Seat No.

F.Y. (M.Tech.) (Sem - I) (New) (CBCS) Examination: Oct/Nov-2022 CIVIL – (STRUCTURES ENGINEERING) Advanced Structural Analysis

Day & Date: Monday, 20-03-2023 Time: 09:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 and Q. no.5 are compulsory.

2) Solve any two remaining questions from each section.

- 3) Figures to the right indicate full marks.
- 4) Assume suitable data if necessary.

Section – I

Q.1 Draw ILD for Mc and SFc of following continuous beam. Calculate ordinate at 1 m interval.



Q.2 Draw ILD for Reaction at 'A' and Moment at 'C' for following frame.

Q.3 A quarter circle beam as shown if fig 3 is subjected to vertical downward load P at its free end. Sketch SFD, BMD and TMD. Also Find the deflection at free end.



Max. Marks: 70

12

11



Set P

- SLR-HK-1
- An infinitely long beam supported on elastic foundation is subjected to an uniformly Q.4 12 distributed load 'w' over a short length of 'l' of the beam. Draw SFD, BMD, deflection and foundation pressure diagram.

Section – II

Analyze the beam shown in fig.4 by stiffness method. Q.5 Support B sinks by 10 mm. Take EI = 6000 kNm²



20 km

20

C

(5)

20KN

24

Q.6 Analyze the frame shown in fig.5 by stiffness method.

B





60





11

Seat	
No.	

F.Y. (M.Tech.) (Sem - I) (New) (CBCS) Examination: Oct/Nov-2022 CIVIL - (STRUCTURES ENGINEERING) Advanced solid Mechanics

Day & Date: Tuesday, 21-03-2023 Time: 09:00 AM To 01:00 PM

Instructions: 1) Question no. 2 is compulsory in section I, and solve any one question from the remaining. Question no. 6 is compulsory in section II, and solve any one question from the remaining.

- 3) Use of non programmable calculator is allowed.
- 4) Numbers to right hand indicate full marks.
- 5) Use suitable data if necessary and mention it clearly.

Section I

Q.1	a)	Derive differential equations of equilibrium for 2 D problems of elasticity in	06
	b)	Rectangular Coordinate System. What are Plane stress and plane Strain conditions? Describe with neat	05
	c)	sketches and examples. Write equation of Modified Hook' Law.	06
Q.2	a) b)	Examine whether $\emptyset = A (x^4 - 3x^2y^2)$ is Airys stress function. Using Airy's stress function, obtain fourth degree bi-harmonic equation representing stress flow in structures.	07 07
	c)	What are stress resultants? Explain.	04
Q.3	a) b)	Obtain Strain compatibility equations for 3 D problems in elasticity. Obtain differential equations of equilibrium for 2-D problems in Polar coordinate system.	09 08
		Section II	
Q.4	a) b) c)	Differentiate between Elasticity and Plasticity. What is idealized stress strain Curve? Explain with neat sketches. Write a note on Saint Venant's Method.	04 07 06
Q.4 Q.5	a) b) c) Exp	Differentiate between Elasticity and Plasticity. What is idealized stress strain Curve? Explain with neat sketches. Write a note on Saint Venant's Method.	04 07 06 18
Q.4 Q.5	a) b) c) Exp a) b) c)	Differentiate between Elasticity and Plasticity. What is idealized stress strain Curve? Explain with neat sketches. Write a note on Saint Venant's Method. Iain following terms. Von Mises Criteria. Tresca's Yield criteria Isotropic hardening	04 07 06 18

Max. Marks: 70

Set P

Seat No.

F.Y. (M.Tech) (Sem - I) (New) (CBCS) Examination: Oct/Nov-2022 CIVIL- (STRUCTURES ENGINEERING) Structural Dynamics

Day & Date: Thursday, 23-03-2023 Time: 09:00 AM To 01:00 PM Max. Marks: 70

Set

Instructions: 1) Solve any five questions.

- 2) Figures to the right indicates full marks.
- 3) Make suitable assumptions if necessary and state them clearly.
- Q.1 A Vibrating system consisting of a weight of 1000KN and spring stiffness of 80KN/m is viscously damped so that two consecutive amplitude are 1cm to 0.85cm. Determine a) the logarithmic decrement b) Natural Frequency c) Damping ratio d) Damping Coefficient e) The damped natural Frequency.
- Q.2 From first principle derive the governing differential equation for undamped free vibration. Obtain the solution if SDOF is given an initial displacement xo and initial velocity Vo.
- 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.



- Q.4 Write note on a) Dunkerly's Method b) Mode superposition Method c) Duhamal's 14 Integral.
- **Q.5** Determine fundamental Frequency of Vibrations using Rayleigh method for the system shown in Figure 2. Take $m_1 = 2000$ Kg, $m_2 = 1500$ Kg, $m_3 = 1000$ Kg and $k_1 = 1800$ kN/m, $k_2 = 1200$ kN/m and $k_3 = 600$ kN/m

Assume Fundamental Mode as { 0.30 0.644 1.00}



Figure 2

- Q.6 Write Note of a) Static condensation b) orthogonality conditions c) Eigen Value 14 problem.
- Q.7 Perform free vibration analysis of a simply supported beam and determine its first three natural frequencies and mode shapes.

Set

Seat	
No.	

F.Y. (M.Tech.) (Sem - I) (New) (CBCS) Examination: Oct/Nov-2022 **Civil – (Structures Engineering) Research Methodology and IPR©**

Day & Date: Friday, 24-03-2023 Time: 09:00 AM To 01:00 PM

Max. Marks: 70

Instructions: 1) Question 3 and Question 6 are compulsory.

- 2) Solve any one question from remaining questions from each section.
- 3) Figures to the right indicate full marks.
- 4) Make necessary assumptions if required.

Section – I

Q.1	a)	What do you mean by a research? Explain its significance in modern times and industrial economy.	09
	b)	What is a research problem? Define the main issues which should receive the attention of the researcher in formulating the research problem. Give suitable examples to elucidate your points.	08
Q.2	a)	What is literature review in research? What are the sources of literature? Explain its importance and methods.	09
	b)	Explain the meaning and significance of a 'Research design.'	80
Q.3	Sol a) b) c) d)	ve any three of the following. What do you mean by a 'Hypothesis'? How is it tested? Describe the 'Brain Storming' technique adopted for 'Idea generation' in industries. Discuss the contents and outline of a Technical Research Paper. Explain ethical and legal aspects in research.	06 06 06 06
		Section – II	
Q.4	a)	Explain the various types and domains of Patents. Discuss the importance of patents in the industrial world.	09
	b)	Elaborate the conditions to be satisfied by an invention to be patentable. Describe the process of acquisition of patent rights. Describe the types of inventions that are not patentable in India?	80

- Q.5 Explain the role of World Trade Organization (WTO) in promoting Intellectual 09 a) **Property Rights?**
 - What do you mean by a 'Copy Right? List the types of Intellectual works for b) **08** which one can take a copyright.

Answer the following question. (Any Three) Q.6

- a) Write a short note on 'Traditional knowledge and Intellectual property Rights'. 06 06
- b) What is meant by 'Design' under the Designs Act, 2000?
- c) What is a trademark? What are the legal requirements for registering a 06 trademark in India?
- d) What are Geographical Indications? How one can obtain legal protection under 06 Geographical Indications for in India?

Seat	
No.	

Set | I

F.Y. (M.Tech.) (Sem - I) (New) (CBCS) Examination: Oct/Nov-2022 CIVIL – (STRUCTURES ENGINEERING) Advanced Design of Concrete Structures

Day & Date: Saturday, 25-03-2023 Time: 09:00 AM To 01:00 PM Max. Marks: 70

Instructions: 1) Section- I Q. 2 is compulsory & attempt any one question from the remaining. 2) Section- II Q. 4 is compulsory & attempt any one question from the

- remaining.
- 3) Use of IS 456 and IS 3370 part IV are allowed.
- 4) Assume suitable data if necessary.
- 5) Draw neat sketches wherever necessary.

Section – I

- Q.1 A R.C. grid floor is to be designed to cover a floor area of 10 m x 16 m. The spacing of the ribs in mutually perpendicular directions is 1.5 m c/c. Live load on floor is 3.5 kN/m². Adopt M₂₀ grade concrete and Fe ₅₀₀ steel. Assume ends are simply supported. Analyse the grid floor by IS 456:2000 method and design suitable reinforcements in the grid floor.
- Q.2 Design a combined rectangle footing to support two columns of 400 mm x 400 mm and 500 mm x 500 mm spaced 4.5 m apart, carrying axial loads of 900 kN and 1100 kN respectively. The SBC of the soil is 200 kN/m². Adopt M₂₀ grade of concrete and Fe 415steel.
- Q.3 a) Design a corbel to carry an ultimate load of 620 kN at a distance of 250 mm
 from the face of a column of size 400 mm x 400 mm. Use M₂₅ grade of concrete and Fe₅₀₀ steel.
 - b) When the beam is termed as deep beam and what are the guide line used for determination of lever arm for deep beams?

Section – II

- Q.4 Design a rectangular ESR having capacity 35,000 litres ESR with individual wall panel, top hinged, bottom and vertical edges are fixed. The bottom slab is resting on four beams supported by four peripheral columns. The depth of water may be kept as 3 m with free board 0.3m. Use M₂₅ grade of concrete and Fe₅₀₀ Steel. Adopt IS code method of design.
- **Q.5** Design a chimney of height 72 m and check the stresses in bars. Use following
data,
External Diameter = 4m at top and 4.8 m at base
Shell thickness = 200 mm at top and 400 mm at base
Wind intensity = 1.8 kN/m², throughout,
Thickness of fire brick lining = 100 mm and air gap is 100 mm,
Temperature difference = 72° C and coefficient of thermal expansion is
 $11 \times 10^{-6}/C^{\circ}$, Es = 210×10^{3} N/mm²,17

Unit weight of brick lined = 20 kN/m^3 . Use M₂₅ grade of concrete and Fe₅₀₀ Steel.

- Q.6 a) Design the side wall and hopper bottom of a rectangular bunker of capacity 320 kN to store wheat of unit weight 8 kN/m³, angle of repose 25°. Use M₂₀ grade of concrete and Fe₅₀₀ Steel.
 b) Draw a sketch of silo and show its components. 14

Page 1 of 1

SLR-HK-7

Set

Seat	
No.	

F.Y. (M.Tech.) (Sem - I) (New) (CBCS) Examination: Oct/Nov-2022 **CIVIL - (STRUCTURAL ENGINEERING) Advanced Design of Foundation**

Day & Date: Saturday, 25-03-2023 Time: 09:00 AM To 01:00 PM

Max. Marks: 70

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 Explain the different modes of shear failure with the help of neat sketches. 04 a) 04
 - b) Discuss the effect of ground water table on bearing capacity of soil.
 - c) A square footing fails by general shear in a cohesionless soil under an ultimate 05 load of 3000 KN. The footing is placed at a depth of 3m below ground level. Take $\phi = 35^{\circ}$, $N_a = 41.4$, $N\gamma = 42.4$ and $\gamma = 19$ KN/m³. Determine the size of the footing if the water table is at a great depth.
- Q.2 Explain the procedure for the design of strap footing. 05 a)
 - A trapezoidal footing is to be produced to support two square columns of 30cm 07 b) and 50cm sides respectively. Columns are 6m apart and safe bearing capacity of the soil is 400 KN/m². The bigger column carries 5000 KN and the smaller 3000 KN. Design a suitable size of the footing so that it does not extend beyond the faces of the column.
- Explain under what circumstances raft foundation is adopted. 03 Q.3 a) Explain different design methods for raft foundation. 07 b)
 - Section II
- Write a note on under-reamed piles. Q.4 a)
 - In a 16 pile group, the pile diameter is 450 mm and centre to centre spacing of b) 80 the square group is $1.5 m. If C = 50 KN/m^2$, determine whether the failure would occur with the pile acting individually or as a group? Neglect bearing at the tip of the pile. All piles are 10 m long. Take $\propto = 0.7$ and factor of safety 2.5. Also find safe allowable load.

Q.5	a) b)	Explain various forces acting on well foundation. What do you understand by scour depth and grip length? What is its importance in well foundation?	06 05
Q.6	a)	Discuss the criteria for satisfactory performance of machine foundation.	05
	b)	Explain design of simple machine foundations using IS code method.	07



Seat	
No.	

F.Y (M. Tech.) (Sem - II) (New) (CBCS) Examination: Oct/Nov-2022 **Civil – (Structures Engineering)** FEM in structural engineering

Day & Date: Monday, 20-03-2023 Time: 02:00 PM To 06:00 PM

Instructions: 1) Solve any 5 from below.

- 2) Use of non-programable calculator is allowed.
- Figures to the right indicate full marks.
- 4) Assume suitable data if required and mention clearly.
- Write Short note on Variation Principle. Q.1 07 a) Explain finite element procedure/steps with suitable example/in details 07 b) What is meant by discretization of a structure? Discuss the various aspects Q.2 08 a) to be considered while discretizing a structure for finite element analysis. Write short note on Pascal's triangle for polynomial function. b) 06
- Q.3 Determine the shape functions for 4 noded rectangular elements. Use 08 a) natural coordinate system. 06
 - Explain the term b)
 - Constant strain triangle (CST) i)
 - Linear strain triangle (LST) ii)
 - Quadrilateral strain triangle (QST iii)
- The thin bar of uniform thickness 20 mm, is as shown in figure below. In 14 Q.4 a) addition to the self-weight, the plate is subjected to point load of 400N at mid-depth. The young's modulus $E=2 \times 10^5 N/mm^2$ and unit weight = 0.8 x 10-4N/ mm². Analyze the bar after modeling it with two element and find the stresses in each element. Determine the support reaction also



Q.5 Explain the term a)

- Isoparametric elements i)
- ii) Superparametric element
- Subparametric element iii)
- Development of element stiffness matrix and nodal load vector in iv) axisymmetric elements

08

Set

Max. Marks: 70

SLR-HK-9

- **b)** Write short note on Gauss-quadrature integration.
- **Q.6 a)** For the isoparametric quadrilateral elements shown in Figure 2, determine **14**
 - i) Cartesian coordinates of the point P which has local coordinates ξ =057735. And η = 057735
 - ii) Local coordinates of the point Q which has Cartesian coordinates (7, 4)



Q.7 Write short notes on the following shell elements

- a) Facet elements
- b) Curved elements
- c) Solid elements
- d) Degenerated elements
- e) Hamillon's principle
- f) Finite Element Applications to Structural Dynamics
- **g)** Axisymmetric Elements

Seat	
No.	

F.Y. (M.Tech.) (Sem - II) (New) (CBCS) Examination: Oct/Nov-2022 CIVIL - (STRUCTURES ENGINEERING) Theory of plates and shells

Day & Date: Tuesday, 21-03-2023 Time: 02:00 PM To 06:00 PM Max. Marks: 70

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 a brief account of classification of plates and write strain displacement relation in Cartesian coordinate system.	07
	b)	Derive differential equation for the deflection surface of laterally loaded rectangular plates.	11
Q.2	a)	Compare Navier's method and Levy's methods as applied to solution of rectangular plate problems	05
	b)	Using Nevier's solution obtain expression for deflection of a simply supported plate subjected to UDL.	12
Q.3	a) b)	Describe Rayleigh-Ritz approach for analysis of plates. Analyse a circular plate of radius 'a' supported throughout along its outer edge and subject to uniform moment M.	05 12
		Section – II	
Q.4	a) b)	Give types of shells with the help of neat sketches. Obtain equations of equilibrium for cylindrical shells using membrane theory.	07 11
Q.5	a)	Describe Membrane theory of shells.	05 12
	b)	 Finsterwalder's theory D. K. J. theory 	12
Q.6	a)	Differentiate between the membrane theory and the bending theory of	07
	b)	Describe thermal stresses in plates and shells.	10

Set P

Seat	
No.	

F.Y (M.Tech.) (Sem - II) (New) (CBCS) Examination: Oct/Nov-2022 CIVIL – (STRUCTURES ENGINEERING) Seismic design of multistoried buildings

Day & Date: Thursday, 23-03-2023 Time: 02:00 PM To 06:00 PM Max. Marks: 70

Instructions: 1) Q. No.3 and Q. No 6 are compulsory.

