Seat
No.

ME (Semester - I) (CBCS/CGPA) Examination Dec- 2019
Civil – (Structures Engineering)
THEORY OF ELASTICITY & PLASTICITY

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

Instructions: 1) Q. No.1 & Q. No. 5 are compulsory. solve any one questions from each section.
2) Use of non - programable calculators are allowed.
3) Figures to the right indicate full marks.

Section – I

Q.1	a)	State St. Venant's Principle.	04
	b)	Explain Hooke's Law of Elasticity.	04
	c)	Derive D. E. of equilibrium of 3-D problem of elasticity in rectangular coordinates.	10
Q.2	a)	Find the principal stresses developed for following state of stress at a Point $\sigma_x = 120\ MPa$, $\sigma_y = 90\ MPa$, $\sigma_z = 110\ MPa$ $\tau_{xy} = 60\ MPa$, $\tau_{yz} = 40\ MPa$, $\tau_{zx} = 70\ MPa$	11
	b)	Derive Differential equation of equilibrium for a 2-D problem of elasticity in Polar Coordinate system.	06
Q.3	a)	Find stress distribution in a thick cylinder subjected to internal bursting pressure 4 Mpa. Take inner and outer radii as 125mm and 225mm respectively. Hence find the maximum shear stress developed.	11
	b)	Find stress distribution in ring $a \le r \le b$ given by proposed stress function $\phi = C\theta$. Comment on Results obtained.	06

Section – II

Q.4	a)	Write a note on "Membrane Analogy"	05
	b)	Establish the relation of torsion of a bar with elliptical cross section Subjected to end torsion.	12
Q.5	**Write notes.**		18
	a)	Drucker's Postulate	
	b)	Prandtl-Reuss Relations	
	c)	Idealized material behavior in plasticity	
Q.6	a)	Find yield stress in unidirectional tension using Mises criterion for a material with following state of stress : $\sigma_x = 100\ MPa$, $\sigma_y = 83\ MPa$, $\tau_{xy} = 45\ MPa$	08
	b)	Find collapse load for a simply supported isotropic circular plate loaded with point load at centre.	09

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ME (Semester - I) (CBCS/CGPA) Examination Nov/Dec 2019
Civil – (Structures Engineering)
MECHANICS OF STRUCTURES

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

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

Section – I

Q.1 Draw ILD for R_B and MA for propped cantilever shown in fig 1. Compute   **12**
ordinate at 1.5 m interval.

fig ①

Q.2 A semi circular beam curved in plan and supported on three equally spaced   **12**
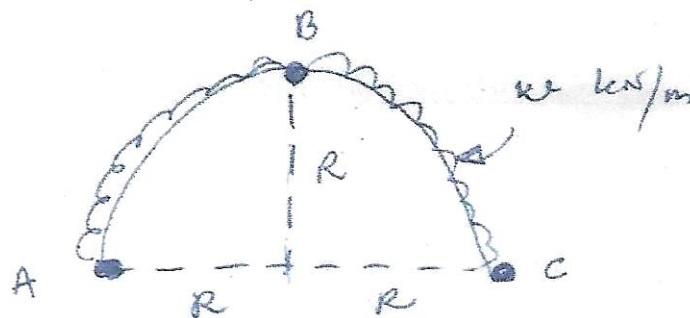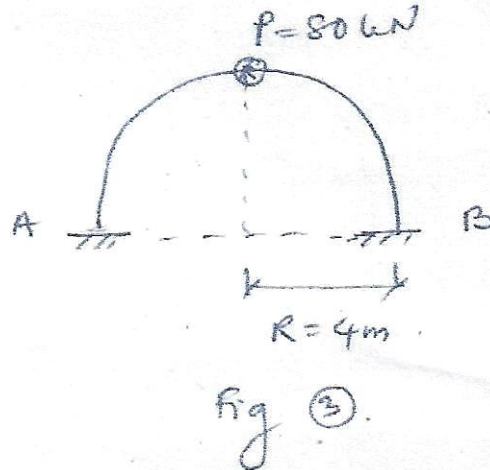support. The beam carries udl of 'w'. Analyse the beam and sketch BMD, TMD.


fig ②

OR

Find bending moment at midspan of semicircular beam loaded at mid span with a concentrated load of 80kN. The beam is fixed at both support. Find maximum bending moment and maximum torque in the beam.

fig ③.

Q.3 Draw SFD, BMD, deflection and foundation pressure diagram for a semi in finite beam on elastic foundation hinged at one end and subjected to udl of 'w' throughout the length.   **11**

Section – II

Q.4 A simply supported beam column is subjected to constant axial force 'p' and udl 'w' throughout its length. Find maximum deflection and maximum BM in the Beam column.   **11**

Q.5 Anayse the beam as shown in fig 4 by stiffness method.   **12**

fig. ④
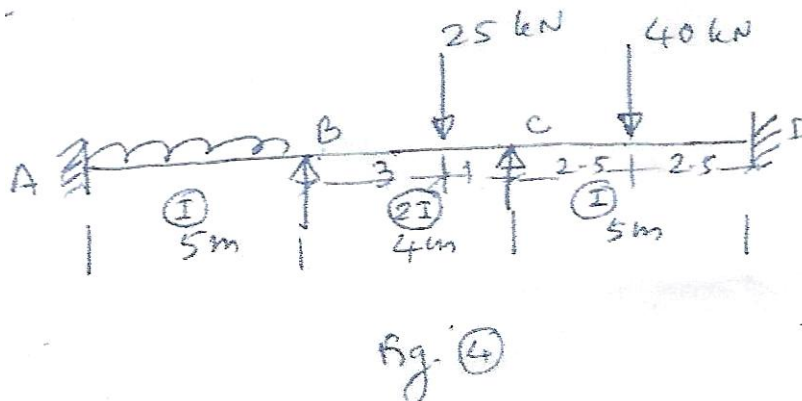
OR

Analyse frame as shown in fig 5 by stiffness method.

fig ⑤
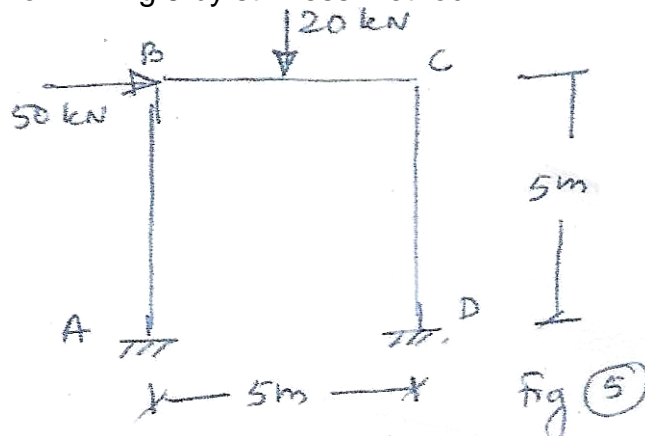
Q.6 Find the bar forces in the truss as shown in fig 6 by stiffness method **12**
(member approach)

Member	AE (MN)	L (CM)
AD, CD	300	300
BD	259.8	259.8

Seat No.

Set **P**

ME (Semester – I) (CBCS/CGPA) Examination Dec-2019
Civil – (Structures Engineering)
DYNAMICS OF STRUCTURES

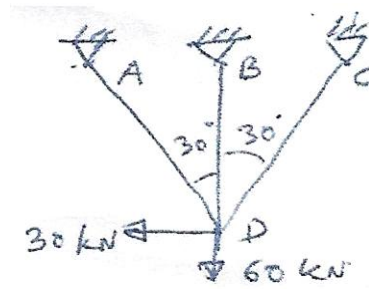Day & Date: Wednesday,18-12-2019   Max. Marks: 70
Time: 10:00 AM To 02:00 PM

Instructions: 1) Q. No. 2 & Q. No. 5 are compulsory.
2) Solve any one question from each section.
3) Figures to the right indicate full marks.
4) Assume suitable data if necessary and assume if clearly.

Section – I

Q.1 From first principle derive the governing differential equation for undamped free vibration. Obtain the solution if SDOF is given an initial displacement yo and initial velocity Vo. Plot the graph of y vs t, v vs t and a vs t.   **17**

Q.2 a) A sensitive instrument of weight 450 N is to be installed at a location where the vertical acceleration of the ground is 0.11 g at a frequency of 12 Hz. The instrument is mounted on a rubber pad of stiffness 14 N/mm and damping such that the damping ratio of the system is 10%. Determine. What acceleration is transmitted to the instrument?   **14**

b) Write a note on Transmissibility.   **04**

Q.3 Derive the expression for Duhamel's Integral for damped system. 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   **17**
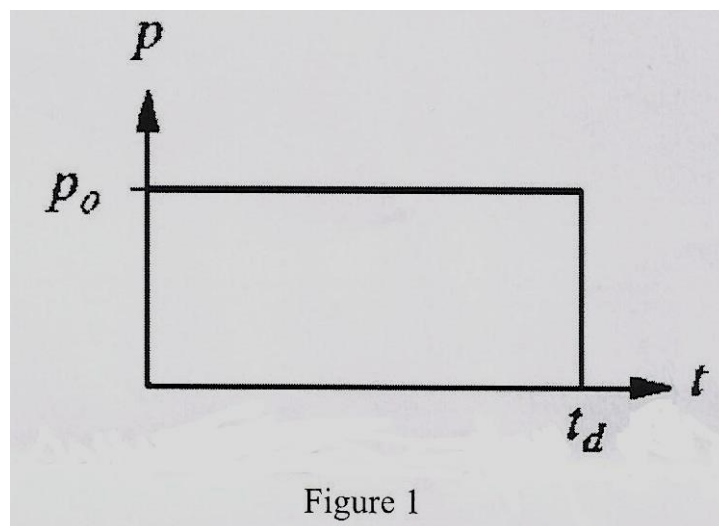
Figure 1

Section – II

Q.4 What is MDoF system? Derive Generalized equation of motion for MDOF system for damped forced system.   **18**

Q.5 A two degree of freedom system has properties as shown in Figure 2. Determine the natural frequency and mode shapes of the system.   **17**
Consider k_1=3 kN/m ; k_2=3 kN/m ; k_3=2 kN/m
m_1=200kg m_2=200kg

Figure 2
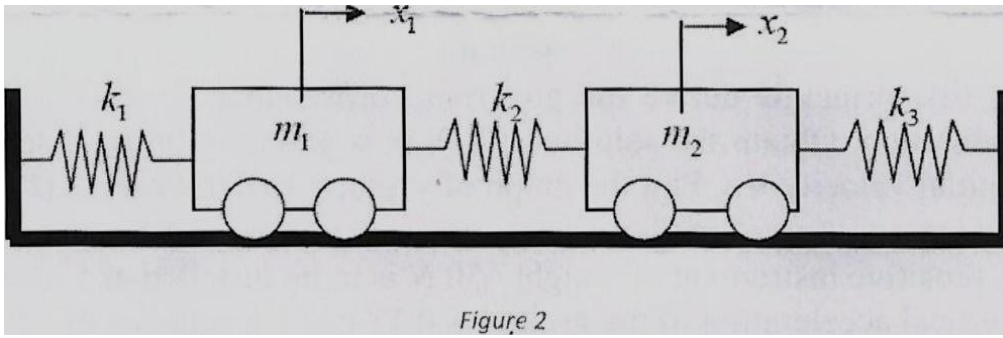
Q.6 **a)** Write a note on Dunkerley's Method. **06**
     b) Determine first three frequencies and mode shapes for a simply supported **12**
        continuous beam.

