no.1 and Q.no.5 are compulsory.
2) Solve any two from remaining questions from each section.
3) Assume suitable data wherever necessary.
4) Figures to the right indicate full marks.

Section – I

Q.1	**a)**	Explain different geometric primitives and transformations.	**10**
	b)	Explain 2D geometric transformations.	**05**
Q.2	**a)**	How edges are detected using Hough Transform.	**05**
	b)	Explain different distance functions used for feature matching.	**05**
Q.3	**a)**	Explain main factors affecting the performance of a digital image sensor.	**05**
	b)	Explain median filtering.	**05**

Section – II

Q.4	**a)**	Explain useful properties of Fourier Transform.	**05**
	b)	Explain processing stages occurred in modem digital camera.	**05**
Q.5	**a)**	Explain Guassian mixure model Clustering algorithm.	**10**
	b)	Explain supervised, unsupervised and semi-supervised classification.	**05**
Q.6	**a)**	Explain discriminant function analysis used in classification.	**05**
	b)	Explain how features are reduced using Principal Component Analysis.	**05**
Q.7	**a)**	Explain activity recognition and its various types.	**05**
	b)	Explain photographic calibration.	**05**
Q.8	**a)**	Explain photographic calibration.	**05**
	b)	Explain Bayes Classifier.	**05**

SLR-FQ-98

Seat No.	

Set P

F.Y (M.Tech.) (Semester - I) (New) (CBCS) Examination Dec-2019
Computer Science & Engineering
OBJECT ORIENTED SOFTWARE ENGINEERING

Day & Date: Friday, 20-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 and Q. No. 5 are compulsory.
2) Answer any two questions in each Section.
3) Make suitable assumptions if necessary and state them clearly.

Section – I

Q.1 Answer briefly **15**
- **a)** Explain the Software Architecture and its Relationships to other Disciplines.
- **b)** Write a short note on use case modelling.
- **c)** Explain the life cycle of Domain object.

Q.2 **a)** Write a short note on building blocks of model driven design. **05**
b) Explain how model is expressed in software. **05**

Q.3 **a)** Explain requirement workflow in detail. **05**
b) Draw and explain the use case and activity diagram for saving account banking process. **05**

Q.4 Write a short note on following architectural styles (Any two). **10**
- **a)** Piles & filters
- **b)** Layered system
- **c)** Data abstraction and object orientation

Section – II

Q.5 Answer briefly. **15**
- **a)** Write a short note on Component and connector view type and styles.
- **b)** Explain Customer Relationship Management (CRM) Archetype Pattern.
- **c)** Write a short note on IS2000: The Advanced Imaging Solution.

Q.6 **a)** Write a short note on Module architecture view. **05**
b) Explain Allocation View type and Styles. **05**

Q.7 **a)** Explain literate modeling. **05**
b) Write a note on quality Archetype Pattern. **05**

Q.8 Explain the Object oriented patterns and patterns for Interactive system. **10**

SLR-FQ-99

Seat No.	

Set P

F.Y. (M.Tech.) (Semester – II) (New) (CBCS) Examination Dec-2019
Computer Science & Engineering
RESEARCH METHODOLOGY & IPR©

Day & Date: Thursday, 05-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable data if required.

Section – I

Q.1 **Answer the following questions.** **12**
- **a)** Discuss research design. What are its features?
- **b)** Explain ethical issues in research.
- **c)** Explain objectives of research.

Q.2 **Answer any three from the following questions:** **18**
- **a)** What are different types of research? Explain any two with suitable examples.
- **b)** What is a need of literature review? What are steps to carry it?
- **c)** Explain writing technical research paper for publication.
- **d)** Write a comprehensive note on the “writing research proposal (synopsis)”.

Q.3 With suitable example, explain research problem formulation. **05**

Section – II

Q.4 **Write short notes on:** **12**
- **a)** Need of simulation in research
- **b)** Copyright-IPR
- **c)** Scope of patent rights

Q.5 **Answer any three from the following questions:** **18**
- **a)** Explain need and techniques of Mathematical modeling.
- **b)** Write about procedure for grants of patents.
- **c)** Explain in brief about “Geographical Indications”.
- **d)** Explain trademarks for identification of products or services.

Q.6 Explain Monte Carlo Simulation. **05**