- 2) Solve any one from each section.
- 3) Figures to the right indicates full marks.
- 4) Assume suitable data if required.
- 5) Use of IS 1893 is permitted.

Section – I

Q.1	a) b) c)	Write a note on Earthquake Terminology. What do you understand by Intensity and Magnitude of Earthquake? Explain the concept of soil liquefaction.	05 06 06
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	3 Explain in detail Earthquake design philosophy with respect to effect of irregularities and architectural planning in detail. Also explain general principles of EQ resistant Building.		18

Section – II

- Q.4 What do you understand by as of soft storey? How will you reduce failure in soft17 Storey? What are the general code provisions for design of soft storey?
- Q.5Explain Seismic response control concepts in details with all types.17
- Q.6 Consider a four-storey reinforced concrete office building shown in Fig. 1.1. The building is located in Shillong (seismic zone V). The soil conditions are medium stiff and the entire building is supported on a raft foundation. The R. C. frames are infilled with brick-masonry. The lumped weight due to dead loads is 12 kN/m² on floors and 10 kN/m² on the roof. The floors are to cater for a live load of 4 kN/m² on floors and 1.5 kN/m² on the roof. Determine design seismic load on the structure as per new code.

Set P



ELEVATION Figure 1.1 - Building Configuration

Seat	
No.	

F.Y (M. Tech.) (Sem - II) (New) (CBCS) Examination: Oct/Nov-2022 Civil – (Structures Engineering) Concrete Composites

Day & Date: Friday, 24-03-2023 Time: 02:00 PM To 06:00 PM Max. Marks: 70

Instructions: 1) Section-I Q.1 is compulsory. Attempt any one question from the remaining.

- 2) Section-II Q.4 is compulsory. Attempt any one questions from the remaining.
- 3) Figures to the right indicates full marks.

Section-I

Q.1	a)	Explains the Mix proportion of FRC? Explains the properties of freshly mixed concrete of FRC	06
	b)	What is mean by Fiber Reinforced Concrete. Explains the different types of	06
	c)	Explains the factors affecting the properties of Fiber Reinforced Concrete.	05
Q.2	a) b)	What are the applications of Fiber Reinforced Concrete? Explains the mechanical properties of Ferro cement? Explains the application of Ferro cement	06 06
	c)	Explains the mechanical properties of Fiber reinforced concrete.	06
Q.3	a)	Explains the properties of constituent materials of Fiber reinforced	06
	b) c)	Explain the materials used in Ferro cement. Explains the Advantages and Disadvantages of Ferro cement?	06 06
		Section-II	
Q.4	a) b) c)	Explain the Silica Fume Concrete with respect to durability of concrete. State the applications of Silica Fume Concrete. Explain the reaction mechanism of Silica Fume Concrete.	06 06 05
Q.5	a)	What are the applications of polymer impregnated concrete and polymer concrete?	06
	b)	 Briefly explain the following: 1) Classification of Polymer Concrete 2) Advantages & Disadvantages of Silica Fume Concrete. 	06 06
Q.6	a) b)	Write note on types of polymer concrete Explain properties of constituent materials of Polymer Concrete.	05 06

c) Explain different physical and chemical properties of Silica Fumes. 06

Set P

12

Seat No.

F.Y. (M.Tech) (Sem - II) (New) (CBCS) Examination: Oct/Nov-2022 CIVIL – (STRUCTURES ENGINEERING) Design of RCC Bridges

Day & Date: Saturday, 25-03-2023 Time: 02:00 PM To 06:00 PM

Instructions: 1) Section-I Q.2 is compulsory. Attempt any two question from the remaining.

- 2) Section-II Q.6 and Q.7 is compulsory. Attempt any one questions from the remaining.
- 3) Figure to the right indicate full Marks.
- 4) Assume suitable data is necessary and mention it clearly.

Section – I

- Q.1 An RCC deck slab bridge is to be constructed over a Trapezoidal channel of 6 m
 base width and side slope 1:1 laid at a bed slope of 0.2 m/km. The following details are available. Design the slab bridge.
 - a) Chezy s constant =60.
 - b) Bed level of stream: 100 m
 - c) Bottom slab level :103.0 m
 - d) Loading IRC Class AA (Tracked)
 - e) Materials- M25 Concrete, Fe 415 Steel
 - f) Road width=7.5 m
 - g) Footpath: 600 mm on either side
 - h) Wing wall; Splayed type
 - i) Span Of the deck =4 m

Give details of reinforcement with the help of neat sketch.

Q.2 A box culvert having inside dimensions of 3m x 3m. this culvert is subjected to a dead load of 14kN/m2 and a live load of IRC Class AA tracked vehicle. Assume the unit weight of soil to be 18 kN/m³. the angle of repose of soil is 30° Use M25 concrete and 415 steel. Road width is 7.5 m. Span is 3.3 m. Calculate Bending moment, Shear force and axial force, for the case Dead load and live loads acting from outside, while no water pressure from inside.

- Q.3 a) Write a note on Guyon -massonet Theory for the analysis of slab panels. What 06 is the limitation of the theory?
 - b) What is economic span? how it is calculated? Derive the equation For the same

Q.4 Write a note on: (4x3=12)

- a) Write importance of bridge engineering.
- **b)** Investigation of bridge site.
- c) Breaking forces on bridge.
- d) Bridge bearing.

Set P

Max. Marks: 70

11

Section – II

Q.5 Design of pier By using following data

Superstructure: Simply supported T- beam of 21.3 m span Foundation: Well foundation Reaction due to live load on the one span = 900 kN Dead load from each span=2250 kN. Maximum mean velocity of current =3.6 m/sec Material for pier: Cement concrete M 20 grade Live load: IRC Class A whichever produces severer effect Only the straight portion of the pier will be considered in design here. It is required to check the adequacy of the dimensions.



Q.6 Write Short note on:

- a) Erection of the superstructure of the bridge.
- **b)** Inspection of bridge
- c) Types of piles.
- d) Expansion joints.

Q.7 a) Write on different type Culvert with their suitability. 04

- **b)** Describe the elastomeric bearing along with neat sketch.
 - c) Explain various Method of Inspection of bridge.
- Q.8 a) It is required to design an elastomeric pad bearing foe a two-lane R.C. T-beam 06 bridge of 15.0 m clear span with following data: Maximum Dead load reaction per bearing: 280KN Maximum live load reaction per bearing: 520KN Vertical reaction induced by longitudinal forces per bearing: 12kN Longitudinal force per bearing: 33 kN Concrete for t- beam and bed block over pier: M20 A1/A2 >2 Rotation at bearing of superstructure due to D.L. and L.L.=0.0025 rad.
 - **b)** Explain Types of bridge maintenance.

05

12

04

Set

Seat	
No.	

S.Y. (M.Tech.) (Sem - III) (New) (CBCS) Examination: Oct/Nov-2022 CIVIL – (STRUCTURES ENGINEERING) Business Analytics

Day & Date: Monday, 27-03-2023 Time: 03:00 PM To 06:00 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.

- a) What is Data Mining? State different terminology and notations used in data mining.
- b) Describe the concept of 'PCA: Principal Component Analysis'.
- c) Explain rescaling, aggregation and hierarchy concept of data visualization.

Q.2 Attempt any two.

- a) What is data visualization? Explain in details about the basic charts of data visualization.
- **b)** Explain dimension reduction and state why reducing the number of categories in categorical variables are important.
- c) Describe business analytics process in details.
- Q.3 State the difference between supervised and unsupervised learning process. 07

Section – II

Q.4 Attempt any two.

- a) Describe the concept of evaluating predictive performance with lift chart.
- b) Explain regression tree concept with its advantages and weaknesses.
- c) What is clustering? Explain feature selection for clustering by using filter models.

Q.5 Attempt any two.

- a) Describe multiple linear regression. How variable selection has done in linear regression?
- b) Explain in detail 'K-means algorithm'.
- c) Describe performance evaluation and evaluate predictive performance with Naive benchmark.
- **Q.6** What is classifier? Explain Naive Bayes classifier in detail.

07

Max. Marks: 70

14

14

14

Subject t	o 3	$3 \times 1 + 2 \times 2$	≥ 1				
-	2	$2 \times 1 + \times 2 \ge$	1				
	>	<1+2 ×2≥	<u>≥</u> 3				
		$\times 1 \& \times 2$	$2 \ge 0$				
Explain t ∞(infinit	he charac v)/∞)	cteristics of E	rlang Queu	ing Model	(M/M/1)	: (FCFS/	04
Explain M	/onto Car	rlo Simulatior	n Technique	Э.			04
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remaining. 3) Figures to the right indicate full marks. 4) Make necessary Assumptions if required. Section – I Q.1 Define LPP and state its advantages and disadvantages. a) Solve the following LPP using Big M method. b) Minimize $Z = 12 \times 1 + 20 \times 2$

> $6 \times 1 + 8 \times 2 \ge 100$ $7 \times 1 + 12 \times 2 \ge 120$ $\times 1$ and $\times 2 > 0$

b) Discuss the various relations regarding Primal and Dual LPP.

Solve the dual LPP of the following Primal LPP. Also interpret the optimal

CIVIL - (STRUCTURES ENGINEERING) **Operation Research** Day & Date: Monday, 27-03-2023

Subject to

a) What is Sensitivity analysis?

solution to the Primal LPP. Minimize $Z = 3 \times 1 + 2 \times 2$

Seat

No.

Q.2

Q.3

C)

a)

b)

C)

Time: 03:00 PM To 06:00 PM

Instructions: 1) Section-I Q.3 is compulsory. Attempt any one question from the remaining.

2) Section-II Q.4 is compulsory. Attempt any one questions from the

S.Y. (M.Tech.) (Sem - III) (New) (CBCS) Examination: Oct/Nov-2022

SLR-HK-21

Max. Marks: 70

12

03

04

10

Section – II

Q.4	a) b)	Explain the various costs associated with Inventory. A particular item has a demand of 9000 units/ year. The cost of one procurement is rupees 100 and the holding cost per unit per year is Rs. 2.40. The replacement is instantaneous and the shortages are allowed. The shortages cost is Rs. 5/ unit/year. Calculate the EOQ. Also find the annual inventory cost if the unit-nurchase cost is Rs: 2			
	c)	Explain the application of minimum spanning tree problem with suitable example.	05		
Q.5	a)	What are the types of replacement models? Explain in brief with suitable	05		
	b)	The Probability of failure for certain electronic component observed over the usage time is given below;	12		
	Fa Pro	ilure at the end of month 1 2 3 4 5 6 obability of failure 0.09 0.16 0.24 0.36 0.12 0.03 Initially 1000 units are put in the service simultaneously. If the individual single component is replaced it costs rupees 3 but if it is replace in a group, it costs rupees 0.70. Determine the group replacement age for the component.			
Q.6	a) b) c)	Explain the significance of crashing the network. Write a note on ABC analysis. A small project consists of the following activities given with their completion time in days	03 04 10		

Activity	1-2	1-3	1-4	2-3	2-6	3-5	3-6	4-5	5-6
Time	23	8	20	16	24	18	4	19	10

Draw the project network and identify the critical path. Find the Optimal project duration. Calculate the total float for all the activities

1) 2) 3)

Set

Max. Marks: 70

SLR-HK-22

Seat No.

S.Y. (M.Tech) (Sem - III) (New) (CBCS) Examination: Oct/Nov-2022 **ČIVIL - (STRUCTURES ÉNGINEERING) Cost Management of Engineering Projects**

Day & Date: Monday, 27-03-2023 Time: 03:00 PM To 06:00 PM

Instructions: 1) Q. no. 3 is compulsory. Attempt any one question from section I.

2) Q. no. 6 is compulsory. Attempt any one question from section II.

3) Figures to the right indicates full marks.

4) Make suitable assumptions if required.

Section - I

Q.1	a)	Describe the various element of cost and explain how selling price of the product is determined	
	b)	Differentiate between fixed cost and variable cost with suitable example.	08
Q.2	a)	Explain in brief about cost, value and price with suitable example and why	09
	b)	What do you mean by cost control explain the various steps involved in the process of cost control?	08
Q.3	Writ a) b) c) d)	te a short note on any three. Tracking cost and schedule performance Parametric model in cost estimations Earn value for variable budget Time value of money	18
		Section - II	
Q.4	a) b)	Explain in brief about integrated cost management programme. Explain in brief about concept of value management why their is need for Value Management in projects.	08 09
Q.5	a)	Explain in brief relationship between project value and risk with suitable	09
	b)	What is value analysis explain in brief about earned value management for assessing project performance.	08
Q.6	Writ a)	te short notes (Any Three) Integrated cost and value project	18
	b) c)	Feed forward technique in cost management	
	d)	Relevancy of earned value management	

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Set S.Y. (M.Tech.) (Sem - III) (New) (CBCS) Examination: Oct/Nov-2022 CIVIL - (STRUCTURES ENGINEERING)

Day & Date: Monday, 27-03-2023 Time: 03:00 PM To 06:00 PM

Instructions: 1) All questions are compulsory.

Attempt any two of the following.

2) Figures to the right indicate full marks.

3) Assume suitable data if necessary.

Section – I

Non Conventional Energy

a) Explain nuclear power with nuclear fission and fusion? **b)** What is meant by solar air conditioning? Explain absorption cooling system in detail? c) What are specification of energy storage device with its category review? Q.2 Attempt the following. 07 Explain biomass energy dispersed generation system? Q.3 Attempt the following. 14

- a) What are the material used in phase change energy storage? Explain it with typical latent heat storage arrangement?
- b) Explain Laws of thermal radiation with its graph?

Section – II

Q.4	Attempt the following.				
	a)	Explain solar cell characteristics and principles? Write a note on typical solar cell design?			
	b)	Explain basic wind energy conversion system with energy storage also explain its pumping application?			
Q.5	Attempt any one of the following.				
	a)	Explain biomass classification with downdraft gasifier?			
	b)	Write a short note on hydrogen production by electrolysis?			
Q.6	Att	empt the following.	14		
	a)	Explain basic fundaments and principles of wind energy conversion? Comment			
		on available wind power (Pa)?			
	h)	Explain Floating Drum type biogas plant (KV/IC) model?			

b) Explain Floating Drum type blogas plant (KVIC) model?

SLR-HK-23

Max. Marks: 70

14

Seat No.

Q.1

Seat	
No.	

F.Y. (M.Tech) (Sem - I) (New) (CBCS) Examination: Oct/Nov-2022 MECHANICAL – (DESIGN ENGINEERING) Advanced Stress Analysis

Day & Date: Monday, 20-03-2023 Time: 09:00 AM To 12:00 PM

Instructions: 1) Q. no. 3 is compulsory and Attempt any one question from Section – I.

2) Q. no. 6 is compulsory and Attempt any one question from Section – II.

- 3) Figures to the right indicate full marks.
- 4) Make necessary assumptions if required.

Section – I

- Q.1 a) What are the strain-displacement relations?
 b) Derive the compatibility equation for plane stress problem in Polar 12 coordinates.
- **Q.2 a)** Explain the significance of Airy stress function in stress analysis. **05 b)** Investigate what problem of plane stress can be solved by using the **12** following Airy stress function $\emptyset = \frac{-F}{d^3} [xy^2](3d - 2y)$ for the region included by y = 0 to d and $0 \le x \le 1$.
- Q.3 a) Derive the stresses induced in solid rotating disk having uniform thickness.
 b) Determine the variation of stresses induced in thick cylinder subjected to an
 06
 - internal pressure of 300Mpa. The internal diameter of cylinder is 20mm and thickness is 20mm.

Section – II

- Q.4 a) State the assumptions made in theory of contact stresses.
 b) Derive the expression for wear strength of involute gears using contact 12 stress theory.
- Q.5 a)Define shear centre and explain its significance.05
 - b) Locate the shear centre for the following section having uniform thickness 12 of 5mm.







Q.6	a)	Write a note on Castigliano's Theorem.	06
	b)	Derive the expression for torque and angle of twist for a prismatic bar	12
		having elliptical cross section.	

Seat	
No.	

F.Y. (M.Tech) (Sem - I) (New) (CBCS) Examination: Oct/Nov-2022 MECHANICAL – (DESIGN ENGINEERING) Advanced Vibrations and Acoustics

Day & Date: Tuesday, 21-03-2023 Time: 09:00 AM To 12:00 PM

Instructions: 1) Solve any five questions.