Seat No.

Set **P**

ME (Semester-I) (CBCS/CGPA) Examination Dec 2019
Civil – (Structures Engineering)
DESIGN OF FOUNDATION

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

Instructions: 1) All questions are compulsory.
       2) Make suitable assumption if necessary and mention it clearly.
       3) Figures to the right indicate full marks.

Section – I

Q.1	a)	State assumptions and limitations in Terzaghi's analysis for bearing capacity. Also write on effect of water table on bearing capacity.	05
	b)	A square footing has to carry load of 800 kN. Find size of footing for FOS of 2.5. The depth of foundation is 1.5m. Soil has following properties $G = 2.7, e = 0.53, Sr = 0.5, \emptyset = 28°$ and $C = 10 kN/m^2$ What will be safe bearing capacity of soil for above case if voids ratio of soil is 0.72 instead of 0.53. Find the size of the footing in this case. Take N_c =37.5, N_q =22.5 and N_γ =19.7	08
Q.2	a)	Discuss the necessity of combined footing with examples.	05
	b)	Two reinforced column 800 x 800 mm and 600 x 600 mm in size carry axial load of 2500 kN and 1800 kN respectively. The columns are spaced 3 m apart. The available space by side of 1800 kN column is 1.25m only from centre of column. The SBC of soil is 250 kN/m². Use M-20 concrete and Fe-415 steel. Design combined trapezoidal footing (Geometry only)	07
Q.3		Design a raft foundation (beam column type) for 4 columns spaced at a distance of 3.8 m center to center in either direction (square pattern). All four columns carry an equal load of 900 kN. Assume SBC = 180 kN/m². Use M-20 concrete and Fe-415 steel.	10

Section – II

Q.4		A column earning load of 3000 kN has to be supported by four piles each of size 280 mm x280mm arranged in square pattern. Piles are spaced 1 m centre to centre. Column size is 550 x 550 mm. Design pile cap. Use M-20 concrete and Fe-415 steel.	12
Q.5	a)	Discuss in detail the methods to correct tilts and shifts of well during sinking.	06
	b)	Discuss in detail working of pneumatic caisson.	05
Q.6	a)	Draw the sketch of block foundation with all 6 degrees of freedom (3 translation and 3 rotation).	04
	b)	Describe various types of machine foundation.	04
	c)	Write short note on permissible amplitude of vibration for machine.	04

Seat No.

Set **P**

ME (Semester - I) (CBCS/CGPA) Examination Dec-2019
Civil - (Structures Engineering)
ADVANCES IN CONCRETE COMPOSITES

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

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

Section – I

Q.1	**a)**	Explains the properties of constituent materials of Fiber reinforced concrete.	**06**
	b)	Explain the materials used in Ferro cement.	**06**
	c)	What are the applications of Fiber Reinforced Concrete?	**06**
Q.2	**a)**	Explains the Advantages and Disadvantages of Ferro cement.	**06**
	b)	Explains the mechanical properties of Ferro cement. Explains the application of Ferro cement.	**06**
	c)	What is mean by Fiber Reinforced Concrete? Explains the different types of Fibers used for construction Fiber Reinforced Concrete.	**06**
Q.3	**a)**	Explains the Mix proportion of FRC. Explains the properties of freshly mixed concrete of FRC.	**06**
	b)	Explains the mechanical properties of Fiber reinforced concrete.	**06**
	c)	Explains the factors affecting the properties of Fiber Reinforced Concrete.	**06**

Section – II

Q.4		What is Silica Fume Concrete and explain in detail its properties with respect to	
	a)	Physical properties	**06**
	b)	Properties of fresh concrete	**06**
	c)	Durability of concrete	**05**
Q.5	**a)**	State the applications of Silica Fume Concrete.	**06**
	b)	Explain the comparison of important properties of normal concrete with those of polymer concrete.	**06**
	c)	Write note on types of polymer concrete.	**05**
Q.6	**a)**	What are the applications of polymer impregnated concrete and polymer concrete?	**05**
	b)	Briefly explain the following : 1) Classification of polymer concrete 2) Advantages of silica fume concrete	**06**

Seat No.

Set **P**

M.E. (Semester - II) (CBCS/CGPA) Examination Dec- 2019
Civil – (Structures Engineering)
THEORY OF PLATES & SHELLS

Day & Date: Thursday, 05-12-2019   Max. Marks: 70
Time: 10:00 AM To 02:00 PM

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

Section – I

Q.1	a)	Enlist different types of plates. State the assumption made in thin plate theory.	10
	b)	Differentiate between rectangular and circular plates.	08

Q.2 Using Navier's Solution obtain expression for maximum deflection of a simply supported square plates subjected to uniformly distributed load.   **17**

Q.3 Using finite difference method, calculate moments and deflections at various points of a uniformly loaded square plate of side 'a' by dividing the plate into 4 x 4 = 16 square mesh.   **17**

Q.4 Obtain Governing Differential Equation for the deflection surface of a laterally loaded rectangular plates.   **17**

Section – II

Q.5	a)	Give classification of shells based on geometry with neat sketches.	10
	b)	Explain load distribution method of shells. How it differs from plates?	08

Q.6 Obtain D.E. of equilibrium for cylindrical shells using membrane theory.   **17**

Q.7 Define Stress resultants. Obtain stress displacement relations and equilibrium equations for thin shell surfaces.   **17**

Q.8 **Write notes.**   **17**
a) Assumptions in Finsterwalder's theory
b) Beam theory of bending of shells
c) Thin shells theory

Seat No.

Set **P**

ME (Semester-II) (CBCS/CGPA) Examination Dec-2019
Civil – (Structures Engineering)
FINITE ELEMENT METHOD

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

Instructions*:* 1) Q. No. 1 & Q. No. 5 is compulsory Solve any two questions from each
Section.
2) Use of non-programmable calculator is allowed.
3) Assume suitable data if required and mention clearly.

Section – I

Q.1	**Answer the following (any one).**		**05**
	a)	A beam is subjected to a uniformly distributed load of intensity w per unit length (in -y direction). Derive equivalent nodal force vector.	
	b)	Write about Pascal's Triangle in FEM.	
	c)	State and explain generalized Hooke's law.	
Q.2	a)	Find Shape functions of a 5 node bar element using Lagrange polynomial function, Plot the variation of shape functions.	**05**
	b)	Use a suitable displacement function develop strain displacement matrix (B) of a Constant Strain Triangle (CST) element.	**10**
Q.3	Using an appropriate polynomial for 2 node straight prismatic beam.		**15**
	1.	Find shape function of beam	
	2.	Using shape function derive equivalent nodal force of the beam when it is subjected to uniformly distributed load of intensity q/m for the entire length of the beam.	
Q.4	a)	Derive stiffness matrix for a 2-noded bar element with its diameter varying form 300 mm at one end to 150 mm at other end. Consider the length of bar as 1.5 m, E = 200 GPa.	**09**
	b)	Explain the terms:	**06**
		1. Local co-ordinates	
		2. Global co-ordinates.	

Section – II

Q.5	**Answer the following (any one).**		**05**
	a)	Write a short note on triangular plate bending element. Suggest displacement function for it.	
	b)	Explain Natural and Cartesian Co-ordinate systems and how the co-ordinates can be mapped from one system to other system.	
	c)	What is axis symmetric problem, explain with various examples.	
Q.6	Assemble Jacobian matrix of a 4 node isoparametric quadrilateral element with nodes (0, 0), (60, 0), (65.7735,10),(5.7735,10) at Gauss point (0.57735, 0.57735).		**15**
Q.7	a)	Discuss about discrete Kirchhoff triangle element for plate bending problem.	**08**
	b)	What are the convergence criteria of the displacement function?	**07**
Q.8	a)	What do you mean by lumped mass and consistent mass matrices? How do you obtain the same? Discuss their merits and demerits.	**05**
	b)	Explain patch test for plate bending element.	**05**
	c)	Discuss any one shell element used in FEM.	**05**

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ME (Semester - II) (CBCS/CGPA) Examination Dec- 2019
Civil – (Structures Engineering)
EARTHQUAKE ENGINEERING

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

Max. Marks: 70

Instructions: 1) Q. No. 2 and Q. No. 5 is compulsory.
2) Solve any one questions from each section
3) Figures to right indicate full marks.
3) Assume suitable data, if necessary and state it clearly.

Section – I

Q.1	**a)**	What do you understand by tectonic causes of an earthquake? Explain various theories related to tectonic causes.	**10**
	b)	Write note on seismograph.	**07**

Q.2 A water tower of weight 1600 kN and having stiffness 1000 kN/m is subjected to ground acceleration $a_g = t^2$ for a period of I second. Determine the maximum relative displacement of the tower with respect to its base by using Newark's β method. Assume 5 % damping. **18**

Q.3 Derive expression for maximum displacement, velocity and acceleration response of SDOF system subjected to earthquake ground motion. From these expressions explain the concept of pseudo velocity and pseudo acceleration spectra. **17**

Section – II

Q.4 What are the two seismic design requirements an engineer has to account for the analysis & design of earthquake-resistant building? Discuss briefly how these are incorporated to achieve the objective. **17**

Q.5 A five storey building 6.5 m x 7.5 m in plan is supported by four columns at the corners each storey is 3.35 m height. Slab of each floor is 120 mm thick and the beams are 230 mm x 530 mm in size. All the columns are 300 mm x 300 mm and walls are of 230 mm thick brick masonry. The building is to be constructed in Solapur city. Assuming live load category 3 kN/ m^2 over the slab, evaluate the lateral forces and storey shear in both directions. **18**

Q.6 What is meant by Base isolation? Explain any one base isolation system in detail. **17**

Seat No.		Set	P

ME (Semester - II) (CBCS/CGPA) Examination Dec-2019
Civil – (Structures Engineering)
ADVANCED DESIGN OF STEEL STRUCTURES

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

Instructions*: 1) Q. No. 1 & Q. No. 5 are Compulsory.
2) Attempt any one from the remaining questions of each section.
3) Use of IS 800, steel table , calculator, IS 811 allowed
4) Assume suitable data wherever necessary.
5) Draw neat sketches wherever necessary.