- 2) Figures to the right indicates 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 $m_1 = m_2 \& 1_1 = 1_2 = 1_3$



Q.2	a)	Derive an equation for the response of a damped system subjected to an impulsive input.	07
	b)	Write the equations of motions for an undamped multi-degree freedom system. Represent these equations in matrix form.	07
Q.3	a) b)	Explain principle of dynamic vibration absorber. Explain Rayleigh's method to find natural frequency of multi-degree freedom system.	07 07
Q.4	a)	What is coordinate coupling? Explain only dynamic coupling.	07
	b)	Write a note on longitudinal vibrations of bars (a continuous system).	07
Q.5	a)	Write a note on forced vibrations with nonlinear spring forces.	07
	b)	Explain power spectrum & power spectral density in case of random vibrations.	07
Q.6	a)	What are nonlinear vibrations? Discuss in detail with examples.	07
	b)	What are random vibrations? Explain the terms time averaging & expected value.	07
Q.7	a)	Explain construction & working of FFT analyzer.	07
	b)	Write note on sound fields.	07

Max. Marks: 70

Set P



Seat	
No.	

F.Y. (M.Tech) (Sem - I) (New) (CBCS) Examination: Oct/Nov-2022 MECHANICAL - (DESIGN ENGINEERING) Industrial Instrumentation

Day & Date: Thursday, 23-03-2023 Time: 09:00 AM To 12:00 PM

Max. Marks: 70

Instructions: 1) Q. 1 & Q. 4 Compulsory & Attempt any one question from section - I.

2) Q. 5 & Q. 8 Compulsory & Attempt any one question from section - II.

3) Figures to the right indicates full marks.

4) Make suitable assumptions if necessary and state them clearly.

Section - I

Q.1	a)	Describe the functional elements of the measurement system with block	08
	b)	Explain the terms Accuracy and Precision associated with the instruments. Also explain difference between them.	04
Q.2	a)	Explain with neat sketch LVDT for linear and rotary motion.	05
	b)	Explain linearity, threshold and hysteresis characteristics related to instruments.	06
Q.3	a)	Explain with neat sketch Gear dynamometer.	06
	b)	Explain with neat sketch Dead weight pressure gauge.	05
Q.4	Writ a) b) c) d)	te short notes on (Any Three): Prony-Brake Dynamometer D-A conveter Capacitive type transducer Electro dynamic transducer	12
		Section - II	
Q.5	a)	Explain principle and working of bimetal helix thermometer.	06
	b)	Explain a seismic instrument for vibration measurement.	06
Q.6	a)	Explain system analysis by transient testing.	06
	b)	Explain wear behavior monitoring.	05
Q.7	a)	Explain Frequency system analysis by harmonic testing.	06
	b)	Explain Hot wire anemometer with neat sketch.	05
Q.8	Writ a) b)	te short notes on (Any Three) Capacitor Microphone Data display and Storage	12

- c) Thermistors
- d) Dead weight pressure gauge

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Seat No.

F.Y. (M.Tech.) (Sem - I) (New) (CBCS) Examination: Oct/Nov-2022 Mechanical – (Design Engineering) **Research Methodology and IPR©**

Day & Date: Friday, 24-03-2023 Time: 09:00 AM To 12:00 PM

Instructions: 1) Question 3 and Question 6 are compulsory.

- 2) Solve any one question from remaining questions from each section.
- 3) Figures to the right indicate full marks.
- 4) Make necessary assumptions if required.

Section – I

Q.1 a) What do you mean by a research? Explain its significance in modern times and 09 industrial economy. **b)** What is a research problem? Define the main issues which should receive the 08 attention of the researcher in formulating the research problem. Give suitable examples to elucidate your points. a) What is literature review in research? What are the sources of literature? Q.2 09 Explain its importance and methods. b) Explain the meaning and significance of a 'Research design.' **08** Solve any three of the following. Q.3 a) What do you mean by a 'Hypothesis'? How is it tested? 06 **b)** Describe the 'Brain Storming' technique adopted for 'Idea generation' in 06 industries. c) Discuss the contents and outline of a Technical Research Paper. 06 d) Explain ethical and legal aspects in research. 06

Section – II

- Q.4 a) Explain the various types and domains of Patents. Discuss the importance of 09 patents in the industrial world. **b)** Elaborate the conditions to be satisfied by an invention to be patentable. 80 Describe the process of acquisition of patent rights. Describe the types of inventions that are not patentable in India? Q.5 Explain the role of World Trade Organization (WTO) in promoting Intellectual 09 a) **Property Rights?**
 - What do you mean by a 'Copy Right? List the types of Intellectual works for b) **08** which one can take a copyright.

Answer the following question. (Any Three) Q.6

- a) Write a short note on 'Traditional knowledge and Intellectual property Rights'. 06 06
- b) What is meant by 'Design' under the Designs Act, 2000?
- c) What is a trademark? What are the legal requirements for registering a 06 trademark in India?
- d) What are Geographical Indications? How one can obtain legal protection under 06 Geographical Indications for in India?

Max. Marks: 70

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Page	1	of	2
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F.Y. (M.Tech) (Sem - I) (New) (CBCS) Examination: Oct/Nov-2022 Mechanical – (Design Engineering) **Computational Techniques in Design Engineering**

Day & Date: Saturday, 25-03-2023 Time: 09:00 AM To 12:00 PM

Instructions: 1) Section-I Q.1 is compulsory. Attempt any one question from the remaining.

- 2) Section-II Q.4 is compulsory. Attempt any one questions from the remaining.
- 3) Figures to the right indicate full marks.
- 4) Use of calculator is allowed.
- 5) Assume suitable data if necessary.

Section – I

- **a)** Find the relative error if the number X = 0.004997 is. Q.1
 - 1) Truncated to three decimal digits
 - 2) Rounded off to three decimal digits
 - **b)** The evaluation above a datum line of seven points of a road are given below. 06

x =	0	300	600	900	1200	1500	1800
y =	135	149	157	183	201	205	193

Find the gradient of the road at the middle point. he eigen values of

C)	Using	g pov	wer	method	. Find	all	tł
		5	0	1]			

A =	0	-2	0	
	l 1	0	5]	

- Q.2 a) Write short note on choice of an interpolation formula.
 - b) Explain use of mathematical modeling in numerical techniques.
 - c) A curve passes through the points (0, 18), (1, 10), (3, -18) and (6, 90). Find the 07 slope of curve at x = 2.
- Q.3 Predict the mean radiation dose at an altitude at 3000 feet by fitting an a) exponential curve to the given data:

Altitude (X)	50	450	780	1200	4400	4800	5300	
Dose of radiation (Y)	28	30	32	36	51	58	69	
Take exponential curve as $y = ab^{X}$								

i ake exponential curve as y = ab

b) Derive normal equations for evaluating the parameters 'a' and 'b' to fit the data 80 to straight line y = a + bx in curve fitting.

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Max. Marks: 70

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Section – II

Q.4	a)	Solve $u_{xx} + u_{yy} = 0$ over the square mesh of side 4 units: satisfying the	12
		followings boundary conditions:	
		1) $u(0, y) = 0 \text{ for } 0 \le y \le 4$	
		2) $u(4, y) = 12 + y$, for $0 \le y \le 4$	
		3) $u(x,0) = 3x \text{ for } 0 \le 4 \le 4$	
		4) $u(x,4) = x^2 \text{ for } 0 \le x \le 4$	
	b)	Solve $u_t = u_{xx}$ subject to $u(0,t) = 0$, $u(1,t) = 0$ and $u(x,0) = \sin \pi \chi$, $0 < x < 0$	06
		1. Take step size $h = 0.2$ and $k = 0.02$ and $a = 1$.	
05	a)		12
Q.5	a)	If $\frac{dy}{dx} = 2e^x y$, $y(0) = 2$, find $y(0,4)$ using Adam's predictor corrector formula by	12
		calculating y(0.1), y(0.2) and y(0.3) using Euler's modified formula.	
		$\int_{C}^{1} dx$	05
	b)	Evaluate $\int \frac{dH}{1+r^2}$ using Gauss quadrature two and three point formula.	
		$J \perp \pm \lambda$ -1	

Q.6 a) A solid of revolution is formed by rotating about the x-axis, the area between the x- axis, the lines x = 0 and x = 1 and a curve through the points with the following ordinates:

x =	0	0.25	0.50	0.75	1.0
y =	1	0.9896	0.9589	0.9089	0.8415

Estimate volume of solid formed using Simpson's 1/3rd rule volume of solid generated is given as $\int \prod y^2 dx$

b) Using Runge Kutta method of order 4, find y for x = 0.1, 0.2, 0.3 given that $\frac{dy}{dx} = xy + y^2$ Continue the solution at x = 0.4 using Milne's method. **10**

06

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Seat	
No.	

F.Y. (M.Tech.) (Sem - I) (New) (CBCS) Examination: Oct/Nov-2022 Mechanical – (Design Engineering) Reliability Engineering

Day & Date: Saturday, 25-03-2023 Time: 09:00 AM To 12:00 PM

Instructions: 1) All questions are compulsory.

- 2) Assume suitable data if necessary.
- 3) Figure to right indicates marks.

Section – I

- Q.1 a) Explain the typical engineering failures with their causes.
 b) Explain the estimation of performance measures for ungrouped complete data.
 Q.2 a) What is MTTF? Discuss the mathematical approaches for estimating the MTTF
 O6 05
 O6 05
 - **b)** Explain the Weibull's distribution function in reliability analysis.

Q.3 Write short note on (Any Three)

- a) Constant failure rate
- b) Bath tub curve
- c) Estimation of distribution parameters
- d) Mean time between failures (MTBF)

Section – II

Q.4 a) Calculate the system reliability for the units connected as shown in figure. 06



b)	What is availability and explain in brief the types of availability.	06

- **Q.5** a) Explain success tree method with suitable example.
 - **b)** Discuss the significance of reliability life testing.

Q.6 Write short note on (Any Three)

- a) Cut and tie approach for evaluation of reliability
- **b)** Measures of maintainability
- c) Repair and replacement
- d) Ideal reliability growth curve

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Max. Marks: 70

12

	F.Y	. (M.Tech) (Sem - II) (New) (CBCS) Examination: Oct/N MECHANICAL – (DESIGN ENGINEERING) Finite Element Method	lov-2022
Day & Time:	& Da : 02:	te: Tuesday, 28-03-2023 00 PM To 05:00 PM	Max. Marks: 70
Instru	uctio	 ons: 1) All questions are compulsory. 2) Use of non programmable calculator is allowed. 3) Figures to the right indicate full marks. 4) Make necessary assumptions if required. 	
		Section – I	
Q.1	Sol a) b) c) d) e)	ve any four What is FEM & BEM? Differentiate between FEM & BEM. Explain the Weighted Residual method used in FEM. Describe the concept of Tensors. What do you mean by CAE? Enlist CAE software with its use. Describe the concept of functional.	16
Q.2	Sol a) b) c)	ve any two Describe the steps involved in FEM. Explain the stiffness matrix and explain its special features. Write a short note on: Matrix Algebra	12
Q.3	Sol a) b)	ve any one Define the vector product of two vectors and use that definition to the vector product a x b pf the vectors $a = 2i + 3j + k$ and $b = -i - 1$ Discuss the advantages and disadvantages of finite element methol.	07 compute ⊦ 2j – 4k. od over
		Section – II	
Q.4	Sol a) b) c) d) e)	ve any four Discuss 1D, 2D & 3D Element. Explain isoparametric solid element. Explain Hermite's interpolation formula. Write a short note on: Fatigue analysis. Write a short note on: Size and number of element.	16
Q.5	Sol a) b) c)	ve any two Explain Mesh design and mesh refinement. Explain convergence requirement of Isoparametric element What is meant by discretization of a structure? discuss the various to be considered while discretizing a structure for finite element ar	12 s aspect nalysis.
Q.6	Sol a) b)	ve any one Explain the types of meshing and its effect on accuracy. What is shape function? Explain various characteristics of it.	07

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F.Y (M. Tech.) (Sem - II) (New) (CBCS) Examination: Oct/Nov-2022 Mechanical – (Design Engineering) Advanced Design Engineering

Day & Date: Tuesday, 21-03-2023 Time: 02:00 PM To 05:00 PM

Instructions: 1) Section-I Q.1 and Q.4 are compulsory. Attempt any one question from the remaining.

- 2) Section-II Q.6 is compulsory. Attempt any two questions from the remaining.
- 3) Figures to the right indicates full marks.
- 4) Assume necessary data if required and state it clearly.

Section-I

Q.1	a) b)	Derive an expression for a response of a single degree of freedom cam and follower system subjected to a ramp input. Compare the kinematics of SHM and Cycloidal motion cam with the help of SVAJ diagrams.	06 06
Q.2	a) b)	Explain CEP and CPM cams. Derive an expression for load carrying capacity of Idealised full Journal Bearing	05 06
Q.3	a) b)	Explain the significance of Sommerfield number. A full journal bearing have the following specifications: Shaft Diameter = 4.5 cm Bearing Length = 6.5 cm Radial Clearance Ratio = 0.0015 Speed =2800 rpm Radial Load = 8000 N Viscosity of Lubricant = 8.274 x 10 ⁻³ Ns/m ² Considering the bearing as lightly loaded, Determine 1) Frictional Torque 2) Coefficient of friction 3) Power Lost	05 06
Q.4	Wr	ite short notes on:	12
	a) b)	Effect of temperature and pressure on viscosity	
	c)	Pressure Development Mechanism in Hydrodynamic Bearing	

Set P

Max. Marks: 70

Section-II

Q.5	a)	Derive the expression:	06
		Z(t) R(t) = f(t)	
	b)	A hard plastic box designed to house a multimeter is tested for its impact	06
		strength by dropping it from a fixed height and observing for any damage.	
		A total of 500 boxes were tested and the results are tabulated as follows:	
		No. of Drops 10 12 13 15 17 20 21 23 25	
		No. of boxes 30 50 30 110 90 130 17 35 8	
		damaged	
		Determine	
		1) Failure density	
		2) Hazard rate	
		3) Reliability	
Q.6	a)	Explain the significance of Bath tub curve in reliability analysis.	04
	b)	Write a short note on Hydrostatic bearing and Elastohydrodynamic	07
	,	Bearing.	
		5	
Q.7	a)	Explain cumulative damage in fatigue.	06
	b)	Explain factors affecting fatigue behaviour.	06
	,		
Q.8	Wri	te short notes on:	12
	a)	Design for manufacturing	
	b)	Methods of Improving Reliability	
	c)	Rayleigh distribution	
	-,		

Seat No. F.Y (M. Tech.) (Sem - II) (New) (CBCS) Examination: Oct/Nov-2022

Mechanical – (Design Engineering) **Industrial Product Design** Max. Marks: 70

Day & Date: Thursday, 23-03-2023 Time: 02:00 PM To 05:00 PM

Instructions: 1) Section-I Q.1 is compulsory. Attempt any one question from the remaining.

- 2) Section-II Q.4 is compulsory. Attempt any one questions from the remaining.
- 3) Figures to the right indicates full marks.
- 4) Make suitable assumptions if required.

Section-I

Q.1	a) b)	Discuss the importance of creativity in idea generation. Discuss the significance of colour scheme in aesthetic and ergonomic design of a product.	09 09
Q.2	a)	"Good combination of lines and forms not only improves ergonomics and aesthetics, with suitable examples	09
	b)	Discuss generic product development process.	08
Q.3	a) b)	What are manufacturing aspects of industrial product design? Discuss the aspect of ergonomic design of boilers. Section-II	09 08
Q.4	a) b)	Explain concept of purpose, style and environment in aesthetic design. How the creative ideas are generated with the help of brainstorming session? How is it effectively conducted?	09 09
Q.5	a)	List the aspects of manufacturing operations that will lower the cost of products	09
	b)	Write a short note on Value Analysis and Cost reduction.	08
Q.6	a) b)	Explain legal protection in product design. What is meant by rapid prototyping? What are different methods of rapid prototyping?	09 08

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Set S.Y. (M.Tech.) (Sem - III) (New) (CBCS) Examination: Oct/Nov-2022

Mechanical – (Design Engineering) **Business Analytics**

Day & Date: Monday, 27-03-2023 Time: 03:00 PM To 06:00 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.

Seat

No.

- a) What is Data Mining? State different terminology and notations used in data mining.
- b) Describe the concept of 'PCA: Principal Component Analysis'.
- c) Explain rescaling, aggregation and hierarchy concept of data visualization.

Q.2 Attempt any two.

- What is data visualization? Explain in details about the basic charts of data a) visualization.
- b) Explain dimension reduction and state why reducing the number of categories in categorical variables are important.
- c) Describe business analytics process in details.
- Q.3 State the difference between supervised and unsupervised learning process. 07

Section – II

Q.4 Attempt any two.

- a) Describe the concept of evaluating predictive performance with lift chart.
- b) Explain regression tree concept with its advantages and weaknesses.
- c) What is clustering? Explain feature selection for clustering by using filter models.

Q.5 Attempt any two.

- a) Describe multiple linear regression. How variable selection has done in linear rearession?
- **b)** Explain in detail 'K-means algorithm'.
- Describe performance evaluation and evaluate predictive performance with C) Naive benchmark.
- **Q.6** What is classifier? Explain Naive Bayes classifier in detail.

Max. Marks: 70

14

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Page 1 of 2	

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()	S.Y. (M.Tech.) (Sem - III) (New) (CBCS) Examination: Oct/Nov-2022
	MECHANICAL – (DESIGN ENGINEERING)

Operation Research

Day & Date: Monday, 27-03-2023 Time: 03:00 PM To 06:00 PM

Instructions: 1) Section-I Q.3 is compulsory. Attempt any one question from the remaining.

- 2) Section-II Q.4 is compulsory. Attempt any one questions from the remaining.
- 3) Figures to the right indicate full marks.
- 4) Make necessary Assumptions if required.

Section – I

a) Define LPP and state its advantages and disadvantages. Q.1 05 Solve the following LPP using Big M method. 12 b) Minimize $Z = 12 \times 1 + 20 \times 2$ Subject to $6 \times 1 + 8 \times 2 \ge 100$ $7 \times 1 + 12 \times 2 \ge 120$ $\times 1$ and $\times 2 > 0$ Q.2 a) What is Sensitivity analysis? 03 b) Discuss the various relations regarding Primal and Dual LPP. 04 Solve the dual LPP of the following Primal LPP. Also interpret the optimal 10 C) solution to the Primal LPP. Minimize $Z = 3 \times 1 + 2 \times 2$ $3 \times 1 + 2 \times 2 \ge 1$ Subject to $2 \times 1 + \times 2 \ge 1$ $\times 1 + 2 \times 2 \ge 3$ $\times 1 \& \times 2 \ge 0$ Q.3 **a)** Explain the characteristics of Erlang Queuing Model (M/M/1): (FCFS/ 04 ∞ (infinity)/ ∞) Explain Monto Carlo Simulation Technique. 04 b)

- c) The customers arrive at Sales counter at the rate of 12 per/hour. There is a lady serving the customers at the rate of 20 per hour. Lady is fond of reading the novel. She can read 1 page in 3 minutes, whenever she is idle. How many pages she can read in 8 hours of duty time. Also find.
 - 1) The average number of customers in the queue system.
 - 2) Average waiting time of customers in the queue system.

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SLR-HK-44

Max. Marks: 70

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Section – II

Q.4	a) b)	Explain the various costs associated with Inventory. A particular item has a demand of 9000 units/ year. The cost of one procurement is rupees 100 and the holding cost per unit per year is Rs. 2.40. The replacement is instantaneous and the shortages are allowed. The shortages cost is Rs. 5/ unit/year. Calculate the EOQ. Also find the annual inventory cost if the unit purchase cost is Rs. 2						
	c)	Explain the application of minimum spanning tree problem with suitable example.	05					
Q.5	a)	What are the types of replacement models? Explain in brief with suitable	05					
	 b) The Probability of failure for certain electronic component observed over the usage time is given below; 							
	Failure at the end of month12345Probability of failure0.090.160.240.360.12Initially 1000 units are put in the service simultaneously. If the individual sing component is replaced it costs rupees 3 but if it is replace in a group, it costs rupees 0.70. Determine the group replacement age for the component.							
Q.6	a) b) c)	Explain the significance of crashing the network. Write a note on ABC analysis. A small project consists of the following activities given with their completion time in days	03 04 10					

Activity	1-2	1-3	1-4	2-3	2-6	3-5	3-6	4-5	5-6
Time	23	8	20	16	24	18	4	19	10

Draw the project network and identify the critical path. Find the Optimal project duration. Calculate the total float for all the activities 1)

2)

3)

Seat No.

S.Y. (M.Tech) (Sem - III) (New) (CBCS) Examination: Oct/Nov-2022 Mechanical – (Design Engineering) Cost Management of Engineering Projects

Day & Date: Monday, 27-03-2023 Time: 03:00 PM To 06:00 PM

Instructions: 1) Q. no. 3 is compulsory. Attempt any one question from section I.

2) Q. no. 6 is compulsory. Attempt any one question from section II.

3) Figures to the right indicates full marks.

4) Make suitable assumptions if required.

Section - I

Q.1	a)	Describe the various element of cost and explain how selling price of the product is determined.	09
	b)	Differentiate between fixed cost and variable cost with suitable example.	08
Q.2	a)	Explain in brief about cost, value and price with suitable example and why there is need for cost estimation	09
	b)	What do you mean by cost control explain the various steps involved in the process of cost control?	08
Q.3	Writ	e a short note on any three.	18
	a) b)	I racking cost and schedule performance Parametric model in cost estimations	
	c)	Earn value for variable budget	
	d)	Time value of money	
		Section - II	
Q.4	a) b)	Explain in brief about integrated cost management programme. Explain in brief about concept of value management why their is need for Value Management in projects.	08 09
Q.5	a)	Explain in brief relationship between project value and risk with suitable	09
	b)	What is value analysis explain in brief about earned value management for assessing project performance.	08
Q.6	Writ	e short notes (Any Three)	18
	a)	Integrated cost and value project	
	(a (a	Feed forward technique in cost management Dimension and measure of values	
	U		

d) Relevancy of earned value management

Ρ Set

Max. Marks: 70

		Mechanical – (Design Engineering) Non Conventional Energy	
Day & Time	& Da : 03:	ate: Monday, 27-03-2023 Max. Ma 00 PM To 06:00 PM	arks: 70
Instr	uctio	 ons: 1) All questions are compulsory. 2) Figures to the right indicate full marks. 3) Assume suitable data if necessary. 	
		Section – I	
Q.1	Atte a) b) c)	empt any two of the following. Explain nuclear power with nuclear fission and fusion? What is meant by solar air conditioning? Explain absorption cooling system in detail? What are specification of energy storage device with its category review?	14
Q.2	Att Exp	empt the following. Iain biomass energy dispersed generation system?	07
Q.3	Atte a) b)	empt the following. What are the material used in phase change energy storage? Explain it with typical latent heat storage arrangement? Explain Laws of thermal radiation with its graph?	14
		Section – II	
Q.4	Atte a) b)	empt the following. Explain solar cell characteristics and principles? Write a note on typical solar cell design? Explain basic wind energy conversion system with energy storage also explain its pumping application?	14 n
Q.5	Atte a) b)	empt any one of the following. Explain biomass classification with downdraft gasifier? Write a short note on hydrogen production by electrolysis?	07
Q.6	Atte a) b)	empt the following. Explain basic fundaments and principles of wind energy conversion? Comme on available wind power (Pa)? Explain Floating Drum type biogas plant (KVIC) model?	14 nt

Seat No.

S.Y. (M.Tech.) (Sem - III) (New) (CBCS) Examination: Oct/Nov-2022

SLR-HK-46

Set Ρ

	F.`	Y. (M.Tech.) (Sem - I) (New) (CBCS) Examination: Oct/N ELECTRONICS ENGINEERING Digital Design and Varification	ov-2022
Day a Time	& Da : 09	ate: Monday, 20-03-2023 :00 AM To 12:00 PM	Max. Marks: 80
Instr	ucti	ons: 1) All questions are compulsory.2) Assume suitable data If necessary.	
		Section – I	
Q.1	An a) b) c)	 swer the following questions. (Any Two) Explain and compare the direct testing method and constrained ran stimulus for testing the design. Explain in brief randomization in system verilog. Explain how to use static variables in system Verilog. Write the rout initializing. 	14 Idom
Q.2	An a) b)	swer the following questions. (Any One) Write short note on Barrel shifter. Explain FIFO memories with suitable application.	05
Q.3	An a) b)	swer the following questions. Write verilog code for modeling JK Flip-flop. Also write the testbenc testing it. Write verilog code for full adder. Also write the testbench for testing	16 h for it.
		Section – II	
Q.4	An a) b)	swer the following questions. What are stuck at faults? Explain how to detect these faults with a sexample. What is soft IP? Explain with suitable example.	14 suitable
Q.5	An a) b)	swer the following questions. (Any One) Explain in brief different steps in physical design flow. What are wire load models? Explain.	07
Q.6	An a) b)	swer the following questions. (Any One) Explain SRAM based FPGA in brief. Differentiate PLA & PAL devices along with their architecture.	14

Set Ρ

SLR-HK-47

Seat No.

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Seat	
No.	

F.Y. (M.Tech.) (Sem - I) (New) (CBCS) Examination: Oct/Nov-2022 Electronics Engineering **Advanced Digital Signal Processing**

Day & Date: Tuesday, 21-03-2023 Time: 09:00 AM To 12:00 PM

Max. Marks: 70

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicates full marks.
- 3) Assume suitable data If necessary.

Section – I

Q.1	a)	Explain linear phase FIR filter design using frequency sampling method.	06
	b)	Explain the Impulse Invariant technique for designing IIR filters.	06
Q.2	a)	Explain the process of sampling rate conversion by a rational factor I/D.	05
	b)	Explain the application of multirate signal processing for subband coding of speech signals.	06
Q.3	a) b)	Explain the Schur algorithm used for solving the Normal equations. Draw the block diagram of backward linear predictor and derive the equation for Backward prediction error.	06 06
		Section – II	
Q.4	a)	Explain the application of adaptive filters for adaptive noise cancellation.	06
	b)	Explain the LMS Algorithm in detail.	06
Q.5	a)	Explain the Bartlett method of power spectral estimation.	06
	b)	Explain in detail how to compute the spectrum of deterministic signal from a finite sequence of data.	06

Q.6	a)	Explain with the block diagram application of DSP in Speech processing.	06
	b)	Explain the application of DSP in the design of phase shifters.	05



Set

Seat No.

F.Y (M.Tech.) (Sem - I) (New) (CBCS) Examination: Oct/Nov-2022 ELECTRONICS ENGINEERING Voice and Data Networks

Day & Date: Thursday, 23-03-2023 Time: 09:00 AM To 12:00 PM

Max. Marks: 70

12

12

05

12

Instructions: 1) All question are compulsory.

- 2) Figures to the right indicates full marks.
 - 3) Assume suitable data if required.

Section – I

Q.1 Answer following questions.

- a) Compare between circuit switching and packet switching.
- **b)** Which are the important factors to be considered in VoIP? Describe them briefly.
- c) What is Go_Back_N retransmission policy? Describe it briefly.

Q.2 Answer any two from following questions.

- a) List different link layer protocols? Describe ethernet MAC protocol.
- b) What is Go_Back_N mechanism? What is the effect of long frames on its performance?
- c) What are advantages of cross layer communication? Describe different approaches of cross layering in brief

Q.3 Answer following questions.

- a) What is need of convergence of voice and data network? Discuss benefits
 06 and risks involved in convergence of data and voice networks.
- b) What is need of network? Explain statistical multiplexing

OR

What is prioritizing queuing? Explain different prioritizing queuing mechanisms.

Section – II

Q.4 Answer following questions.

- a) Subnet the class C IP address so that 30 subnets are produced,
 - 1) What is the subnet mask for maximum number of hosts?
 - 2) How many hosts can each subnet have?
 - 3) What is IP address of host-3 on subnet-2?
- **b)** What are sender's and receiver's window in TCP communication? What is small packet communication problem in TCP? How this problem is overcome?
- c) Describe general congestion control policies used in packet networks



12

06

Q.5 Answer any two from following questions.

- a) Draw IPV4 header format and describe it in detail.
- **b)** What are different types of cryptographic algorithm? Describe RSA algorithm.
- c) What is congestion avoidance in TCP? Describe RED mechanism briefly.

Q.6 Answer following questions.

- a) What is QoS in packet networks? Describe them briefly.
- b) Explain fast transmit and fast recovery mechanism related to TCP/IP. 05

OR

Describe DES-data encryption standard in detail

	F.Y. (M.Tech.) (Sem - I) (New) (CBCS) Examination: Oct/No Electronics Engineering Machine Learning©	v-2022
Day a Time	& Date: Friday, 24-03-2023	Max. Marks: 70
Instr	 uctions: 1) All questions are compulsory. 2) Figures to the right indicate full marks. 3) Assume suitable data if necessary. 	
	Section – I	
Q.1	 Answer briefly any three a) What is the purpose of using Machine learning in projects today? b) How does a learning network function? c) Compare between Supervised and Unsupervised learning. d) Comment on types of regression techniques. e) What is recursive induction w.r.t 'Decision trees'? 	15
Q.2	 Attempt any two a) List and elaborate on different models of Regression. b) State the steps involved in machine learning? c) Illustrate with an example a WELL-POSED learning problem. 	10
Q.3	 Attempt any two a) What are the steps in designing systems that permit learning? b) Illustrate Parametric and non-parametric models in machine learning. c) What are the types of machine learning? Illustrate each. 	10
_	Section – II	
Q.4	 Answer briefly any three. a) What is clustering? How is it different from classification? b) How does the Error Back-propagation Algorithm work? c) Define the term 'Deep Neural Network' and illustrate. d) Give the exact meanings of the terms 'Spectral Clustering' and 'Learn e) How is testing carried out in Neural Networks? 	15 ing'.
Q.5	 Attempt any two a) List and illustrate the applications of Support Vector Machines. b) How do Support Vector Machines work? c) Develop an output for a single hidden layer Neural Network. 	10
Q.6	 Attempt any two a) What are the applications of 'Neural Networks'? Illustrate one applicate b) What are the key perspectives on machine learning? Elaborate. c) List the different types of Clustering. Illustrate one of these. 	10 ion.

Seat No.

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Set P

Seat No.						Set	Ρ	
	F.Y. (M. Tech) (Sem - I) (New) (CBCS) Examination: Oct/Nov-2022 ELECTRONICS ENGINEERING Wireless Sensor Networks							
Day & Time:	& Da 09:	te: Saturday, 25-03-: 00 AM To 12:00 PM	2023			Max. Marks	: 70	
Instru	uctio	ons: 1) All questions 2) Figures to the 3) Assume suita	are compulso e right indicate able data if ne	ory. e full marks. ecessary.				
			S	ection – I				
Q.1	a) b)	What are different V What are different e	VSN topologic nergy based	cal architectures? metrics used to e	valuate routing pro	otocols?	07 06	
Q.2	Ans a) b) c)	swer the following of Explain any hybrid M Explain wise MAC. Compare FDM, TDM	question. (A r MAC. M and CDM.	ıy Two)			12	
Q.3	Ans a) b) c)	swer the following of Explain any one typ Explain optimized lin Explain flooding and	question. (Ar e of on dema nk state routir l gossiping.	n y Two) nd routing. ng.			10	
			S	ection – II				
Q.4	a) b)	Explain data transfe Explain Ad hoc posi	er in Beacon e itioning syster	nabled and non I n (APS).	Beckon enabled n	etworks.	07 06	
Q.5	Ans a) b) c)	wer the following of With suitable diagra Explain receiver-rec What are network la	question. (Ar im explain gen eiver synchro ayer active po	ny Two) neric architecture onization. wer conservation	of WSN node. mechanisms?		12	
Q.6	Ans a) b) c)	swer the following o Explain features of Explain any one typ What are challenge	question. (Ar IEEE 802.15.4 e of range fre s in time sync	y Two) 4. e localization. hronization?			10	

Page 1 of 1

SLR-HK-52

Seat	
No.	

F.Y. (M.Tech) (Sem - I) (New) (CBCS) Examination: Oct/Nov-2022 **ELECTRONICS ENGINEERING** Analog & Digital CMOS VLSI Design

Day & Date: Saturday, 25-03-2023 Time: 09:00 AM To 12:00 PM

Instructions: 1) Question 1 & 5 are compulsory.