Section – I

Q.1 The effective span of a through type truss girder railway bridge is 39 m for a **18** single lane B.G. track. The cross girders a speed at 6.5 m apart. the stringers are spaced at 1.9 m between centre line. The weight of stock and check rails are 0.44 kN/m and 0.4kN/m. Wooden sleepers of size 2.80 m x 250 mm x 150 mm are placed 0.4 m c/c. Unit weight of wooden sleepers is 7.4 kN/m^3. The main girders are provided at 6.5m apart; determine the design forces in top, bottom, vertical and diagonal members of central panel. Design the bottom chord member and vertical member. The bridges is to carry a equivalent U.D.L line load of 4000 kN for B.M and 4200 for shear force.

Q.2 Determine the shears and moments in columns and beams of a building frame **17** with moment resisting joints as shown in Fig. No.1, by cantilever method. The cross sections area of the columns are as shown in Fig. No. 1.
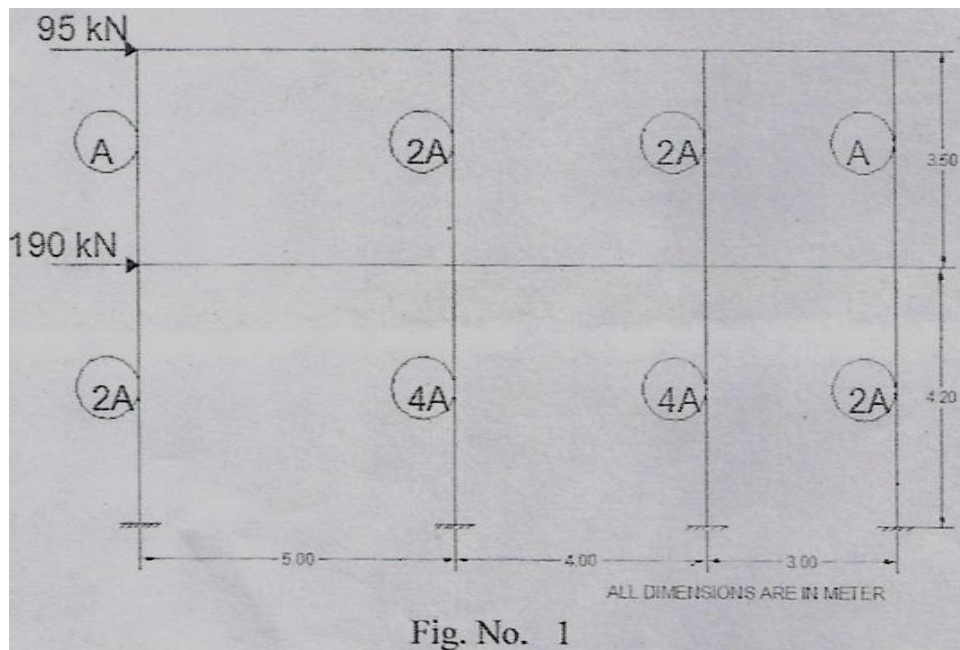
Fig. No. 1

Q.3	a)	A cold form section 200 mm X 100 mm X 2 mm with lip 20mm is to be used as a concentrically loaded column of 3.6 m effective length. Determine the allowable load.	07
	b)	Explain local buckling of thin element with neat sketch.	05
	c)	Write on design procedure for light gauge beams.	05

Section – II

| Q.4 | a) | A fixed beam of span 5.2m carries a uniform distributed load 5.2 kN/m on the right hand 3.8 m portion of the beam. The load factor is 1.75 and the shape factor is 1.15. The yield stress is 250MPa. Calculate the section modulus of the beam and locate the position of plastic hinges. | 12 |
| | b) | Explain different collapse mechanisms. | 05 |

| Q.5 | a) | Design a cased column to carry a load of 1100 kN. The effective length of column is 4 m. | 09 |
| | b) | Design a composite foot bridge having clear width of 3.5 m and effective span of 10 m The bridge is to be designed for live load of 4kN/m2. Assume kerb 40 cm X 30 cm and two steel girders at 1.5 m c/c are provided. | 09 |

| Q.6 | a) | Write the design procedure of composite beams. | 5 |
| | b) | Determine the values of fully plastic moment of the frame, when loaded up to portal collapse, The portal frame has vertical members AB=2.5m, CD=5m and horizontal portion BC= 6m. The end A and D are fixed. A horizontal load of 25kN towards B is acting at B and a vertical load of 35kN acting downwards is at 2m from B on BC portion. The plastic moment of the frame is uniform throughout. Draw BMD also. | 12 |

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M.E. (Semester - II) (CBCS/CGPA) Examination Dec- 2019
Civil – (Structures Engineering)
DESIGN OF R.C.C. BRIDGES

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

Instructions: 1) Q.1 and Q.2 are compulsory and solve any one from section - I.
                  2) Q.5 and Q.8 are compulsory and solve any one from section - II.
                  3) Figures to the right indicate full marks.
                  4) Assume suitable data if necessary and mention it clearly.

Q.1 **Answer the following questions.**
     a) What are the basic components of bridge structure? Explain with the help of Sketch with their functions   **04**
     b) Give the detail classification of Bridges   **04**
     c) Give the details of IRC Class AA tracked loading for bridges   **04**

Q.2 Find the design bending moment of Two lane bridge solid deck slab for following data: **12**
     a) Effective span - 8 m
     b) Carriage way width - 7.5 m
     c) Kerb- 600 x 275 on both side
     d) Live load- IRC Class A (Two lane)
     e) Wearing coat - 100 mm thick
     f) Use M-30 concrete and Fe- 415 steel
     g) Use $\alpha = 2.65$

Q.3 A RCC T beam type bridge having deck slab of 200 mm thick, wearing coat of 80 mm thick, three longitudinal girders and five cross girders. Determine the Design bending moment for all the longitudinal girders. Use following additional data,   **11**
     a) Carriage way width - 7 5 m
     b) Span of bridge -14 m
     c) Live Load - IRC class AA Tracked
     d) Kerb- 600 mm wide. 400 mm deep
     e) Web thickness for Longitudinal and cross girder- 300 mm
     f) Longitudinal Girder spacing - 2.5 m
     g) Use M-30 concrete and Fe-415 steel

Q.4 Write the detail procedure of design of slab panel using Pigeuad's theory.   **11**

Section – II

Q.5 Verify the adequacy of pier for the following data: **12**
Top width of pier- 2 m, Height of pier upto springing level - 10 m, C/C distance of bearing - 1.2 m, Side batter 1:12, HFL-1.2 m below the bearing level, Span of bridge -18 m. Self weight of the superstructure = 300 kN/m . Live load- IRC class AA tracked, Material of pier = M20 concrete

Q.6 Verify the suitability of abutment as shown in the fig 7.1 Use following data **11**
Density of soil - 17 kN/m^3, Friction angle of soil ($\emptyset$) = 32°.
Coefficient of friction - 0.6, Live load IRC class AA tracked.
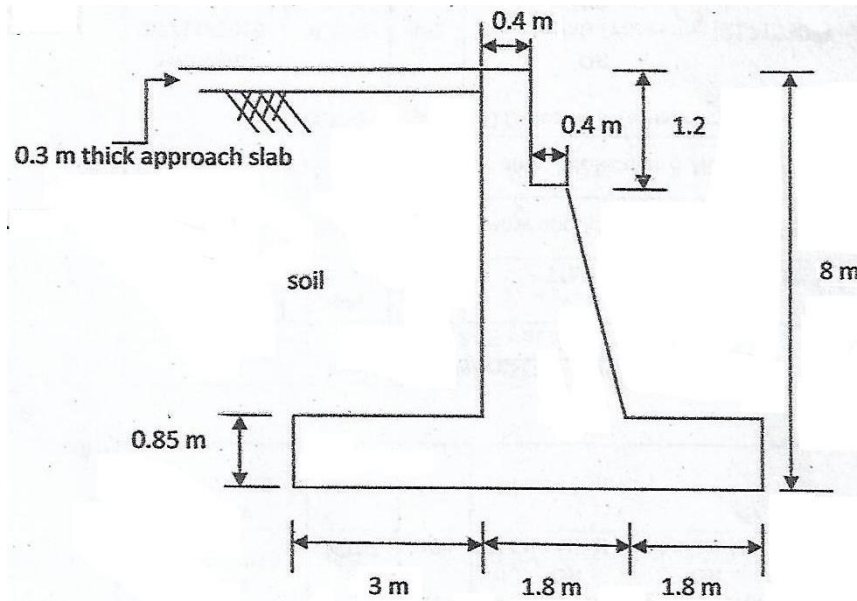
Fig no 7.1

Q.7 a) Design a elastomeric unreinforced bearing pad for following data **11**
Vertical load (sustained) = 200 kN,
Vertical load (dynamic) = 80 kN,
Horizontal force = 85 kN,
Modulus of rigidity of elastomer – 1.1 N/mm^2,
Coefficient of friction = 0.35,
b) Write a detail note on Expansion Joints.

Q.8 Write Notes. (Any Three) **12**
a) Types of bridge abutments with their suitability
b) Expansion Joints
c) Types of bearing
d) Importance of bridge insepection

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ME (Semester-I) (CBCS/CGPA) Examination Dec-2019
Mechanical – (Design Engineering)
COMPUTATIONAL TECHNIQUES IN DESIGN ENGINEERING

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

Instructions: 1) Q.3 is compulsory and solve any one question from section - I.
                2) Q.4 is compulsory and solve any one question from section - II.
                3) Use suitable data if necessary & mention it clearly.
                4) Figures to right indicate full marks.
                5) Use of scientific calculator is allowed.

Section – I

Q.1 a) Using Lagrange's formula, express the function.   **09**
$\frac{3x^2+x+1}{(x-1)(x-2)(x-3)}$ as a sum of partial fractions.

b) Using the method of least squares, fit the curve, $y = ax^2 + b/x$ to the following data   **08**

x :	1	2	3	4
y :	-1.51	0.99	8.88	7.66

Q.2 a) The velocity 'v' of a moped which starts from rest, is given at fixed intervals of time 't' as follows   **09**

t:	2	4	6	8	10	12	14	16	18	20
v:	10	18	25	29	32	20	11	5	2	0

Estimate the distance covered in 20 minutes.

b) Solve the equations,   **08**
$27x + 6y - z = 85,$ $x + y + 54z = 110,$ $6x + 15y + 2z = 72$
By Jacobi method.

Q.3 a) Apply Bessei's formula to find the value of f (27.5) from the table.   **09**

x :	25	26	27	28	29	30
$f(x)$:	4	3.846	3.704	3.571	3.448	3.333

b) The elevation above a datum line of seven points of road are given below. Find the gradient of the road at middle point.   **09**

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

Section – II

Q.4 a) Explain with suitable figure types of 1D & 2D elements.   **06**
b) Explain general steps used in FEM.   **06**
c) Explain history & application of FEM.   **06**

Q.5 **a)** Solve the equations $\nabla^2 u = 0$ for the following mesh. **12**

0	500	1000	500	0
1000	u_1	u_2	u_3	1000
2000	u_4	u_5	u_6	2000
1000	u_7	u_8	u_9	1000
0	500	1000	500	0
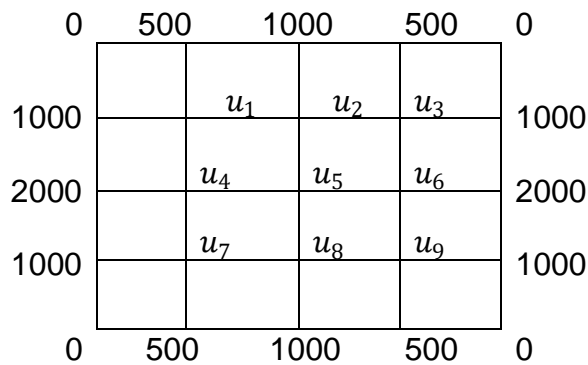
b) Using Crank - Nicolson's scheme, solve $U_{xx} = 16\, u_t$ subject to $u(x, 0) = 0$, $u(0, t) = 0$, $u(1, t) = t$, for two time steps. **05**

Q.6 **a)** Using Euler's modified method, obtain a solution of the equation, $\frac{dy}{dx} = x + \sqrt{y}$ with initial conditions $y = 1$ at $x = 0$ for range $0 \leq x \leq 0.6$ in steps of 0.2. **09**

b) Explain use of mathematical modelling in numerical methods. **08**

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ME (Semester - I) (CBCS/CGPA) Examination Dec-2019
Mechanical – (Design Engineering)
MACHINE DYNAMICS

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

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

Q.1 a) For a single degree of freedom system, explain free vibrations with viscous damping.   **10**

b) Write a note on whirling of shaft.   **04**

Q.2 a) Find out the two natural frequencies and corresponding mode shapes for the system with two masses fixed on a tightly stretched string shown in figure. Here $m_1 = m_2$ & $l_1 = l_2 = l_3 = 1$ **10**
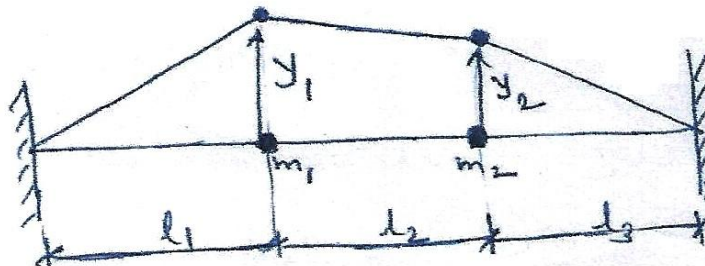
b) Draw a neat sketch of two degree of freedom system & write equations of motion. (Longitudinal Vibration)   **04**

Q.3 a) What is multi degree freedom system? Draw a neat sketch of multi degree freedom system & write equations of motion. Represent these equations in matrix from.   **10**

b) Explain vibration isolation.   **04**

Q.4 a) Find the lower natural frequency of vibration for the system shown in figure by Rayleigh's method.   **10**

Assume $E = 1.96 \times 10^{11} \, N/m^2$
         $I = 4 \times 10^{-7} \, m^4$.

$m_1 = 100 \, kg$
$m_2 = 50 \, kg$
$c = 0.18 \, m$
$l = 0.3 \, m$
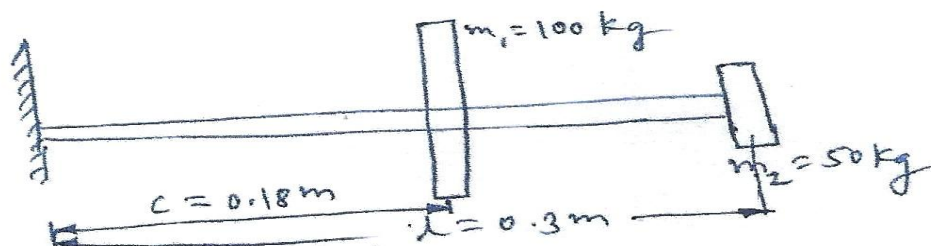
b) What are nonlinear vibrations? Give examples .   **04**

Q.5	a)	Explain longitudinal vibration of bars. (continuous system)	**10**
	b)	Write a note on machine conditioning & monitoring.	**04**
Q.6	a)	Explain perturbation method used for nonlinear vibrations.	**10**
	b)	What is a continuous system? Give examples.	**04**
Q.7	a)	Explain construction & working of FFT Analyzer.	**10**
	d)	Write a note on random vibrations. Give examples.	**04**

Seat No.		Set	P

ME (Semester-I) (CBCS/CGPA) Examination Dec-2019
Mechanical – (Design Engineering)
SOLID MECHANICS

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

Instructions: 1) Q.3 & Q.6 are compulsory. Solve any one questions from each section.
2) Figures to the right indicate full marks.
3) Assume necessary suitable data, if required.

Section – I

Q.1 **a)** What are the assumptions made in theory of elasticity and explain the components of strain with usual notations.   **05**

b) Derive the equation of compatibility for plane stress problem in terms of cartesian coordinates for plane stress problem.   **12**

Q.2 **a)** Discuss the significance of Airy's stress function in theory of elasticity.   **05**

b) Investigate what problem is solved by the stress function ϕ when applied to the region included by $y = \pm c$ and $0 < x < l$. The stress function ϕ is as given below: **12**

$$\phi = S \left[\frac{1}{4}xy - \frac{xy^2}{4C} - \frac{xy^2}{4C^2} + \frac{ly^2}{4C} + \frac{ly^3}{4C^2} \right]$$

Q.3 **Write short notes on the following. (any three)**   **18**
a) Relation between E, μ and G
b) Strain components in polar co-ordinates
c) Saint Venant's principle
d) Plane stress and plane strain

Section – II

Q.4 **a)** Explain in detail the basic assumptions made in theory of contact stresses and its significance.   **05**

b) Derive the expression for torsion of a bar of narrow rectangular cross section.   **12**

Q.5 **a)** Explain the significance of shear center with examples.   **05**

b) Locate a shear centre for a structural cross section as shown in Fig. I   **12**
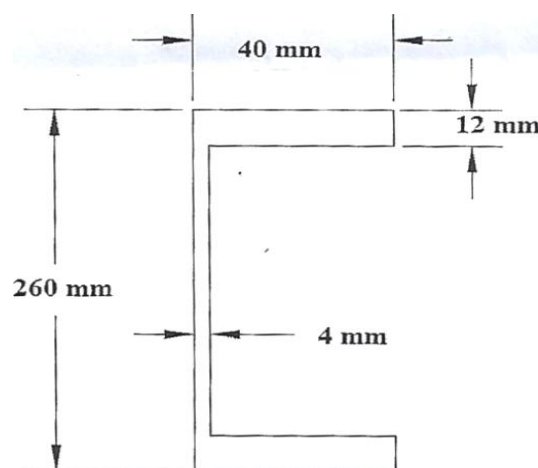
Fig. I

Q.6 **Write short note on the following (any three)** 18
    a) Membrane analogy
    b) Shell of uniform strength
    c) Torsion of hollow shaft
    d) Contact stresses in cylindrical rollers

Seat No.		Set	P

ME (Semester - I) (CBCS/CGPA) Examination Dec 2019
Mechanical – (Design Engineering)
INDUSTRIAL INSTRUMENTATION

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

Instructions: 1) Q. No.1 and Q.No.4 are compulsory and Solve any one question from section I.
2) Q. No.5 and Q.No.8 are compulsory and solve any one question from section II.
3) Figures to the right indicate full marks.
4) Draw neat sketches wherever necessary.

Section – I

Q.1	a)	Define calibration and explain different types of calibration.	06
	b)	Define the following	06
		1) Time Lag	
		2) Dead Zone	
		3) Fidelity	
Q.2	a)	Explain what is meant by zero order, first order and second order instruments and Derive an expression for output response for second order system for periodic input harmonic type.	06
	b)	Explain typical applications of instrument systems.	05
Q.3	a)	Explain photo-emissive, phot-conductive and photo-voltaic transducer.	06
	b)	Explain inverting, non-inverting and summing operational amplifiers.	05

Q.4	**Write short notes. (Any Four)**	12
	1) Filters	
	2) Data display and data storage	
	3) Elastic Force Devices	
	4) Gear Dynamometer	
	5) Strain gauge torque transducer	
	6) Seismic Devices	

Section – II

Q.5	a)	What are the different types of elastic transducers used for pressure measurement? Explain LVDT-type pressure transducer.	06
	b)	Explain Ultrasonic flow meters.	06
Q.6	a)	Explain Bimetallic thermometers.	06
	b)	Explain different sound measurement conditions.	05
Q.7	a)	Explain time compression analyzer.	06
	b)	Explain Wear behavior monitoring.	05

Q.8 **Write short notes. (Any four)** **12**
   1) Data acquisition system
   2) Sound Level meter
   3) Total radiation pyrometer
   4) Electret Microphone
   5) Random force testing
   6) Corrosion monitoring

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ME (Semester - I) (CBCS/ CGPA)Examination Dec-2019
Mechanical – (Design Engineering)
RELIABILITY ENGINEERING

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

Instructions: 1) All questions are compulsory.
         2) Figures to the right indicates full marks.
         3) Assume suitable data if necessary and Mention it clearly.
         4) Use non programmable calculators is allowed.