- 2) Attempt any two questions from question 2 to 4 from section I.
- 3) Attempt any two questions from question 6 to 8 from section II.
- 4) Figures to the right indicate full marks.

Section – I

Q.1	a)	Draw structure of enhancement type NMOS transistor and explain it's static behavior	06
	b)	What is dynamic behavior of CMOS inverter?	05
Q.2	a) b)	What is pass transistor logic? Design two input NAND gate using this logic. Design 4:1 multiplexer using CMOS logic.	06 06
Q.3	a) b)	What is principle of bistability for latches? Explain in detail. Explain master-slave negative edge triggered register using multiplexers.	06 06
Q.4	Wr a)	ite Notes (Any Two) Wire delay models	12

b) Ratioed logic

c) Giga-scale dilemma

Section – II

Q.5	a)	Derive the expression for voltage gain of single stage CS amplifier with divide connected load	06
	b)	Explain common mode response of differential amplifier.	05
Q.6	a) b)	Explain active current mirrors. What is frequency response of CS stage? Explain in detail.	06 06
Q.7	a) b)	Explain telescopic and folded cascode OPAMP topologies. Draw circuit of gain boosting of OPAMP using NMOS CS stage and explain.	06 06
Q.8	Wr a) b)	ite Notes (Any Two) Common mode feedback in OPAMP Noise in single stage amplifiers	12

c) Slew rate of OPAMP

Max. Marks: 70

Set Ρ

Instr	uctio	ns: 1) All que 2) Figure	estion es to th	s are o ne righ	compu nt indi	ulsory cates	r. full n	narks.	
						Secti	ion -	I	
Q.1	 Attempt any Four. a) Explain frame rate conversion and de interfacing. b) Explain 2D orthogonal & unitary transforms. c) Explain with block diagram components of Image processing system. d) Explain 4*4 Haar transform. e) Write note on maximum entropy restoration. 						20		
Q.2	Solv a) b)	/e the follow Explain 4 ne Explain and	ring q eighbo Perfo 4 3 3 3 4	uestic rs and rm his 4 4 5 4 4 4	ons. d 8 ne stogra 4 5 5 5 5 4	ighbo m eq 4 4 5 4 4 4	ors wi ualiza 4 3 3 3 4	th the help of example. ation of image.	08 07
						Se	ectio	n - II	
Q.3	 Attempt any four: a) Explain any two method of edge detection. b) Explain semantic video object segmentation. c) Write short note on video quality assessment d) Explain H 264 and HEVC in details. e) Explain details of spatial feature extraction. 						20		
Q.4	Solv a) b)	/e the follow Explain Vide Explain 1. S	r ing q eo con patial	uestic npress featur	ons: sion te re extr	echnio ractio	que n 2. I	mage segmentation	07 08

F.Y. (M.Tech.) (Sem - I) (New) (CBCS) Examination: Oct/Nov-2022 ELECTRONICS ENGINEERING Image and Video Processing

Day & Date: Saturday, 25-03-2023 Time: 09:00 AM To 12:00 PM

Max. Marks: 70

Seat No.

SLR-HK-53

Set P

Set S.Y. (M.Tech.) (Sem - III) (New) (CBCS) Examination: Oct/Nov-2022 Electronics Engineering

Day & Date: Monday, 27-03-2023 Time: 03:00 PM To 06:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

3) Assume suitable data if necessary.

Section – I

Business Analytics

Q.1 Attempt any two.

Seat

No.

- a) What is Data Mining? State different terminology and notations used in data mining.
- b) Describe the concept of 'PCA: Principal Component Analysis'.
- c) Explain rescaling, aggregation and hierarchy concept of data visualization.

Q.2 Attempt any two.

- a) What is data visualization? Explain in details about the basic charts of data visualization.
- **b)** Explain dimension reduction and state why reducing the number of categories in categorical variables are important.
- c) Describe business analytics process in details.
- Q.3 State the difference between supervised and unsupervised learning process. 07

Section – II

Q.4 Attempt any two.

- a) Describe the concept of evaluating predictive performance with lift chart.
- b) Explain regression tree concept with its advantages and weaknesses.
- c) What is clustering? Explain feature selection for clustering by using filter models.

Q.5 Attempt any two.

- a) Describe multiple linear regression. How variable selection has done in linear regression?
- b) Explain in detail 'K-means algorithm'.
- c) Describe performance evaluation and evaluate predictive performance with Naive benchmark.
- **Q.6** What is classifier? Explain Naive Bayes classifier in detail.

SLR-HK-63

Max. Marks: 70

14

07

14

14

Seat No.				Set	Ρ				
	S.Y. (M.Tech.) (Sem - III) (New) (CBCS) Examination: Oct/Nov-2022 Electronics Engineering Operation Research								
Day & Time:	& Da 03:	te: Monday, 27-03-2 00 PM To 06:00 PM	2023	Max. Marks	: 70				
Instru	 Instructions: 1) Section-I Q.3 is compulsory. Attempt any one question from the remaining. 2) Section-II Q.4 is compulsory. Attempt any one questions from the remaining. 3) Figures to the right indicate full marks. 4) Make necessary Assumptions if required. 								
			Section – I						
Q.1	a) b)	Define LPP and sta Solve the following Minimize $Z = 12 \times$ Subject to 6 7 ×	te its advantages and disadvantages. LPP using Big M method. $\times 1 + 20 \times 2$ $\times 1 + 8 \times 2 \ge 100$ $\times 1 + 12 \times 2 \ge 120$ $1 \text{ and } \times 2 \ge 0$		05 12				
Q.2	a) b) c)	What is Sensitivity a Discuss the various Solve the dual LPP solution to the Prim Minimize $Z = 3 \times$ Subject to 3 $2 \times$	analysis? s relations regarding Primal and Dual LPP. of the following Primal LPP. Also interpret the opti al LPP. $1+2\times2$ $\times 1+2\times2 \ge 1$ $\times 1+2\times2 \ge 1$ $1+2\times2 \ge 1$ $1+2\times2 \ge 3$ $\times 1 \And \times 2 \ge 0$	mal	03 04 10				
Q.3	a)	Explain the charact ∞ (infinity)/ ∞)	eristics of Erlang Queuing Model (M/M/1) : (FCFS	5/	04				
	b) c)	Explain Monto Carl The customers arrive lady serving the customers arrive lady serving the customers the novel. She can pages she can read 1) The average read 2) Average waiting	o Simulation Technique. ve at Sales counter at the rate of 12 per/hour. The stomers at the rate of 20 per hour. Lady is fond of read 1 page in 3 minutes, whenever she is idle. He d in 8 hours of duty time. Also find. number of customers in the queue system. ng time of customers in the queue system.	re is a reading ow many	04 10				

Section – II

Q.4	a) b)	Explain the various costs associated with Inventory. A particular item has a demand of 9000 units/ year. The cost of one procurement is rupees 100 and the holding cost per unit per year is Rs. 2.40. The replacement is instantaneous and the shortages are allowed. The shortages cost is Rs. 5/ unit/year. Calculate the EOQ. Also find the annual inventory cost if the unit-purchase cost is Rs: 2							5 8	
	C)	Explain the application of minir example.	Explain the application of minimum spanning tree problem with suitable 05 example.							
Q.5	a)	What are the types of replacen	nent mod	els? Exp	lain in brie	ef with sui	table	0	5	
	b)	The Probability of failure for ce usage time is given below;	rtain elec	tronic co	mponent	observed	over the	1	2	
	Fa Pro	ilure at the end of month obability of failure 0.0 Initially 1000 units are put in the component is replaced it costs rupees 0.70. Determine the gro	1 09 (e service rupees 3 oup replac	2).16 simultar but if it i cement a	3 0.24 neously. If s replace age for the	4 0.36 the indivi in a group compone	5 0.12 dual sing o, it costs ent.	6 0.03 le		
Q.6	a) b) c)	Explain the significance of crass Write a note on ABC analysis. A small project consists of the time in days	shing the following	network. activities	s given wit	h their co	mpletion	0 0 1	3 4 0	

Activity	1-2	1-3	1-4	2-3	2-6	3-5	3-6	4-5	5-6
Time	23	8	20	16	24	18	4	19	10

Draw the project network and identify the critical path. Find the Optimal project duration. Calculate the total float for all the activities 1)

2) 3)

-	1	
Seat		
No.		

S.Y. (M.Tech) (Sem - III) (New) (CBCS) Examination: Oct/Nov-2022 Electronics Engineering Cost Management of Engineering Projects

Day & Date: Monday, 27-03-2023 Time: 03:00 PM To 06:00 PM

Instructions: 1) Q. no. 3 is compulsory. Attempt any one question from section I.

2) Q. no. 6 is compulsory. Attempt any one question from section II.

3) Figures to the right indicates full marks.

4) Make suitable assumptions if required.

Section - I

Q.1	a)	Describe the various element of cost and explain how selling price of the product is determined	09
	b)	Differentiate between fixed cost and variable cost with suitable example.	08
Q.2	a)	Explain in brief about cost, value and price with suitable example and why	09
	b)	What do you mean by cost control explain the various steps involved in the process of cost control?	08
Q.3	Wrii a) b) c) d)	te a short note on any three. Tracking cost and schedule performance Parametric model in cost estimations Earn value for variable budget Time value of money	18
		Section - II	
Q.4	a) b)	Explain in brief about integrated cost management programme. Explain in brief about concept of value management why their is need for Value Management in projects.	08 09
Q.5	a)	Explain in brief relationship between project value and risk with suitable example	09
	b)	What is value analysis explain in brief about earned value management for assessing project performance.	08
Q.6	Wri a) b)	te short notes (Any Three) Integrated cost and value project Feed forward technique in cost management Dimension and measure of values	18

d) Relevancy of earned value management

Set P

Max. Marks: 70

	S.\	Y. (M.Tech.) (Sem - III) (New) (CBCS) Examination: Oct/Nov-2022 Electronics Engineering	
		Non Conventional Energy	
Day & Time	& Da : 03:	te: Monday, 27-03-2023 Max. Marks 00 PM To 06:00 PM	: 70
Instr	uctio	 ons: 1) All questions are compulsory. 2) Figures to the right indicate full marks. 3) Assume suitable data if necessary. 	
		Section – I	
Q.1	Atte a) b) c)	empt any two of the following. Explain nuclear power with nuclear fission and fusion? What is meant by solar air conditioning? Explain absorption cooling system in detail? What are specification of energy storage device with its category review?	14
Q.2	Att Exp	empt the following. Iain biomass energy dispersed generation system?	07
Q.3	Atte a) b)	empt the following. What are the material used in phase change energy storage? Explain it with typical latent heat storage arrangement? Explain Laws of thermal radiation with its graph?	14
		Section – II	
Q.4	Atte a) b)	empt the following. Explain solar cell characteristics and principles? Write a note on typical solar cell design? Explain basic wind energy conversion system with energy storage also explain its pumping application?	14
Q.5	Atte a) b)	empt any one of the following. Explain biomass classification with downdraft gasifier? Write a short note on hydrogen production by electrolysis?	07
Q.6	Atte a) b)	empt the following. Explain basic fundaments and principles of wind energy conversion? Comment on available wind power (Pa)? Explain Floating Drum type biogas plant (KVIC) model?	14

Seat

No.

SLR-HK-66

Set P

Set

Seat	
No.	

F. Y (M. Tech.) (Sem - I) (New) (CBCS) Examination: Oct/Nov-2022 Electronics & Telecommunication Engineering Research Methodology & IPR

Day & Date: Monday, 20-03-2023 Time: 09:00 AM To 12:00 PM

Instructions: 1) All question are compulsory.

- 2) Figures to the right indicates full marks.
 - 3) Assume suitable data if required.

Section-I

Q.1 Solve any four.

- a) What is research? Importance, Advantages and limitation of research.
- b) What do you mean by Research Problem and how can you identify the Research Problem?
- c) With suitable example explain Quantitative vs. Qualitative research
- d) Explain features of good hypothesis.
- e) What are motivational factors for carrying research?

Q.2 Solve any two.

- a) Describe the steps involved in conducting research.
- **b)** Explain briefly different types of Research.
- c) Explain the important steps involved in a research design.

Section-II

Q.3 Solve any four.

- a) What ethic rules should be considered when conducting a research?
- b) Discuss the various sources of collecting secondary data.
- c) Write a note on generalization and interpretation in data collection and analysis.
- d) Write a note on technical reports.
- e) Write a note on IPR and laws.

Q.4 Solve any two.

- a) Explain a general structure of an engineering research project report. How it differs from similar report of other disciplines like social science.
- **b)** Explain bibliography, references and footnotes in detail.
- c) What is ethics in research and why it is important?

Max. Marks: 70

20

15

15

Set

Ρ

18

10

07

18

Seat No.

F.Y. (M.Tech.) (Sem - I) (New) (CBCS) Examination: Oct/Nov-2022 Electronics & Telecommunication Engineering Antenna Design and Application

Day & Date: Tuesday, 21-03-2023 Time: 09:00 AM To 12:00 PM Max. Marks: 70

Instructions: 1) All question are compulsory.

2) Figures to the right indicates full marks.

Section-I

Q.1 Solve any two questions.

- a) Derive an array factor equation for linear array of n-isotropic point sources. 10
- b) Explain End fire Array radiation pattern with mathematical expression.
- c) Explain about various micro strip antenna configurations.

Q.2 Solve any one question.

- a) Explain transmission line model for the analysis of micros trip antenna. 07
- b) Explain different feeding mechanism of micro strip antenna.

Q.3 Solve any three questions.

- a) Derive the expression for Electric field intensity at a point due to two isotropic Sources which has equal Amplitude and in phase to each Other.
- **b)** Explain Broadside Array radiation pattern with mathematical expression.
- c) Explain the radiation mechanism of a micro stripantenna.
- d) Design a rectangular micro strip patch antenna, based on the dominant mode that can be mounted on the roof of a car to be used for satellite cellular telephone. The designed center frequency is 10GHz, the dielectric constant of the substrate is 2.2 (i.e., RT/duroid), and the thickness of the substrate is 0.1588 cm.

Section-II

Q.4 Solve any two questions.

- a) Explain about the aperture coupled micro strip antenna for broad band antennas.
- b) Explain broadbanding using stacked Elements.
- c) Explain desirable substrate characteristics for antenna fabrication.

Q.5 Solve any one question.

- a) Explain Linear array design with Micro strip patches using corporate feed Arrays.
- **b)** Explain about antenna design consideration and its application for Satellite communication

Q.6 Solve any one question.

- a) Explain the effects of substrate parameters on Bandwidth.
- b) Write a note on composite material substrate.
- c) Explain series feed excitation method for micro strip antenna.
- **d)** Explain about antenna design consideration and its application for: Terrestrial mobile communication.

20

Seat No.

F.Y. (M.Tech.) (Sem - I) (New) (CBCS) Examination: Oct/Nov-2022 ELECTRONICS & TELECOMMUNICATION ENGINEERING Soft Computing Methods

Day & Date: Thursday, 23-03-2023 Time: 09:00 AM To 12:00 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicates full marks.
- 3) Use of non programmable calculator is allowed.
- 4) Assume necessary data if necessary.

Section - I

Q.1 Solve any four.

- a) Explain fuzzification in detail.
- b) What is fuzzy logic? Describe one of the application of it?
- c) What is Defuzzification? Explain different defuzzification method with an example?
- d) Consider fuzzy relations
 - $R = \begin{bmatrix} 0.7 & 0.6 \\ 0.8 & 0.3 \end{bmatrix} \qquad S = \begin{bmatrix} 0.8 & 0.5 & 0.4 \\ 0.1 & 0.6 & 0.7 \end{bmatrix}$ Find the relation T = R o S using max-min
- e) Enumerate steps followed by GA.

Q.2 Solve any two

- a) Discuss in detail about properties of fuzzy sets?
- b) What are the basic Genetic Algorithm Operators and explain them in detail?
- c) Consider the following two discrete fuzzy sets, which are defined on universe $X = \{-5, 5\}$:

$$\mathbf{A} = "Zero" = \left\{ \frac{0}{-2} + \frac{0.5}{-1} + \frac{1.0}{0} + \frac{0.5}{1} + \frac{0}{2} \right\}$$

 $\mathbf{\underline{B}} = "Positive medium" = \left\{ \frac{0}{0} + \frac{0.5}{1} + \frac{1.0}{2} + \frac{0.5}{3} + \frac{0}{4} \right\}$

Construct the relation for the rule IF A THEN B

Section - II

Q.3 Solve any four

- 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 in detail Convolutional Neural Network.
- e) Draw a 4-5-1 artificial neural network.

Max. Marks: 70

15

20

Set F

SLR-HK-72

Q.4 Solve any two

- a) Describe the structure of back propagation neural network and derive the learning rule for the back propagation algorithm.
- **b)** Discuss in detail various types of activation functions used in neural network with the aid of graphical as well as mathematical representation and output.
- c) Elaborate on Neuro-fuzzy Inference systems.

No.			000					
F.Y. (M.Tech) (Sem - I) (New) (CBCS) Examination: Oct/Nov-2022 Electronics & Telecommunication Engineering Advanced Network System								
Day & Time	& Dat : 09:0	e: Friday, 24-03-2023 00 AM To 12:00 PM	Max. Marks	: 70				
Instr	 Instructions: 1) All questions are compulsory. 2) Figures to the right indicates full marks. 3) Use of non programmable calculator is allowed. 4) Assume necessary data if necessary. 							
		Section - I						
Q.1	Solv a) b) c) d) e)	ve any four. Differentiate between circuit & Packet switching. How DQDB works? Explain in detail. Explain official & unofficial internet. Explain Domain mapping message format. What is difference between layer 2 and layer 3 VPN services?		20				
Q.2	Solv a) b) c)	ve any two Explain the structure of FDDI & explain ring topology used in netw What is DNS technique? Explain naming techniques in DNS. Illustrate the architecture of MPLS.	vork?	15				
		Section – II						
Q.3	Solv a) b) c) d) e)	ve any four Write a short note on adaptive self-healing network. Write a short note on queue management algorithm. Which are the next generation networks? Write a short note on cyber physical system. What is the performance parameter for security in NGN?		20				
Q.4	Solv a)	ve any two What is network management? Explain the parameters related to management. What is traffic opgingering in QoS of potworking?	network	15				

b) What is traffic engineering in QoS of networking?c) Explain various device network related to smart devices.

SLR-HK-73

Seat No.



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		2) Figures to the right indicates full marks.3) Use of non-programmable calculator is allowed.4) Assume suitable data if required.	
Q.1	Solv a) b) c)	ve any TWO Draw and explain register structure of ARM 11. Write a note on embedded memories. Explain the features of ARM 11 MP core processor with the help of block diagram.	20
Q.2	Sol ^y a) b) c)	ve any TWO Draw and explain memory structure of ARM 11 Write a note on embedded system development life cycle with block diagram. Explain with diagram pipelining stages of ARM 11.	14
Q.3	Sol ^y a) b) c)	ve any TWO What is real time OS? Describe various functions of it. Explain software design process and lifecycle. What are different software development tools?	20
Q.4	Sol ^v a) b)	ve any TWO Explain Task scheduling in RTOS. Explain in detail interfacing components on Raspberry Pi board.	16

c) Explain features of RT Linux.

Seat No.

F.Y (M. Tech.) (Sem - I) (New) (CBCS) Examination: Oct/Nov-2022 ELECTRONICS & TELECOMMUNICATION ENGINEERING Advanced Embedded System

Day & Date: Saturday, 25-03-2023 Time: 09:00 AM To 12:00 PM

Instructions: 1) All question are compulsory.

Max. Marks: 70

Set P

Seat	
No.	

F. Y (M. Tech.) (Sem - II) (New) (CBCS) Examination: Oct/Nov-2022 Electronics & Telecommunication Engineering Advanced internet of things

Day & Date: Monday, 20-03-2023 Time: 02:00 PM To 05:00 PM

Instructions: 1) All question are compulsory.

- 2) Figures to the right indicates full marks.
- 3) Use of non-programmable calculator is allowed.
- 4) Assume suitable data if required.

Section-I

Q.1 Solve any TWO

- a) Explain the reference architecture of Industrial IOT.
- b) Describe Register structure of Cortex M 3 in detail.
- c) What is IOT? What are the different components of IOT system?
- d) Describe applications of IOT in embedded systems with examples.

Q.2 Solve any TWO

- a) What are different types of Instructions of ARM CORTEX processor? Explain any one with the help of its example.
- **b)** Describe Arithmetic and Data processing Instructions with example.
- c) Explain peripherals associated with Cortex M-3 in detail.

Section-II

- Q.3Solve any TWO20a)Write a short note on Wi-fi.20b)Explain COAP in detail.20c)Write a note on Application Programming Interface (API).16Q.4Solve any TWO16
 - a) What is MQTT? Describe its features. Compare MQTT with COAP.
 - **b)** State various IOT Cloud platforms. Explain various performance metrics for cloud platforms in IoT.
 - c) Justify the costing structure of cloud for IoT in detail.



Set

Max. Marks: 70

20

F.Y. (M.Tech.) (Sem - II) (New) (CBCS) Examination: Oct/Nov-2022 ELECTRONICS & TELECOMMUNICATION ENGINEERING

RF Circuit Design

Day & Date: Tuesday, 21-03-2023 Time: 02:00 PM To 05:00 PM

Seat

No.

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) Define S-parameters. Explain S parameters from SPICE analysis.
- b) Derive the expression for current gain and Voltage gain in terms of S parameters for two port network.
- c) Explain Two Port Network parameters.

Q.2 Solve any one question.

- a) Explain the working principal of Schotky diode and Varactor diode.
- b) The S parameters for the HP HFET -102 GaAs FET at 2 GHz with a bias voltage of Vgs = 0 are given as follow (Z0 = 50 0hm): $S_{11} = 0.894 < -60.6$, $S_{21} = 3.122 < 123.6$, $S_{12} = 0.020 < 62.4$, $S_{22} = 0.781 < -27.6$ Determine the stability of this transistor using the $K - \Delta$ test and the μ test, and plot the stability circles on the Smith Chart.

Q.3 Attempt any three questions.

- a) Explain a balanced amplifier using 90° hybrid couplers.
- b) Explain about different diodes like Gunn Diode. IMPATT diodes.
- c) Derive the equations for constant-noise figure circles and show how they are used in transistor amplifier design.
- d) Explain stability of amplifier and Derive the expressions for input and Output stability circles and also sketch stability circles using smith chart.

Section – II

Q.4	Solv	<i>v</i> e any two questions.
	a)	Draw oscillator design flowchart and explain in brief.

- **b)** Explain $K \beta$ diagram and wave velocities.
- c) Explain the process of filter design by image parameter method.

Q.5 Solve any one questions.

- a) Explain nonlinear active model for oscillator.
- **b)** List MMIC fabrication Techniques and explain.

SLR-HK-78

Set P

Max. Marks: 70

18

10

07

10

Q.6 Attempt any three questions.

- a) Write a note on Richards's transformation for filter implementation.
- **b**) Explain the characteristics of ideal substrate material and ideal conductor material used for the manufacturing of monolithic microwave integrated circuits.
- c) State the image parameters for T and π network of filter design.
- d) Explain kuroda's identity.

Set

F.Y (M.Tech.) (Sem - II) (New) (CBCS) Examination: Oct/Nov-2022 ELECTRONICS & TELECOMMUNICATION ENGINEERING Artificial Intelligence & Machine Learning

Day & Date: Thursday, 23-03-2023 Time: 02:00 PM To 05:00 PM

Instructions: 1) All question are compulsory.

- 2) Figures to the right indicates full marks.
- 3) Use of non-programmable calculator is allowed.
- 4) Assume suitable data if required.

Section – I

Q.1 Solve any four

- a) What is Artificial Intelligence?
- b) Define Breadth first-search and explain it with algorithm.
- c) Explain with suitable example the concept of First order logic.
- d) Explain with a diagram the goal based reflex agent.
- e) What are the components of well-defined problems?

Q.2 Solve any two

- a) Differentiate Uninformed Search (Blind search) and Informed Search (Heuristic Search) strategies.
- **b)** What is a task environment? How it is specified? List the properties of task environments.
- c) Consider the following graph.



Starting from state A, execute DFS. The goal node is G. Show the order in

- Q.3 Solve any four
 - a) Distinguish between Supervised Learning & Unsupervised Learning
 - b) Explain in detail about Linear Regression.
 - c) Explain the method for dimensionality reduction.
 - d) Write steps for K-Means Algorithm.
 - e) List out the applications of clustering algorithm.

20

15

20

Max. Marks: 70

Q.4 Solve any two questions.

- a) List the advantages of SVM and how optimal Hyperplane differ from Hyper plane.
- **b)** Explain the concepts of clustering approaches. How it differ from classification.
- c) How does the structure of decision tree help in classifying a data instance?

No.	•					Set	Ρ
	F.Y. (N El	/I.Tech.) (Sei LECTRONIC Cry	n - II) (New) (C S & TELECON ptography an	BCS) Exami IMUNICATIO d Network So	ination: Oct/l N ENGINEEI ecurity	Nov-2022 RING	2
Day a Time	& Date: : 02:00	Friday, 24-03-2 PM To 05:00 P	2023 M			Max. Marl	ks: 70
Instr	uctions	 1) All question 2) Figures to 3) Use of non 4) Assume ne 	ns are compulsor the right indicates programmable c ecessary data if n	y. s full marks. alculator is allo ecessary.	wed.		
			Sec	tion – I			
Q.1	Solve a) E b) V c) E d) E e) E	any four. xplain the OSI /hat is the differ xplain different xplain the secu xplain RC5 algo	security architecto ence between a types of key Man rity services. prithm in detail.	ure. block cipher and agement.	d a stream ciphe	er?	20
Q.2	Solve a) E b) E c) D	any two xplain a model xplain Blowfish iscuss impleme	for network secur algorithm in deta entation of RSA a	ity. il. Igorithm with su	iitable example.		15
			Sec	tion – II			
Q.3	Solve a) E b) D c) W d) W e) W	any four xplain what are escribe elemer /rite a note on (/rite a note on) /rite a note on }	the requirements its of public-key ir Combining Securi viruses and relate Kerberos.	s of message au nfrastructure. ty Associations d threats.	uthentication.		20
Q.4	Solve a) D b) D	any two escribe X.509 d iscuss secure h	certificates.				15

b) Discuss secure hash algorithm.c) Explain architecture of IPSec.

Set P

SLR-HK-80

Seat No.

Set

Ρ

Seat No.

F.Y (M. Tech.) (Sem - II) (New) (CBCS) Examination: Oct/Nov-2022 ELECTRONICS & TELECOMMUNICATION ENGINEERING Automation and Industrial Robotics

Day & Date: Saturday, 25-03-2023 Time: 02:00 PM To 05:00 PM

Instructions: 1) All question are compulsory.

- 2) Figures to the right indicates full marks.
- 3) Use of non-programmable calculator is allowed.
- 3) Assume suitable data if required.

Section - I

Q.1 Solve any four

- a) What are the different automated manufacturing systems? Discuss each with one case study.
- **b)** Explain ladder logic with one suitable example.
- c) Discuss the MODBUS protocol.
- d) Explain advanced automation functions in details.
- e) Explain in detail costs in manufacturing.

Q.2 Solve any two

- a) What is USA principle in automation?
- **b)** Show different wiring symbols for PLC.
- c) Sketch the wiring for PLC outputs that are listed below.
 - a) A double acting hydraulic solenoid valve (with two coils)
 - b) A 24Vdc lamp
 - c) A 120 Vac high current lamp
 - d) A low current 12Vdc motor

Q.3 Solve any one

- a) 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
- b) What are the key features of SCADA system?

Section - II

Q.4 Solve any four

- a) Write the different definitions of 'robot' and 'robotics'.
- b) Explain the Concepts of ON-LINE Programming.
- c) Explain in detail basic architecture of the robot controller.
- d) Explain NEURO-FUZZY Control Systems
- e) Write a short note on application of robot in Investment Casting.

Max. Marks: 70

12

07

Q.5 Solve any two

- a) Write a short note on
 - a) Types of Controller b) Program memory
- b) Write a short note on application of Machine loading
- c) Write a short note on application of robot in Cutting

Q.6 Solve any one

- a) Write a short note on
 - i) Sensors for Joint angles
 - ii) Sensors for Joint angular velocity
 - iii) Rectilinear position
 - iv) Force and Torque
- **b)** Write a short note on application of Mobile robots.

07

Seat	
No.	

S.Y. (M.Tech.) (Sem - III) (New) (CBCS) Examination: Oct/Nov-2022 Electronics & Telecommunication Engineering Business Analytics

Day & Date: Monday, 27-03-2023 Time: 03:00 PM To 06:00 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.

- a) What is Data Mining? State different terminology and notations used in data mining.
- b) Describe the concept of 'PCA: Principal Component Analysis'.
- c) Explain rescaling, aggregation and hierarchy concept of data visualization.

Q.2 Attempt any two.

- a) What is data visualization? Explain in details about the basic charts of data visualization.
- **b)** Explain dimension reduction and state why reducing the number of categories in categorical variables are important.
- c) Describe business analytics process in details.
- Q.3 State the difference between supervised and unsupervised learning process. 07

Section – II

Q.4 Attempt any two.

- a) Describe the concept of evaluating predictive performance with lift chart.
- b) Explain regression tree concept with its advantages and weaknesses.
- c) What is clustering? Explain feature selection for clustering by using filter models.

Q.5 Attempt any two.

- a) Describe multiple linear regression. How variable selection has done in linear regression?
- **b)** Explain in detail 'K-means algorithm'.
- c) Describe performance evaluation and evaluate predictive performance with Naive benchmark.
- **Q.6** What is classifier? Explain Naive Bayes classifier in detail.

07

Max. Marks: 70

Set

14

14

14

S.Y. (M.Tech.) (Sem - III) (New) (CBCS) Examination: Oct/Nov-2022 **Electronics & Telecommunication Engineering Operation Research**

Day & Date: Monday, 27-03-2023 Time: 03:00 PM To 06:00 PM

Seat

No.

Instructions: 1) Section-I Q.3 is compulsory. Attempt any one question from the remaining.

- 2) Section-II Q.4 is compulsory. Attempt any one questions from the remaining.
- 3) Figures to the right indicate full marks.
- 4) Make necessary Assumptions if required.

Section – I

Q.1	a) b)	Define LPP and state its advantages and disadvantages. Solve the following LPP using Big M method. Minimize $Z = 12 \times 1 + 20 \times 2$ Subject to $6 \times 1 + 8 \times 2 \ge 100$ $7 \times 1 + 12 \times 2 \ge 120$ $\times 1 \text{ and } \times 2 \ge 0$	05 12
Q.2	a) b) c)	What is Sensitivity analysis? Discuss the various relations regarding Primal and Dual LPP. Solve the dual LPP of the following Primal LPP. Also interpret the optimal solution to the Primal LPP. Minimize $Z = 3 \times 1 + 2 \times 2$ Subject to $3 \times 1 + 2 \times 2 \ge 1$ $2 \times 1 + \times 2 \ge 1$	03 04 10

Q.3 a) Explain the characteristics of Erlang Queuing Model
$$(M/M/1)$$
: (FCFS/ ∞ (infinity)/ ∞)

b) Explain Monto Carlo Simulation Technique.

 $\times 1 + 2 \times 2 \ge 3$

 $\times 1 \& \times 2 \ge 0$

- The customers arrive at Sales counter at the rate of 12 per/hour. There is a 10 C) lady serving the customers at the rate of 20 per hour. Lady is fond of reading the novel. She can read 1 page in 3 minutes, whenever she is idle. How many pages she can read in 8 hours of duty time. Also find.
 - The average number of customers in the queue system. 1)
 - 2) Average waiting time of customers in the gueue system.