SECTION – I

Q.1 a) Discuss Taguchi's loss function concept.   **05**

     b) For a system having Weibull failure distribution with a shape parameter of   **06**
1.4 and a Scale parameter of 550 days, find the following:
     1)   R(100 days)
     2)   MTTF
     3)   The standard deviation
     4)   tmed
     5)   tmode
     6)   The design life for a reliability of 0.90

Q.2 a) A company supplies a box of 50 condensers of which five defective units get   **06**
mixed up due to an Error. If four items are drawn with replacement, what is
the probability of
     1)   Getting exactly 2 defective condensers?
     2)   Getting at least 2 defective condensers?
     3)   Getting at the most 2 defective condensers?

     b) The PDF for the time to failure of the drive train on a, Regional Transit   **06**
Authority bus is given by $f(t) = 0.2 - 0.02t \quad 0 \le t \le 10$ years
Find
     1)   Show that the hazard rate function is increasing, indicating continuous
         wear out over time
     2)   Find the MTTF
     3)   The median time to failure
     4)   Find the mode of the failure distribution
     5)   The standard deviation

Q.3 Write short notes. (Any Three)   **12**
     a) Bayesian theorem of Probability
     b) Taguchi's approach to parameter design
     c) Hazard rate function
     d) Standby Systems

SECTION – II

Q.4 **a)** What are the main steps used for performing FMECA. **05**

b) Consider a system composed of three subsystems with the estimated failure **06**
rates of $\lambda 1 = 0.005$, $\lambda 2 = 0.003$ and $\lambda 3 = 0.001$ failure per hour,
respectively. The system has a mission time of 25 hours. A system reliability
of 0.95 is required. Find the reliability requirement for the subsystems.

Q.5 **a)** Assume that an engineering system is composed of four independent and **06**
identical Units in parallel. At least three units must operate normally for
system success. Calculate the system mean time to failure if the unit failure
rate is 0.0035 failures per hour.

b) Explain reliability life testing. **06**

Q.6 **Write short notes. (Any Three)** **12**

    a) Identification - as one maintainability design factor.

    b) Condition monitoring techniques

    c) Reliability evaluation methods

    d) Reliability growth cycle

Seat No.

Set **P**

ME (Semester - II) (CBCS/CGPA) Examination Dec-2019
Mechanical – (Design Engineering)
ADVANCED DESIGN ENGINEERING

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

Instructions: 1) Q. No.2 & Q. No.3 are compulsory. Solve any one question from section-I.
2) Q. No.6 & Q. No.8 are compulsory. Solve any one question from section-II.
3) Use of Calculator is allowed
4) Figures to the right indicate full marks.
5) Assume additional data, if necessary and mention it clearly

Section – I

Q.1 **a)** Explain CEP & CPM cams.   **05**
b) Compare the kinematics of SHM and cycloidal motion cam with the help of **06**
SVAJ diagrams.

Q.2 **a)** Write short note on converging and diverging films.   **06**
b) Define tribology with example. Discuss economical importance of tribology. **06**

Q.3 **a)** Explain pressure development mechanism in hydrodynamic bearing.   **06**
b) Explain effect of pressure and temperature on viscosity.   **06**

Q.4 A full journal bearing have the following specifications   **11**
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 - 8.274×10^{-3} N-S/m^2
Considering the bearing as lightly loaded, determine
1) Frictional torque
2) Coefficient of friction
3) Power lost

Section – II

Q.5 **a)** Write a note on hydrostatic and elasto hydrodynamic bearings.   **06**
b) Derive an expression for R(t), Z(t) & F(t) in case of distribution function & **05**
reliability analysis.

Q.6 **a)** Explain the methods of reducing thermal stresses.   **06**
b) What are principles employed in design of forging?   **06**

Q.7 In the performance analysis test of 110 electronics instruments under excessive **11**
vibration condition, the following failure frequencies were observed, the total
period of testing was 8 hours

Time interval	0 - 1	1 - 2	2 - 3	3 - 4	4 - 5	5 - 6	6 - 7	7 - 8
No. of failures	3	16	22	42	11	9	4	3

Determine
a) Failure density
b) Hazard Rate
c) Reliability

Q.8 **a)** Write note on form and contiguity constraints   **06**
        b) Write note on Weibull distribution   **06**

Seat No.		Set	P

ME (Semester-II) (CBCS/CGPA) Examination Dec-2019
Mechanical – (Design Engineering)
FINITE ELEMENT ANALYSIS

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

Instructions: 1) Q.3 and Q.4 are compulsory and attempt any question from section – I.
               2) Q.6 and Q.8 are compulsory and attempt any question from section – II.
               2) Make suitable assumptions if necessary and state them clearly.

Section – I

Q.1	**a)**	Explain the factors affecting accuracy of finite element analysis	**05**
	b)	What is meant by discretization of a structure? Discuss the various aspects to be considered while discretising a structure for finite element analysis.	**06**
Q.2	a)	Explain in brief principal of virtual work with suitable example.	**05**
	b)	Explain weighted residual approach applied to finite element analysis.	**06**
Q.3	**a)**	Derive an expression for element stiffness matrix for beam element.	**04**
	b)	Using finite element method calculate the nodal displacement and stresses in the stepped bar as shown in figure.	**08**

P=50000N, E=220Gpa, $A_1=4cm^2$, $A_2=3cm^2$, $A3=2cm^2$
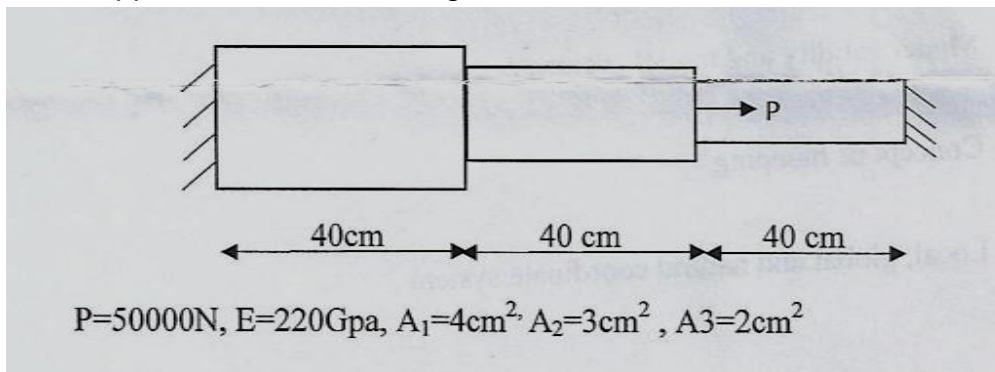
Q.4	**Write short note. (Any Two)**	**12**
	a) Size and number of elements	
	b) Solving and Post processing in Finite element analysis	
	c) FDM and FVM	

Section – II

Q.5	**a)**	Using Lagrangian Polynomial, find shape function for two noded and four noded bar element. Plot the variation of shape function.	**06**
	b)	Explain in brief sub-modeling and sub-structuring methods to improve modeling efficiency.	**05**
Q.6	**a)**	Discuss in brief iterative methods used in static and dynamic finite element analysis with suitable examples.	**06**
	b)	Compare lumped mass and consistent mass formulation of internal properties.	**06**

Q.7 Evaluate the temperature distribution in 1-D straight fin. Also calculate amount   **11**
of heat source 'Q' at the starting node so as to maintain 100°c temperature.
Assume h=10watt/cm^{2}c, length of element= 2.5cm, outside temperature= 20^{0}c,
Cross sectional area of element 1cm^2. perimeter of fin section = 4cm
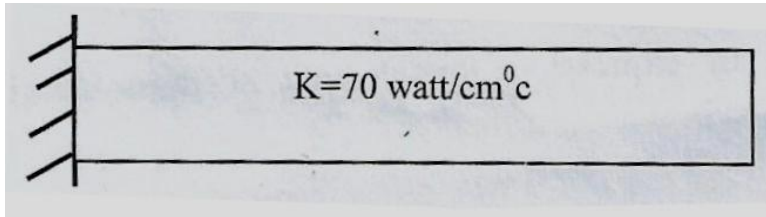
Q.8 **Write short note. (Any Two)**   **12**
   a) Model validity and model accuracy
   b) Concept of mapping
   c) Local, global and natural coordinate system

Seat No.

Set **P**

ME (Semester-II) (CBCS/CGPA) Examination Dec-2019
Mechanical – (Design Engineering)
INDUSTRIAL PRODUCT DESIGN

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

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

Q.1	**a)**	Discuss the importance of the creativity in idea generation.	**07**
	b)	Discuss the significance of colour scheme in aesthetic and ergonomic design of a product.	**07**
Q.2	**a)**	"Good combination of lines and forms not only improves ergonomics and aesthetics, but also adds to the function of the product". Explain with suitable examples.	**07**
	b)	Discuss generic product development process.	**07**
Q.3	**a)**	What are manufacturing aspects of industrial product design?	**07**
	b)	Discuss the aspect of ergonomic design of boilers.	**07**
Q.4	**a)**	Explain concept of purpose, style and environment in aesthetic design.	**07**
	b)	What is interpretation of information? How it can be effectively used in consumer products.	**07**
Q.5	**a)**	Explain mind criticism in the product design with examples.	**07**
	b)	Explain economic considerations in industrial product design.	**07**
Q.6	**a)**	What is anthropometry? List the anthropometric data needed in the design of radial drilling machine.	**07**
	b)	What is Product life cycle? Explain its role in industrial product design.	**07**
Q.7	**a)**	What is value analysis? Explain different techniques of value analysis.	**07**
	b)	How to achieve legal protection in product design?	**07**

Seat No.		**Set**	**P**

ME (Semester-II) (CBCS/CGPA) Examination Dec-2019
Mechanical – (Design Engineering)
ENGINEERING FRACTURE MECHANICS

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

Instructions*:* 1) Q. No. 3 and Q. No. 7 is compulsory.
2) Attempt any one questions from each section.
3) Figures to the right indicate full marks.
4) Use of Scientific calculator is allowed.
5) Assume suitable data, if necessary and mention it clearly.

Section – I

Q.1 **a)** Enlist stress intensity' factor for different problem geometries.   **07**
b) A steel plate with yield stress 350 MPa of width 80 mm and thickness 5 mm   **10**
has centre crack 2a = 40 mm length. If the far field stress is 150 MPa
determine the SIF and length of effective crack using Irwin's correction.