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Max. Marks: 70



04

04

Page 1 of 2

Section – II

Q.4	a) b)	 a) Explain the various costs associated with Inventory. b) A particular item has a demand of 9000 units/ year. The cost of one procurement is rupees 100 and the holding cost per unit per year is Rs. 2.40. The replacement is instantaneous and the shortages are allowed. The shortages cost is Rs. 5/ unit/year. Calculate the EOQ. Also find the annual inventory cost if the unit-purchase cost is Rs; 2. c) Explain the application of minimum spanning tree problem with suitable 					
	C)	Explain the application of minimum spanning tree problem with suitable example.	05				
Q.5	a)	What are the types of replacement models? Explain in brief with suitable	05				
	b)	The Probability of failure for certain electronic component observed over the usage time is given below;	12				
	Fa Pro	ailure at the end of month 1 2 3 4 5 6 robability of failure 0.09 0.16 0.24 0.36 0.12 0.1 Initially 1000 units are put in the service simultaneously. If the individual single component is replaced it costs rupees 3 but if it is replace in a group, it costs rupees 0.70. Determine the group replacement age for the component.	3 03				
Q.6	a) b) c)	Explain the significance of crashing the network. Write a note on ABC analysis. A small project consists of the following activities given with their completion time in days	03 04 10				

Activity	1-2	1-3	1-4	2-3	2-6	3-5	3-6	4-5	5-6
Time	23	8	20	16	24	18	4	19	10

Draw the project network and identify the critical path. Find the Optimal project duration. Calculate the total float for all the activities 1)

2) 3)

Seat No.

S.Y. (M.Tech) (Sem - III) (New) (CBCS) Examination: Oct/Nov-2022 **Electronics & Telecommunication Engineering Cost Management of Engineering Projects**

Day & Date: Monday, 27-03-2023 Time: 03:00 PM To 06:00 PM

Instructions: 1) Q. no. 3 is compulsory. Attempt any one question from section I.

2) Q. no. 6 is compulsory. Attempt any one question from section II.

3) Figures to the right indicates full marks.

4) Make suitable assumptions if required.

Section - I

Q.1	a)	Describe the various element of cost and explain how selling price of the product is determined	09
	b)	Differentiate between fixed cost and variable cost with suitable example.	80
Q.2	a)	Explain in brief about cost, value and price with suitable example and why	09
	b)	What do you mean by cost control explain the various steps involved in the process of cost control?	08
Q.3	Writ a) b) c) d)	te a short note on any three. Tracking cost and schedule performance Parametric model in cost estimations Earn value for variable budget Time value of money	18
		Section - II	
Q.4	a) b)	Explain in brief about integrated cost management programme. Explain in brief about concept of value management why their is need for Value Management in projects.	08 09
Q.5	a)	Explain in brief relationship between project value and risk with suitable	09
	b)	What is value analysis explain in brief about earned value management for assessing project performance.	08
Q.6	Writ a)	te short notes (Any Three) Integrated cost and value project	18

- Feed forward technique in cost management b)
- Dimension and measure of values C)
- Relevancy of earned value management d)

Set Ρ

Max. Marks: 70

14

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Seat	
No.	

S.Y. (M.Tech.) (Sem - III) (New) (CBCS) Examination: Oct/Nov-2022 Electronics & Telecommunication Engineering Non Conventional Energy

Day & Date: Monday, 27-03-2023 Time: 03:00 PM To 06:00 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	Att a) b)	empt any two of the following. Explain nuclear power with nuclear fission and fusion? What is meant by solar air conditioning? Explain absorption cooling system in	14
	C)	detail? What are specification of energy storage device with its category review?	
Q.2	Att Exp	empt the following. In biomass energy dispersed generation system?	07
Q.3	Att a) b)	empt the following. What are the material used in phase change energy storage? Explain it with typical latent heat storage arrangement? Explain Laws of thermal radiation with its graph?	14
		Section – II	
Q.4	Att a) b)	empt the following. Explain solar cell characteristics and principles? Write a note on typical solar cell design? Explain basic wind energy conversion system with energy storage also explain its pumping application?	14
Q.5	Att a) b)	empt any one of the following. Explain biomass classification with downdraft gasifier? Write a short note on hydrogen production by electrolysis?	07

Q.6 Attempt the following.a) Explain basic fundaments and principles of wind energy conversion? Comment on available wind power (Pa)?

b) Explain Floating Drum type biogas plant (KVIC) model?

Set P

Max. Marks: 70

Seat No.

F.Y. (M.Tech) (Sem - I) (New) (CBCS) Examination: Oct/Nov-2022 COMPUTER SCIENCE & ENGINEERING Applied Algorithms

Day & Date: Monday, 20-03-2023 Time: 09:00 AM To 12:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.1 Solve

a) Which kind of growth best characterizes each of these function.

Function	Constant	Linear	Polynomial	Exponential
3n				
3n2				
2n				
(3/2)n				
1000				
1				
(3/2)n				
2n3				

b) What is Amortized analysis?

Q.2 Solve. (Any One)

a) For the following details, find decode tree and code for particular symbol.

Symbol	Frequency
А	70 million
В	3 million
С	20 million
D	37 million

b) Find Minimum cost spanning tree for the following graph using Prims Algorithms.



Q.3 Solve. (Any One)

- a) For the following two strings find Longest Common Subsequence (LCS) String A = "acbaed"; and String B = "abcadf"
- **b)** Explain reliability Design.

10

022

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Max. Marks: 70

10
Section – II

Q.4	 Solve. (Any One) a) Write an algorithm for determining whether any two line segments in a set of segments intersects? b) Explain convex hull. 	15
Q.5	 Solve. (Any One) a) Explain NP-completeness along with reducibility. b) Prove "If any NP-complete problem is polynomial-time solvable, then P=NP. Equivalently, if any problem in NP is not polynomial solvable, then no NP-complete problem is polynomial time solvable" 	10
Q.6	Solve. (Any One)	10

a) Explain any one string matching algorithm.
b) Find all solution to the equation X ≡ 4(mod 5) and X ≡ 5(mod 11)

F.Y. (M.Tech) (Sem - I) (New) (CBCS) Examination: Oct/Nov-2022 **Computer Science & Engineering**

Theory of Computation

Day & Date: Tuesday, 21-03-2023 Time: 09:00 AM To 12:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicates full marks.

3) Assume suitable data If necessary.

Section – I

Q.1 Answer any four.

- Define FA. Construct the FA for the string $(0 + 1)(11 + 0)(0 + 1)^*$ a)
- b) What language is accepted by a PDA? Design PDA for palindrome.
- Define nondeterministic TM? Prove that every nondeterministic TM has an C) equivalent deterministic TM.
- What are decidable languages? Prove that EQ_{DFA} is decidable language. d)
- Describe E_{NFA} & E_{DFA} in decidability & prove that they are decidable e) languages.

Q.2 Answer the following.

Design a TM for a computation of subtraction of two numbers (a-b) with its formal definition.

Q.3 Answer the following.

What is diagonalization method? Prove the corollary "some languages are not Turing recognizable".

Section – II

Q.4 Answer any four.

- If $R_{TM} = \{ < M > | M \text{ is a TM } \& L(M) \text{ is a regular language} \}$ then prove that a) R_{TM} is undecidable.
- List & explain growth rate functions. b)
- C) Define mapping reducibility & prove that if $A < {}_{m}B \& B$ is decidable then A is decidable.
- Elaborate NP completeness with example. d)
- Illustrate time complexity of a Turing Machine. e)

Answer the following. Q.5

Illustarte PCP problem & prove that PCP is undecidable.

Q.6 Answer the following.

If $EQ_{TM} = \{ < M1, M2 > | M1 \& M2 \text{ are TMs} \& L(M1) = L(M2) \}$ then prove that EQ_{TM} is undecidable.

24

06

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Max. Marks: 70

Seat No.

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06

05

	COMPUTER SCIENCE & ENGINEERING Data Mining				
Day & Time:	Day & Date: Thursday, 23-03-2023 Max. Marks: 70 Time: 09:00 AM To 12:00 PM				
Instru	 ictions: 1) Attempt any five question from each section. 2) Figures to the right indicates full marks. 3) Assume suitable data if needed. 				
	Section – I				
Q.1	Explain various components of data warehouse architecture.	07			
Q.2	Describe types of OLAP server.	07			
Q.3	Write and explain KNN (K Nearest Neighbor) algorithm	07			
Q.4	Write and explain agglomerative clustering algorithm	07			
Q.5	Write and explain DT (decision tree) algorithm.	07			
Q.6	Write and explain data parallelism algorithm	07			
Q.7	Compare data mining verses KDD process	07			
	Section – II				
Q.8	What is mining class comparison? State and explain the procedure for performance of class comparison.	or 07			
Q.9	What are applications of data mining? Explain in detail any three.	07			
Q.10	Explain in detail spatial data mining primitives.	07			
Q.11	What is page rank and clever? Explain page rank in detail.	07			
Q.12	Write a short note on designing GUI based on a data mining query la	nguage. 07			
Q.13	Explain in brief Spatial Clustering Algorithms.	07			
Q.14	State and explain multimedia data mining.	07			

F.Y (M. Tech.) (Sem - I) (New) (CBCS) Examination: Oct/Nov-2022

Seat

No.

SLR-HK-93

Set Ρ

Instr	 Instructions: 1) All questions are compulsory. 2) Figures to the right indicate full marks. 3) Assume suitable data if necessary. 			
		Section – I		
Q.1	An a) b) c) d) e)	swer briefly any three What is the purpose of using Machine learning in projects today? How does a learning network function? Compare between Supervised and Unsupervised learning. Comment on types of regression techniques. What is recursive induction w.r.t 'Decision trees'?	15	
Q.2	Att a) b) c)	empt any two List and elaborate on different models of Regression. State the steps involved in machine learning? Illustrate with an example a WELL-POSED learning problem.	10	
Q.3	Att a) b) c)	empt any two What are the steps in designing systems that permit learning? Illustrate Parametric and non-parametric models in machine learning. What are the types of machine learning? Illustrate each.	10	
		Section – II		
Q.4	An a) b) c) d) e)	swer briefly any three. What is clustering? How is it different from classification? How does the Error Back-propagation Algorithm work? Define the term 'Deep Neural Network' and illustrate. Give the exact meanings of the terms 'Spectral Clustering' and 'Learning'. How is testing carried out in Neural Networks?	15	
Q.5	Att a) b) c)	empt any two List and illustrate the applications of Support Vector Machines. How do Support Vector Machines work? Develop an output for a single hidden layer Neural Network.	10	
Q.6	Att a) b) c)	empt any two What are the applications of 'Neural Networks'? Illustrate one application. What are the key perspectives on machine learning? Elaborate. List the different types of Clustering. Illustrate one of these.	10	

F.Y. (M.Tech.) (Sem - I) (New) (CBCS) Examination: Oct/Nov-2022 **COMPUTER SCIENCE & ENGINEERING**

Machine Learning©

Day & Date: Friday, 24-03-2023 Time: 09:00 AM To 12:00 PM

Seat

No.

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Set Ρ

	Section – I		
Q.1	An: a) b) c) d) e)	swer briefly. (Any Three) What does Natural language processing include? Generate a diagrammatic representation of a Word net. Compare between Machine learning and Natural language Processing activities. Comment on Word boundaries. How is Morphology dealt with in speech?	15
Q.2	An a) b) c)	swer Any Two List and elaborate on different Parsing algorithm structures. How is Automatic Morphological Learning carried out? Demonstrate various ambiguity problems w.r.t parsers.	10
Q.3	An a) b) c)	swer Any Two What are the steps in designing a speech analysis system? Illustrate rule based and probabilistic models for labeling in parsing. What are the types of Word net theories? Illustrate each.	10
		Section – II	
Q.4	An: a) b) c) d) e)	swer briefly. (Any Three) What is phonology? How is it different from text classification? How do graphical models work? Define the term 'Speech synthesis' and illustrate. Give the exact meanings of the terms 'Precision' and 'Recall'. What is sentiment analysis?	15
Q.5	An a) b) c)	swer Any Two List and illustrate the applications of Natural Language Processing. How does the Baum Welch Algorithm work? Develop an output for a cross lingual information retrieval system.	10
Q.6	An a) b) c)	swer Any Two What are the applications of 'Sentiment Analysis'? Illustrate one application. What are the key perspectives on phonology? Elaborate. List the different types of graphical models used in NLP. Illustrate one of these.	10

F.Y. (M. Tech) (Sem - I) (New) (CBCS) Examination: Oct/Nov-2022 **COMPUTER SCIENCE & ENGINEERING Natural Language Processing**

Day & Date: Saturday, 25-03-2023 Time: 09:00 AM To 12:00 PM

Seat

No.

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.

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Set Ρ

Seat Set No. F.Y. (M.Tech) (Sem - I) (New) (CBCS) Examination: Oct/Nov-2022 **COMPUTER SCIENCE & ENGINEERING** Soft Computing Day & Date: Saturday, 25-03-2023 Max. Marks: 70 Time: 09:00 AM To 12:00 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 Answer the following question. (Any Two) 14 a) Differentiate fuzzy set Vs Crisp set. **b)** What are Fuzzy Rules? Explain if-then rule. c) Describe Fuzzy intersection operation. Answer the following question. (Any Two) Q.2 14 a) Explain single layer feed forward neural networks. b) Write short note on reinforcement learning c) Differentiate supervised and Unsupervised Learning Neural Network. **Q.3** What is fuzzy reasoning? Describe in short with example. 07 Section – II Q.4 Answer the following question. (Any Two) 14 a) List and explain applications of GA in machine learning. b) Draw and Explain ANFIS Architecture. c) What is decision tree? Explain with example. Q.5 Answer the following question. (Any Two) 14 a) What is k means clustering? Explain with example. b) Explain mountain clustering method. c) Describe recent trends used in neural network and genetic algorithm. **Q.6** What is input space partitioning? 07

SLR-HK-96

No.		56
F.Y. (M.Tech) (CC	Sem - I) (New) (CBC OMPUTER SCIENCE Computer	S) Examination: Oct/Nov-2022 & ENGINEERING Vision
Day & Date: Saturday, 25 Time: 09:00 AM To 12:00	5-03-2023) PM	Max. Ma
Instructions: 1) Questior	n 1 & 5 are compulsory.	

Seat

2) Attempt any two questions from question 2 to 4 from section I.

3) Attempt any two questions from question 6 to 8 from section II.4) Figures to the right indicate full marks.

- 5) Assume suitable data wherever necessary.

Section – I

Q.1	a)	Explain Pointer Operators used for image processing.	10
	b)	Explain Multiresolution Pyramid.	05
Q.2	a)	Explain main factors affecting the performance of a digital image sensor.	05
	b)	Explain sampling and aliasing phenomenon.	05
Q.3	a)	Explain 2D geometric transformations.	05
	b)	Explain any one example of active contour.	05
Q.4	a)	Explain different distance functions used for feature matching.	05
	b)	Explain Discrete Cosine Transform.	05
		Section – II	
Q.5	a)	Explain basic feature detection algorithm and feature descriptors.	10
	b)	Explain image matting and compositing.	05
Q.6	a)	Explain supervised, unsupervised and semi-supervised classification.	05
	b)	Explain KNN Algorithm.	05
Q.7	a)	Explain how features are reduced using linear discriminant Analysis.	05
	b)	Explain K-means Clustering algorithm.	05
Q.8	a)	Explain different types of biometrics.	05
	d)	Explain Object detection in detail.	05

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Set Ρ

Seat No.			Set	Ρ	
	F.Y. (M.Tech.) (Sem-I) (New) (CBCS) Examination: Oct/Nov-2022 COMPUTER SCIENCE & ENGINEERING Object Oriented Software Engineering				
Day 8 Time	& Da : 09:	ate: Saturday, 25-03-2023):00 AM to 12:00 PM	Max. Marks	: 70	
Instr	uctio	ions: 1) Question 1 and 5 are compuls 2) Answer any two questions in e	ory. each Section.		
		Sectio	on - I		
Q.1	An a) b)	Swer briefly: What is SDLC. Phases of SDLC. Explain Software architecture in th cycle.	e context of the overall software life	15	
Q.2	c) a) b)	Draw component diagram for online What is architectural modeling. Explain Component diagram with exa	shopping. ample.	05 05	
Q.3	a) b)	Explain inheritance and polymorphise Draw the use case diagram and active process.	n in detail. ⁄ity diagram for loan account banking	05 05	
Q.4	Ex a) b)	xplain briefly State Chart diagram Life Cycle of a Domain Object		10	
		Sectio	n - II		
Q.5	An a) b) c)	nswer briefly: Explain code architecture view with e Explain Customer Relationship Mana Compare product and quantity arche	example. agement (CRM) Archetype Pattern. type patterns.	15	
Q.6	a) b)	Write a short note on IS2000: The Ad Explain Access Control Patterns.	Ivanced Imaging Solution.	05 05	
Q.7	a) b)	Explain model driven architecture wite Write a short note on Object Manage Patterns.	h archetype Patterns ement Patterns, Communication	05 05	
Q.8	Exp	xplain Patterns for Concurrent and Netw	vorked Objects in Detail	10	

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Seat

07

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Seat	
No.	

F.Y (M. Tech.) (Sem -II) (New) (CBCS) Examination: Oct/Nov-2022 **COMPUTER SCIENCE & ENGINEERING Research Methodology & IPR©**

Day & Date: Tuesday, 28-03-2023 Time: 02:00 PM To 05:00 PM

Instructions: 1) All question are compulsory.

2) Figures to the right indicates full marks.

Section-I

Q.1 Solve any two What is research? Explain different types and approaches of research. 14 a) b) List and explain characteristics of good research. Write detailed notes on data collection and data analysis. C) Q.2 Solve any two Mention differences between Survey and experiments. 14 a) Explain Report writing and presentation of results in detail. b) Explain in detail the concept of e-research. C) Q.3 Solve any one Explain different ethical issues in research. 07 a) Explain in detail how to write technical paper. b) Section-II Solve any two 14 Q.4 Explain need, techniques and classification of Mathematical modeling. a) Explain System models and system simulation in detail. b) Explain in detail role of probability and statistics in simulation. C) Q.5 Solve any two 14 Explain the process of patenting and development in detail. a) Explain in detail the procedure for grants of patents. b)

What are Intellectual Property Rights? Discuss ownership of Patents and C) their transferability.

Solve any one Q.6

- Describe in detail Patents, Designs, Trade and Copyright. a)
- Explain in detail scope of Patent rights. b)

110.				
	F.Y.	(M.Tech) (Sem - II) (New) (CBCS) Examination: Oct/ COMPUTER SCIENCE & ENGINEERING Internet of Things	Nov-2022	
Day & Time:	& Dat : 02:0	e: Tuesday, 21-03-2023 00 PM To 05:00 PM	Max. Marks:	70
Instru	uctio	 ns: 1) All questions are compulsory. 2) Figures to the right indicates full marks. 3) Assume to the right indicate full marks. 		
		Section – I		
Q.1	Ans a) b) c)	wer any two: What is IoT? List and explain characteristics of IoT. Describe in detail: UWB (IEEE 802.15.4). Draw and explain topologies of IoT.		14
Q.2	Ans a) b) c)	wer any two: Draw and explain layered-stack architecture of IoT. Explain applications of IoT. Explain design principles for connected devices in IoT.		14
Q.3	Des	cribe ZigBee with help of its architecture and protocol layers.		07
		Section – II		
Q.4	Ans a) b) c)	wer any two: Write a note on: Google M2M Platform. Explain how to build web services on Rasberry Pi. Describe the use of IoT in Home automation.		14
Q.5	Ans a) b) c)	wer any two: Differentiate between SQL and No-SQL. Explain interfacing of Rasberry Pi. Describe cloud based IoT platforms.		14
Q.6	Expl	lain in detail agriculture application using IoT.		07

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Seat No.

Set P

F.Y (M.Tech.) (Sem - II) (New) (CBCS) Examination: Oct/Nov-2022 COMPUTER SCIENCE & ENGINEERING			
-		Internet Routing Algorithm	
Day Time	& Da : 02:0	te: Thursday, 23-03-2023 00 PM To 05:00 PM	Max. Marks: 70
Instr	uctio	 ans: 1) All question are compulsory. 2) Figures to the right indicates full marks. 3) Assume suitable data if required. 	
		Section – I	
Q.1	Sol ^y a) b) c)	ve any two List the main differences between RIPV1 and RIPV2. Write a short note on service architecture. Explain Bellman-Ford Algorithm with an example.	14
Q.2	Sol ⁱ a) b) c)	ve any two What is classful addressing? Explain different address classes. Write a short note on IP Protocol Stack Architecture. Explain in detail Public Switched Telephone Network.	14
Q.3	Diff	erentiate between shortest path routing and widest path routing.	07
		Section – II	
Q.4	Sol ⁱ a) b) c)	ve any two Write a short note on router architecture. What are the basic requirements of Longest Prefix matching Algo Explain Allocation of IP Prefixes and AS Number in detail.	14 rithm?
Q.5	Sol ⁱ a) b) c)	ve any two With example explain the concept of link-state routing Protocol. List the router bottlenecks and its cause. Explain Packet Processing: Fast Path versus Slow Path.	14
Q.6	Wha	at are the possible factors that can cause instability in Internet routi	ng? 07

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Set P

No.		Jel	F	
F.Y. (M.Tech.) (Sem - II) (New) (CBCS) Examination: Oct/Nov-2022 COMPUTER SCIENCE & ENGINEERING Reinforcement Learning				
Day a Time	& Date: Friday, 24-03-2023 Ma : 02:00 PM To 05:00 PM	x. Marks	5: 70	
Instr	 uctions: 1) All questions are compulsory. 2) Figures to the right indicate full marks. 3) Assume suitable data if necessary. 			
	Section – I			
Q.1	 Answer any two: a) What is Reinforcement learning? b) Compare between Optimality and Approximation. c) What is k-armed Bandit Problem? 		14	
Q.2	 Answer any two: a) List the component of Markov process. b) Compare between Goal and Reward. c) What is an action method for Reinforcement learning? How is it carried component for the second secon	out?	14	
Q.3	Explain an Extended Example: Tic-Tac-Toe w.r.t. Reinforcement Learning.		07	
	Section – II			
Q.4	 Answer any two: a) Define the term 'Daily double wagering' and illustrate. b) Give the exact meanings of the terms 'Alpha Go' and 'Go'. c) Which are Monte Carlo Methods? Explain 		14	
Q.5	 Answer any two: a) What is Real-time Dynamic Programming? Illustrate. b) Explain the steps in modeling a planning process. c) Give examples of TD (0) 		14	

- 2) Wrong model of planning
- **Q.6** Explain the case study "Personalized Web Services" w.r.t reinforcement learning. 07

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		COMPUTER SCIENCE & ENGINEERING Software Defined Network		
Day a Time	& Da : 02:	ite: Friday, 24-03-2023 00 PM to 05:00 PM	Max.	Marks: 70
Instr	uctio	 ons: 1) Question 1 and 5 are compulsory. 2) Answer any two questions in each Section. 3) Make suitable assumptions if necessary and state them cleans 	early.	
		Section - I		
Q.1	Ans a) b) c)	swer briefly: Write a note on Mininet. Explain the constrained forwarding model. Explain on the following application of SDN Resource Utilization.		15
Q.2	a) b)	Explain network service chaining and network programmability. Write a short note on bandwidth calendaring.		05 05
Q.3	a) b)	Explain network as a service (NaaS). Write a note on Open Flow protocol.		05 05
Q.4	Exj a) b) c)	plain the following components of virtual network in detail. Bridge DHCP Server Virtual Switch		10
		Section - II		
Q.5	Ans a) b) c)	swer briefly: What are the different opportunities and challenges in SDN? Write a note on control and data plane separation. Describe the network protocol; ARP and BGP.		15
Q.6	a) b)	Explain the architecture of SDN. Explain link state routing algorithm.		05 05
Q.7	a) b)	 Write a short note on different network topologies. Explain the use case taxonomy 1) Data center optimization 2) Network access control 		05 05
Q.8	Wri a) b)	ite a short note on following properties of SDN Consistency Scalability		10

F.Y. (M.Tech.) (Sem-II) (New) (CBCS) Examination: Oct/Nov-2022 COMPUTER SCIENCE & ENGINEERING

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Seat No.

		SLR-HK-1	07
Seat No.		Set	Ρ
	F.Y. (M.Tech.) (Sem - II) (New) (CBCS) Examination: COMPUTER SCIENCE & ENGINEERING Infrastructure Management	Oct/Nov-2022	
Day a Time	& Date: Saturday, 25-03-2023 : 02:00 PM To 05:00 PM	Max. Marks	: 70
Instr	 uctions: 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. a) What is IM? Explain various activities in it. b) Explain current business demands and IT system issues. c) Explain cost estimation of complexity issues. 		14
Q.2	 Attempt any two. a) Explain design factors and considerations of IT infrastructure. b) Explain patterns of IT system management. c) Explain ITIL. 		14
Q.3	Explain finance management and costing with example.		07
	Section – II		
Q.4	 Attempt any two. a) Explain configuration management. b) Explain incident management with example. c) Explain release management. 		14
Q.5	 Attempt any two. a) Write short note on space management. b) Explain database and application protection. c) What are basics of network security? Explain firewall. 		14
Q.6	Explain technology change management in infrastructure sector.		07

Set F

S.Y. (M.Tech.) (Sem - III) (New) (CBCS) Examination: Oct/Nov-2022 Computer Science & Engineering Business Analytics

Day & Date: Monday, 27-03-2023 Time: 03:00 PM To 06:00 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.

Seat

No.

- a) What is Data Mining? State different terminology and notations used in data mining.
- b) Describe the concept of 'PCA: Principal Component Analysis'.
- c) Explain rescaling, aggregation and hierarchy concept of data visualization.

Q.2 Attempt any two.

- a) What is data visualization? Explain in details about the basic charts of data visualization.
- **b)** Explain dimension reduction and state why reducing the number of categories in categorical variables are important.
- c) Describe business analytics process in details.
- Q.3 State the difference between supervised and unsupervised learning process. 07

Section – II

Q.4 Attempt any two.

- a) Describe the concept of evaluating predictive performance with lift chart.
- b) Explain regression tree concept with its advantages and weaknesses.
- c) What is clustering? Explain feature selection for clustering by using filter models.

Q.5 Attempt any two.

- a) Describe multiple linear regression. How variable selection has done in linear regression?
- b) Explain in detail 'K-means algorithm'.
- c) Describe performance evaluation and evaluate predictive performance with Naive benchmark.
- **Q.6** What is classifier? Explain Naive Bayes classifier in detail.

07

Max. Marks: 70

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14

14

14

14

Sea No.	t	Set	Ρ				
	S.Y. (M.Tech.) (Sem - III) (New) (CBCS) Examination: Oct/Nov-2022 Computer Science & Engineering Operation Research						
Day a Time	& Da : 03	ate: Monday, 27-03-2023 Max. Marks :00 PM To 06:00 PM	: 70				
Instr	 Instructions: 1) Section-I Q.3 is compulsory. Attempt any one question from the remaining. 2) Section-II Q.4 is compulsory. Attempt any one questions from the remaining. 3) Figures to the right indicate full marks. 4) Make necessary Assumptions if required. 						
		Section – I					
Q.1	a) b)	Define LPP and state its advantages and disadvantages. Solve the following LPP using Big M method. Minimize $Z = 12 \times 1 + 20 \times 2$ Subject to $6 \times 1 + 8 \times 2 \ge 100$ $7 \times 1 + 12 \times 2 \ge 120$ $\times 1 \text{ and } \times 2 \ge 0$	05 12				
Q.2	a) b) c)	What is Sensitivity analysis? Discuss the various relations regarding Primal and Dual LPP. Solve the dual LPP of the following Primal LPP. Also interpret the optimal solution to the Primal LPP. Minimize $Z = 3 \times 1 + 2 \times 2$ Subject to $3 \times 1 + 2 \times 2 \ge 1$ $2 \times 1 + 2 \times 2 \ge 1$ $\times 1 + 2 \times 2 \ge 3$ $\times 1 \& \times 2 \ge 0$	03 04 10				
Q.3	a)	Explain the characteristics of Erlang Queuing Model $(M/M/1)$: (FCFS/	04				
	b) c)	 Explain Monto Carlo Simulation Technique. The customers arrive at Sales counter at the rate of 12 per/hour. There is a lady serving the customers at the rate of 20 per hour. Lady is fond of reading the novel. She can read 1 page in 3 minutes, whenever she is idle. How many pages she can read in 8 hours of duty time. Also find. 1) The average number of customers in the queue system. 2) Average waiting time of customers in the queue system. 	04 10				

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Section – II

Q.4	a) b)	Explain the various costs associated with Inventory. A particular item has a demand of 9000 units/ year. The cost of one procurement is rupees 100 and the holding cost per unit per year is Rs. 2.40. The replacement is instantaneous and the shortages are allowed. The shortages cost is Rs. 5/ unit/year. Calculate the EOQ. Also find the annual							
	C)	Explain the application of minimum spanning tree problem with suita example.	Explain the application of minimum spanning tree problem with suitable 05 example.						
Q.5	a)	What are the types of replacement models? Explain in brief with suit	able 05	;					
	b)	examples. The Probability of failure for certain electronic component observed over the usage time is given below;							
	Fa Pro	Failure at the end of month12345Probability of failure0.090.160.240.360.12Initially 1000 units are put in the service simultaneously. If the individual sin component is replaced it costs rupees 3 but if it is replace in a group, it cost rupees 0.70. Determine the group replacement age for the component.							
Q.6	a) b) c)	Explain the significance of crashing the network. Write a note on ABC analysis. A small project consists of the following activities given with their cor time in days	03 04 npletion 10	; ;)					

Activity	1-2	1-3	1-4	2-3	2-6	3-5	3-6	4-5	5-6
Time	23	8	20	16	24	18	4	19	10

Draw the project network and identify the critical path. Find the Optimal project duration. Calculate the total float for all the activities 1)

2)

3)

Seat No.

S.Y. (M.Tech) (Sem - III) (New) (CBCS) Examination: Oct/Nov-2022 Computer Science & Engineering **Cost Management of Engineering Projects**

Day & Date: Monday, 27-03-2023 Time: 03:00 PM To 06:00 PM

Instructions: 1) Q. no. 3 is compulsory. Attempt any one question from section I.

2) Q. no. 6 is compulsory. Attempt any one question from section II.

3) Figures to the right indicates full marks.

4) Make suitable assumptions if required.

Section - I

Q.1	a)	Describe the various element of cost and explain how selling price of the	09
	b)	Differentiate between fixed cost and variable cost with suitable example.	08
Q.2	a)	Explain in brief about cost, value and price with suitable example and why there is need for cost estimation	09
	b)	What do you mean by cost control explain the various steps involved in the process of cost control?	08
Q.3	Wri a) b) c) d)	te a short note on any three. Tracking cost and schedule performance Parametric model in cost estimations Earn value for variable budget Time value of money	18
		Section - II	
Q.4	a) b)	Explain in brief about integrated cost management programme. Explain in brief about concept of value management why their is need for Value Management in projects.	08 09
Q.5	a)	Explain in brief relationship between project value and risk with suitable	09
	b)	What is value analysis explain in brief about earned value management for assessing project performance.	08
Q.6	Wri [:] a) b)	te short notes (Any Three) Integrated cost and value project Feed forward technique in cost management	18

- Dimension and measure of values C)
- d) Relevancy of earned value management

Set Ρ

Max. Marks: 70

		Computer Science & Engineering Non Conventional Energy				
Day & Time	& Da : 03:	ate: Monday, 27-03-2023 Max. Mark 00 PM To 06:00 PM	ks: 70			
Instr	ucti	 ons: 1) All questions are compulsory. 2) Figures to the right indicate full marks. 3) Assume suitable data if necessary. 				
		Section – I				
Q.1	Att a) b) c)	empt any two of the following. Explain nuclear power with nuclear fission and fusion? What is meant by solar air conditioning? Explain absorption cooling system in detail? What are specification of energy storage device with its category review?	14			
Q.2	Attempt the following. (Explain biomass energy dispersed generation system?					
Q.3	Atta a) b)	empt the following. What are the material used in phase change energy storage? Explain it with typical latent heat storage arrangement? Explain Laws of thermal radiation with its graph?	14			
		Section – II				
Q.4	Att a) b)	empt the following. Explain solar cell characteristics and principles? Write a note on typical solar cell design? Explain basic wind energy conversion system with energy storage also explain its pumping application?	14			
Q.5	Att a) b)	empt any one of the following. Explain biomass classification with downdraft gasifier? Write a short note on hydrogen production by electrolysis?	07			
Q.6	Atta a) b)	empt the following. Explain basic fundaments and principles of wind energy conversion? Comment on available wind power (Pa)? Explain Floating Drum type biogas plant (KVIC) model?	14			

S.Y. (M.Tech.) (Sem - III) (New) (CBCS) Examination: Oct/Nov-2022

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