Q.2 **a)** Explain Irwin's Fracture Criterion.   **07**
b) A 75 cm wide steel plate has central crack of length 2a = 10 cm. The plate is   **10**
5 mm thick. The plate is pulled to fracture and the fracture load is 800 KN.
Determine the stress intensity factor assuming a/W as small. Also determine
the value of fracture resistance. Take Young's Modulus for material as 207
GPa.

Q.3 **Write short note on following (Any three)**   **18**
a) Griffith Energy criteria
b) Plastic constraint factor
c) Resistance (R) curves
d) Plastic zone shape according to VonMises criteria

Section – II

Q.4 **a)** Define J- integral. Discuss the significance and limitations of J-integral as a   **07**
fracture parameter.
b) An edge crack detected on a large plate is of 3.1 mm under a constant   **10**
amplitude cyclic load having σ_{max} = 310 MPa and σmin = 1720 MPa. If the
plate is made of a ferrite-pearlite steel and $K_{IC} = 165\ MPa\sqrt{m}$. Determine.
1) propagation life up to failure and
2) propagation life if the crack length a is not allowed to exceed 25 mm.

Q.5 **a)** What is difference between safe design and damage tolerance design   **07**
methodology to predict crack growth life?
b) A large centre-cracked plate containing an initial crack of length $2a_o$ =10 mm   **10**
is subjected to constant amplitude cyclic tensile stress ranging between a
minimum value of 100 MPa and maximum value of 200 MPa. Assuming
fatigue crack growth rate is governed by equation
$\frac{da}{dN} = 0.42 x 10^{-11}(\Delta k)^3 (m/cycle)$
1) calculate crack growth rate when crack length has the following values
2a = 10mm, 30mm, 50mm. Assuming further that the relevant fracture
toughness is $60\ MPa\ \sqrt{m}$, estimate the number of cycles to failure.

Q.6 **a)** Explain Paris law. **06**
     b) Compare creep and stress rupture test. **06**
     c) Explain cyclic stress strain curve. **06**

Seat No.		Set	P

ME (Semester-II) (CBCS/CGPA) Examination Dec-2019
Mechanical – (Design Engineering)
THEORY AND ANALYSIS OF COMPOSITE MATERIALS

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

Instructions: 1) Q. No. 3 and Q. No. 6 are compulsory.
2) Solve any one questions from each section.
3) Figures to the right indicate full marks.
4) Assume suitable data if necessary and mention it clearly.

Section – I

Q.1	**a)** Explain Classification and Characteristics of Composite Materials.	**09**
	b) List out the applications of Composite Materials with suitable examples.	**08**
Q.2	**a)** Explain Strengths of an Orthotropic Lamina.	**09**
	b) What is stiffness? Explain Elasticity Approach to Stiffness.	**08**
Q.3	**Write short notes on. (any three)**	**18**
	a) Basic Terminology of fiber-reinforced composite material	
	b) Stress-Strain Relations for Anisotropic Materials	
	c) Comparison of Approaches to Stiffness	
	d) Maximum Stress theory	

Section – II

Q.4	**a)** Explain Inter-laminar stresses in details.	**09**
	b) Discuss Mechanics of Materials Approach to Strength.	**08**
Q.5	**a)** What is Buckling? Explain Governing Equations for Buckling.	**09**
	b) Explain Effect of discontinuity in laminates.	**08**
Q.6	**Write short notes on. (any three)**	**18**
	a) Classical Lamination Theory	
	b) Bending of laminated plates	
	c) Basic Principles of fracture mechanics	
	d) Design of composite structures	

Seat No.

Set **P**

ME (Semester- I) (CBCS/CGPA) Examination Dec-2019
Electronics Engineering
ADVANCED DIGITAL SIGNAL PROCESSING

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

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

Section – I

Q.1	a)	Draw the block diagram of backward linear predictor. Derive the equation for backward Prediction Error.	06
	b)	Discuss a pipelined architecture for implementing the schur algorithm.	06
Q.2	a)	Explain in detail use of DFT in power spectrum estimation.	06
	b)	Explain the relationship between the autocorrelation and model parameter.	06
Q.3	a)	Explain the design of Hilbert Transform.	06
	b)	Explain the design of FIR differentiator.	05

Section – II

Q.4	a)	Explain in detail interpolation by a factor I.Draw the spectra of x(n) and v(n).	06
	b)	Explain polyphase structures in detail.	06
Q.5	a)	Explain with equation frequency transformation in designing IIR filters.	06
	b)	Design a digital low pass Butterworth filter using impulse-invariant transformation with pass band and stop band cut-off frequencies 300 Hz and 600 Hz respectively. The pass band and stop band attenuations are -5db and -12db respectively. The sampling frequency is 5000Hz.	06
Q.6	a)	Explain Discrete wavelet transform with phase of gain $\sqrt{2}$	06
	b)	Explain the use of scaling function in case of multiresolution system.	05

Seat No.		Set	P

ME (Semester – I) (CBCS/CGPA) Examination Dec-2019
Electronics Engineering
ADVANCED NETWORK ENGINEERING

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

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

Section – I

Q.1 Answer the following questions.   **12**
a) What is senders and receivers window in TCP? How problem related to small packet communication is overcame in TCP?
b) List various MIB variables related to TCP/TP and mention their categories and meaning. What is the structure of management information?
c) Draw TCP finite state diagram and explain it in detail.

Q.2 Answer any two from following questions.   **12**
a) Draw IPSec header format and explain it in detail.
b) What is the use of ICMP? Draw and explain ICMP message formats for source quench and destination unreachable.
c) Draw IPv6 datagram header format and describe each field in detail.

Q.3 Answer the following questions.
a) How privacy and security is handled in IP communication? Explain ESP related to IP.   **06**
b) List various TCP timers and their use. Explain Kern's algorithm in case of TCP communication.   **05**
OR
Discuss SNMP protocol and SNMP message format.

Section – II

Q.4 Answer the following questions.   **12**
a) What is digitization of audio? Discuss in detail compression of audio.
b) What are lossy and lossless image compression? Explain image compression using JPEG.
c) Draw header format related to DVMRP and explain.

Q.5 Answer any two from following questions.   **12**
a) How motion is estimated in Mpeg-4? Explain spatial and temporal salability in Mpeg-4.
b) Draw and explain home reference model for DVB.
c) What are the requirements in real time transport systems? Explain RTP in detail.

Q.6 Answer the following questions.
a) Explain multimedia streaming over internet in detail.   **06**
b) What are CIF and QCIF video formats related to Mpeg?   **05**
OR
What is RSVP for multimedia communication? List different RSVP features.

Seat No.		Set	P

M.E. (Semester – I) (CBCS/CGPA) Examination Dec-2019
Electronics Engineering
RANDOM SIGNAL & PROCESSES

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

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

Section – I

Q.1 Attempt any two.   **12**
   a) State Bernoulli theorem on independent trials. A fair coin is tossed 5 times. What is the probability of getting more heads than tails?
   b) Three persons X,Y,Z are being considered for appointment as a vice chancellor of university whose chances of getting the post are in the ratio of 2:3:5 respectively. The probability that if X is selected will introduce the continuous internal assessment (CIA) in the university structure is 0.3. The corresponding probabilities for Y and Z doing the same are 0.4 and 0.7 respectively. What is the probability that the CIA would be introduced in the university
   c) One bag contains 4 white and 2 black balls. Another contains 3 white balls and 5 black balls. If one ball is drawn from each bag at random find the probability that
      1) Both are white
      2) One is white and one is black

Q.2 Attempt any three.   **12**
   a) Define joint probability distribution of two random variables & state its properties.
   b) A certain random variable has a probability density function of the form
      $$f_x(x) = ce^{-2x}u(x)$$
      Find the following
      1) the constant c,
      2) Pr $(X > 2)$
      3) Pr $(X < 3)$
   c) If the p.d.f. of a continuous random variable X is
      $$f_x(x) = \begin{cases} c(3+2x) & 0 < x < 2 \\ 0 & otherwise \end{cases}$$

      Find the value of c and distribution function $F_x(x)$.
   d) If X is uniformly distributed random variable with mean -1 and variance 4/3 find $P(X > 0)$.

Q.3 **a)** Explain in brief how to obtain the expected value and variance of sum of two random variables. **05**

b) Find **06**
1) Value of A
2) the covariance of X and Y if X and Y have joint probability density function

$$f_{XY}(x, y) = \begin{cases} Ax^2(1 - y) & 0 \leq x \leq 1, \ 0 \leq y \leq 1 \\ 0 & \text{otherwise} \end{cases}$$

OR

Two random variables X and Y have joint probability density function of the form

$$f_{XY}(x, y) = \begin{cases} 2e^{-(x+2y)} & x \geq 0, y \geq 0 \\ 0 & elsewhere \end{cases}$$

Determine the probability density function $fz(z)$, if $Z = X + Y$.

Section – II

Q.4 **Attempt any two.** **12**
a) Define autocorrelation function of random processes? Explain in detail with its properties.
b) Consider a random process $X(t) = B^* \cos(50t + \theta)$ where B & θ are independent random variables. B is a random variable with mean 0 and variance 1. θ is uniformly distributed in $(-\pi, \pi)$. Find the mean and autocorrelation of the process.
c) Let the random process be $X(t) = \cos(t + \theta)$ where θ is a random variable with density function $f(\theta) = 1/\pi \quad -\pi/2 < \theta < \pi / 2$.
Check whether the process is stationary or not.

Q.5 **Attempt any two.** **12**
a) Define power spectral density. State the properties.
b) Find the power spectral density of a WSS process with autocorrelation function $R(\tau) = e^{-a\tau^2}, a > 0$.
c) An ergodic random process has an autocorrelation function $RX(\tau) = 50\delta(\tau) + 36$. What is the value of the spectral density of this process at $\omega = 100$?

Q.6 **Attempt following.**
a) Explain how to estimate the frequency response of linear systems using frequency domain techniques. **05**
b) An ergodic random process having an autocorrelation function of the form **06**
$$R_x(\tau) = 10\delta(\tau) + 25$$
Is applied to the input of a linear system having an impulse response of the from

$$h(t) = \begin{cases} 4(1 - t) & 0 \leq t \leq 1 \\ 0 & elsewise \end{cases}$$

Find the mean value of the process at the output of the system.

OR

Define Poisson Process. Find the autocorrelation $R_{XX}(t1, t2)$ of the Poisson process $X(t)$.

Seat No.		Set	P

ME (Semester - I) (CBCS/ CGPA) Examination Dec-2019
Electronics Engineering
WIRELESS SENSOR NETWORKS

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

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

SECTION – I

Q.1	a)	What are different WSN topological architectures?	07
	b)	Explain transport layer and network layer for WSN protocol stack.	06

Q.2 Attempt Any Two
	a)	Explain how energy can be saved with a better MAC design.	06
	b)	Explain traffic adaptive medium access.	06
	c)	What are different energy based metrics for routing design.	06

Q.3 Attempt Any Two
	a)	Explain rumor routing	05
	b)	What are location based routing?	05
	c)	Explain Z MAC	05

SECTION – II

Q.4	a)	Explain data transfer in Beacon enabled networks.	07
	b)	Compare Harvard architecture and Super Harvard architecture for WSN node.	06

Q.5 Attempt Any Two
	a)	With suitable diagram explain IMote sensor node.	06
	b)	Explain classification of power conservation mechanisms for WSN.	06
	c)	Explain reasons for time synchronization.	06

Q.6 Attempt Any Two
	a)	Explain time of arrival ranging	05
	b)	Explain GPS based localization	05
	c)	Give brief overview for IEEE 892.15	05

Seat No.	

ME (Semester-I) (CBCS/CGPA) Examination Dec-2019
Electronics Engineering
IMAGE AND VIDEO PROCESSING

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

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

Q.1   **Solve any four of the following.**   **20**
    a)   Explain limitations in sampling & reconstruction.
    b)   Explain DFT and DCT.
    c)   Explain 2D orthogonal & unitary transforms.
    d)   Write short note on Bayesian Method.
    e)   Explain false color and pseudo color.

Q.2   **Solve the following Questions.**
    a)   Perform and explain histogram equalization of the image.   **07**

10	10	35	25
35	25	40	35
40	35	10	10
35	10	25	10

    b)   Explain the following.   **08**
       1)   SVD and iterative methods
       2)   Maximum entropy restoration

Q.3   **Solve any four Questions**   **20**
    a)   Explain any two method of edge detection.
    b)   Explain details of special feature extraction?
    c)   Explain inter-frame coding.
    d)   Explain MPEG 1, MPEG2 in details.
    e)   Write note on predictive techniques in image compression.

Q.4   **Solve the following questions**
    a)   Explain video compression technique.   **07**
    b)   For the image shown below, compute the degree of compression that can be achieved using   **08**
       1)   Huffman coding of pixel value
       2)   Run-length coding, assuming 2 bits to represent the pixel value and 2 bits to represent the run length.

3	3	3	2
2	3	3	3
3	2	2	2
2	1	1	0

Seat No.		Set	P

ME (Semester – II) (CBCS/CGPA) Examination Dec-2019
Electronics Engineering
RESEARCH METHODOLOGY

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

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

Section – I

Q.1 **a)** What are different definitions of Research? Which definition do you feel is more relevant to engineering research? Why?   **06**
      b) With suitable example explain research design.   **06**

Q.2 **a)** With suitable example explain dynamic system modeling.   **05**
OR
         With suitable example explain static system modeling.
      b) With suitable example explain Monte Carlo simulation.   **05**

Q.3 **a)** With suitable example explain objective, sub objective and scope in a typical research synopsis.   **07**
      b) Explain continuous modeling.   **06**
OR
         Explain discrete modeling.

Section – II

Q.4 **a)** With suitable application explain any three statistical distributions.   **06**
      b) Discuss hypothesis testing used in statistical output analysis.   **06**

Q.5 **a)** With suitable example explain how to write an abstract of technical report.   **05**
OR
         Discuss role of ICT at different stages of research.
      b) With suitable example discuss ethical practices to be followed in research.   **05**

Q.6 **a)** With suitable example explain strategy for experimentation.   **07**
      b) Discuss a structure of a typical project report with suitable example.   **06**
OR
         Discuss a structure of a typical research paper with suitable example.

Seat No.

Set **P**

ME (Semester - II) (CBCS/CGPA) Examination Dec-2019
Electronics Engineering
EMBEDDED SYSTEM DESIGN

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

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

Q.1	**Attempt any Three.**	**15**
	a) Registers in ARM 9	
	b) ARM 9 processing modes	
	c) ARM 9 instruction types	
	d) Memory interfacing	
Q.2	Illustrate LCD display interfacing and programming with ARM 9.	**10**
Q.3	Explain 3-stage and 5-stage pipelining in detail.	**10**

OR

	Explain various advanced features of ARM 9.	
Q.4	Explain the use of queue in interrupt handling.	**10**
Q.5	What is memory optimization? How to optimise the use of memory in an embedded system.	**10**
Q.6	Explain the different functions of RTOS.	**15**

ME (Semester-II) (CBCS/CGPA) Examination Dec-2019
Electronics Engineering
PERIPHERAL SYSTEM DESIGN & INTERFACING

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

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

Section – I

Q.1	**Answer following questions:**	**12**
	a) Discuss GPIB extender and expander in detail.	
	b) List various available expansion buses? Draw timing diagram of I/O write operation in ISA.	
	c) What is RS 422 standard? Compare between RS 232, RS 422 and RS 485.	
Q.2	**Answer any two from following questions :**	**12**
	a) Draw and explain USB connection diagram and explain. What is enumeration in USB?	
	b) Compare EISA with ISA. Draw EISA structure and explain.	
	c) What is standard parallel interface in PC? Draw timing diagram related to parallel port communication.	
Q.3	**Answer following questions:**	
	a) What is 20mA current loop? Design 20mA current loop to measure pressure. The transducer is located at 2000 feet from measurement interface. Assume voltage range of pressure sensor from 12v to 30v and internal resistance of connecting wire of 2.62 Ω /100 feet.	**06**
	b) Draw frame formats for data transfer in USB and explain in detail?	**05**

OR

Draw RS 485 multi drop configuration and explain it in detail? Discuss
RS 485 termination.

Section – II

Q.4	**Answer following questions:**	**12**
	a) Explain basic DMA operation in PC. How many DMA channels area available in PC?	
	b) What are industrial controllers? Explain functioning of industrial controllers in detail.	
	c) What is multichannel analog input DAQ? Explain different sampling methods for multichannel inputs.	
Q.5	**Answer any two from following questions:**	**12**
	a) Explain programmable display interface.	
	b) What are the features of UART PC 16550D? Explain control and status register format related to PC 16550D.	
	c) Discuss HART network, communication modes, protocol layers and telegram structure?	

Q.6 **Answer following questions:**
   a) Discuss Modbus/RTU protocol in detail. **06**
   b) What is industrial Ethernet and foundation fieldbus? Discuss high speed **05**
      Ethernet foundation field bus.

OR

How information is exchanged on ControlNet link? Explain ControlNet
message format.

Seat No.

ME (Semester-II) (CBCS/CGPA) Examination Dec-2019
Electronics Engineering
ADVANCED CONTROL SYSTEMS

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

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

Section – I

Q.1 Attempt any Two. 12
   a) What is state transition matrix? Obtain state transition matrix for.
$$\dot{x} = \begin{bmatrix} 0 & 0 & -2 \\ 0 & 1 & 0 \\ 1 & 0 & 3 \end{bmatrix} x \, ; \; x(0) = \begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}$$
   b) Compare state space techniques with classical control techniques for analyzing control systems.
   c) Pulse transfer function of a system is given by
$$\frac{y(z)}{u(z)} = \frac{3z}{(z+1)^2(2z+1)}$$
   Obtain the state model realization in Jordan form.

Q.2 Attempt any Two. 12
   a) Explain sampling and quantization effect in detail.
   b) Obtain inverse z transform of
$$x(z) = \frac{1}{z^2(z-2)^2(z+1)}$$
   c) Obtain eigen values and eigen vectors for matrix.
$$A = \begin{bmatrix} -9 & 1 & 0 \\ -26 & 0 & 1 \\ -24 & 0 & 0 \end{bmatrix}$$

Q.3 a) What are steady state errors and error constants? Explain in detail. **06**
   b) Obtain stability of discrete time system described by characteristic equation **05**
   given below by bilinear transformation.
$$p(z) = z^4 - 0.9z^3 + 0.14z^2 + 0.216z + 0.032 = 0$$

Section – II

Q.4 Attempt any Two. 12
   a) What is state observer? Explain observer design in detail.
   b) Explain basic MIMO control loop. How MIMO problems are converted to SISO problem?
   c) For the system represented by
$$\dot{x} = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -6 & -11 & 16 \end{bmatrix} x + \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix} u$$
$$y = [1 \; 0 \; 0]x$$
   Design a full order observer such that the observer eigen values are at
   $-2 \pm j2\sqrt{3}$ and -5

Q.5 **Attempt any Two.** **12**
  a) For MIMO control, explain pairing of inputs and outputs.
  b) How closed loop stability of MIMO control system is obtained? Explain with example.
  c) What are servo systems? Explain in detail.

Q.6 **a)** Explain sensitivity and robustness analysis of Robust control system. **06**
  b) What are uncertain parameters of Robust control system? Explain in detail. **05**

Seat No.	

ME (Semester-II) (CBCS/CGPA) Examination Dec 2019
Electronics Engineering
VLSI IN SIGNAL PROCESSING

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

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

Section – I

Q.1   **Solve any four of the following:**   **20**
    a)   Draw the Block diagram, SFG and DFG for
        $y(n) = ax(n) + bx(n - l) + cx(n - 2)$.
    b)   Explain the advantages of pipelining & parallel processing on account of
        power consumption and justify same.
    c)   Compute the loop bounds for the following loops:
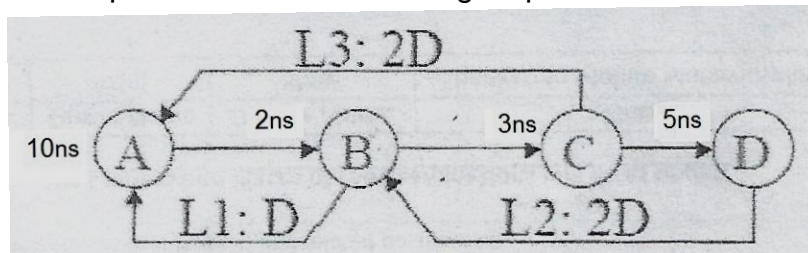
    d)   Perform the retiming for the following DFG shown in fig.
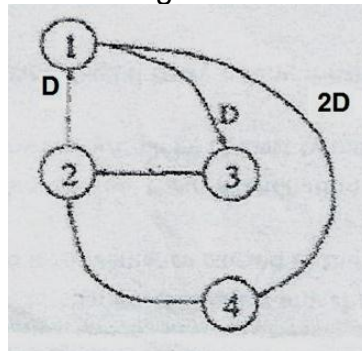
    e)   What is retiming of DFG? Explain properties of retiming.

Q.2   **Solve the following:**
    a)   For DFG shown below find iteration bound using LPM algorithm.   **08**
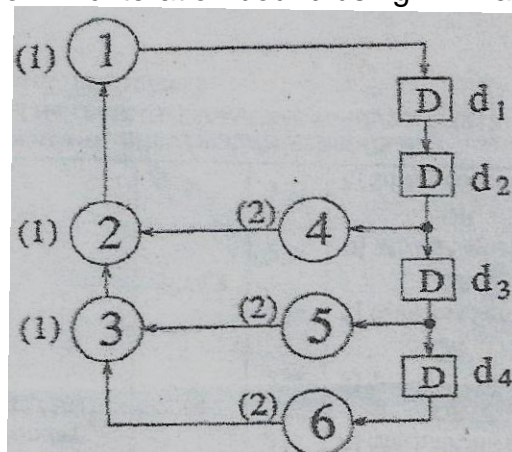
b) In the SFG shown in fig (a) the computation time for each node is assumed to be 1u.t.   **07**
    1) Calculate critical path computation time.
    2) The critical path has been reduced to 2 u.t by inserting 3 extra delay element as shown in fig. (b)
    3) Is this valid pipelining if not obtaining an appropriate pipelining ckt with critical path of 2 u.t.

Fig. a   Fig. b
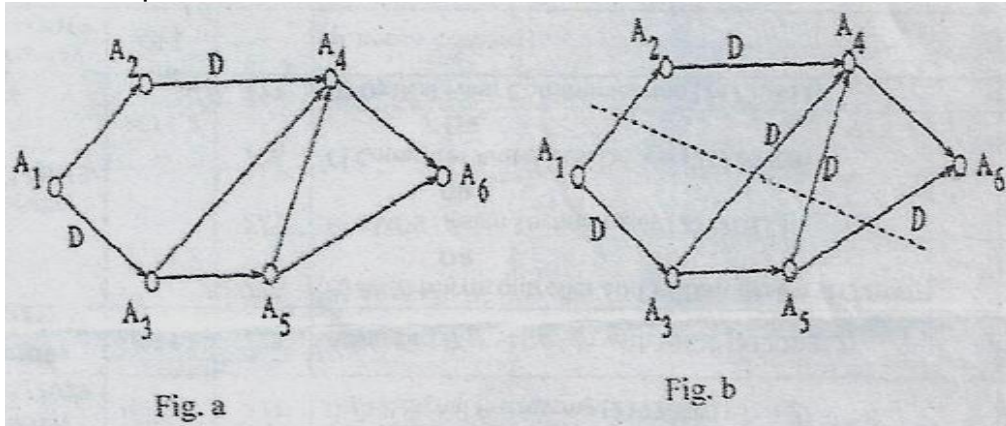
OR

b) Write a note on retiming for register minimization and retiming for clock period minimization.   **07**

Section-II

Q.3 Solve any four   **20**
    a) Write a note on folding transformations.
    b) Mention the step to minimize register in folding architecture.
    c) Prove the relationship with suitable example that unfolding preserves number of delay.
    d) State the properties of unfolding.
    e) Explain parallel carry ripple array multipliers.

Q.4 Solve the following
    a) Design R1 filter for FIR systolic array.   **08**
    b) Draw the constraint graph & use it to determine if the following system inequalities have a solution & find the solution if one exists using Floyd Warshall algorithm.   **07**

$$r_1 - r_2 \leq 0$$
$$r_3 - r_1 \leq 5$$
$$r_4 - r_1 \leq 4$$
$$r_4 - r_3 \leq -1$$
$$r_3 - r_2 \leq 2$$

OR

b) Draw the circular life time chart for following with period N = 8:   **07**

Variable Name	Tin
a	0
b	1
c	2
d	3
e	4
f	5
g	6
h	7

Seat No.

Set **P**

ME (Semester-III) Examination Dec-2019
Electronics Engineering
NETWORK AND INTERNET SECURITY

Day & Date: Friday, 20-12-2019   Max. Marks: 70
Time: 02:30 PM To 05:30 PM

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

Section – I

Q.1	a)	Explain IEEE 802.11 protocol stack	07
	b)	Explain WAP end to end security	06

Q.2   **Solve any two**   **12**
    a)   Discuss federal identity management.
    b)   What are the remote user authentications principles?
    c)   Explain IEEE 802.11i pseudorandom function.

Q.3   **Solve any two**   **10**
    a)   Explain IEEE 802.11i discovery phase.
    b)   Explain Kerberos.
    c)   Explain use of biometrics in network security.

Section – II

Q.4	a)	Explain stateful inspection firewall.	07
	b)	Explain terminology of various malicious programs.	06

Q.5   **Solve any two**   **12**
    a)   Explain secure socket layer architecture.
    b)   Explain IPSec architecture.
    c)   Explain public key ring used in PGP.

Q.6   **Solve any two**   **10**
    a)   Explain relative locations of security facilities in the TCP/IP protocol stack.
    b)   Explain internet mail architecture.
    c)   Explain simple example of DKIM deployment.

Seat No.		

ME (Semester-III) Examination Dec - 2019
Electronics Engineering
ADVANCED SIGNAL AND IMAGE PROCESSING

Day & Date: Friday, 20-12-2019   Max. Marks: 70
Time: 02:30 PM to 05:30 PM

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

Section – I

Q.1 **Solve any four of the following:**   **20**
    a) Explain Biometric system with the help of neat diagram.
    b) Explain the design cycle of Biometric system.
    c) Explain how fuzzy logic is useful in biomedicine.
    d) Explain the filters used to reduce the noise in medical images.
    e) Explain the process of medical image restoration.

Q.2 **Solve the following:**
    a) Explain the design cycle of Biometric system. Also mention the various   **08**
        types of system errors.
    b) Explain biomedical image segmentation.   **07**
                                              OR
    b) Explain how fuzzy logic is useful in industrial automation.   **07**

Section-II

Q.3 **Solve any four of the following:**   **20**
    a) Explain with the help of equations effect of scaling on power consumption.
    b) Explain how the power is estimated in sequential circuits.
    c) Mention the various features of DSP processors.
    d) Explain the Euclidean GCD algorithm for polynomials.
    e) Explain in detail force directed scheduling algorithm.

Q.4 **Solve the following:**
    a) Explain the use of DSP processor in multimedia signal processing.   **08**
    b) Explain simulation and non-simulation based approaches in low power VLSI   **07**
        design.
                                              OR
    b) Explain Wallace tree multiplier with the help of neat diagram.   **07**

Seat No.

Set | **P**

ME (Semester-I) (CBCS/CGPA) Examination Dec-2019
Computer Science & Engineering
THEORY OF COMPUTATION

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

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

Section – I

Q.1   **Answer any four.**   **24**
  a) Define with example; Directed graph, Simple path, Simple cycle & Strongly connected graph.
  b) Prove that $\sqrt{2}$ is rational using a proper method of proof and name it.
  c) Illustrate A_{NFA} & A_{DFA} in decidability & prove that they are decidable languages.
  d) Prove that EQ_{DFA} is a decidable language using Symmetric Difference.
  e) Define nondeterministic TM. Prove that every nondeterministic TM has an equivalent deterministic TM.

Q.2   **Answer the following.**   **06**
Considering set Q = the set of positive rational numbers & N= the set of natural numbers Prove that both are of same size using diagonalization method.

Q.3   **Answer the following.**   **05**
Design a TM for a computation of addition of two numbers with its formal definition.

Section – II

Q.4   **Answer any four.**   **24**
  a) Elaborate recursion theorem & prove that MIN_{TM} is not turing recognizable.
  b) What is time complexity? Brief out the time complexity of a TM.
  c) Elaborate recursion theorem with its applications.
  d) Define computation history & linear bounded automaton. Prove that A_{LBA} is undecidable.
  e) Illustrate time complexity of a Turing Machine. (Non deterministic)

Q.5   **Answer the following.**   **06**
State base functions & strategy sets of primitive recursive functions.

Q.6   **Answer the following.**   **05**
Define PCP problem & prove its undecidabilty.

Seat No.		Set	P

ME (Semester - I) (CBCS/CGPA) Examination Dec-2019
Computer Science & Engineering
ADVANCED OPERATING SYSTEMS

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

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

Section – I

Q.1 Answer any two of the following.   **10**
   a) Define distributed systems. List out the differences between network operating system and distributed operating system.
   b) Explain correctness feature in message passing system. What are the issues related to correctness?
   c) With example illustrate the CBCAST protocol for implementing causal ordering semantics.

Q.2 Answer any two of the following: **10**
   a) Explain RPC mechanism with diagram.
   b) With example illustrate Stateful and Stateless server.
   c) What is thrashing? What are the methods used for solving the problem of thrashing?

Q.3 Answer the following:
   a) Explain design & Implementation issues of DSM.   **08**
   b) How memory coherence protocols work in Replicated Migrating Blocks (RMB).   **07**

Section – II

Q.4 Answer any two of the following   **10**
   a) Draw the taxonomy of Load-Balancing algorithms and explain Static Load balancing algorithms.
   b) Explain Location policies.
      1) Bidding
      2) Pairing
   c) List & Explain Thread Scheduling methods.

Q.5 Answer any two of the following: **10**
   a) Explain mechanisms for handling co processes.
   b) How message-forwarding takes place in process migration?
   c) List five important features of a good process migration.

Q.6 Answer the following.
   a) Explain the following consistency models.   **08**
      1) Sequential consistency model
      2) Causal consistency model
   b) Explain memory management in Linux.   **07**

Seat No.

Set **P**

ME (Semester-I) (CBCS/CGPA) Examination Dec-2019
Computer Science & Engineering
ANALYSIS OF ALGORITHMS

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

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

Section – I

Q.1	**Solve**	**15**
	a) Explain Asymptotic Notations.	
	b) What is Amortized Analysis?	
Q.2	**Solve any one.**	**10**
	a) What is flow shop scheduling?	
	b) Explain Kruskal's Algorithm with example.	
Q.3	**Solve any one.**	**10**
	a) What is Hamitonian cycle?	
	b) Explain 8 Queen's problem.	

Section – II

Q.4	**Solve.**	**15**
	a) Explain – cook's theorm.	
	b) Explain – clique problem.	
Q.5	**Solve any one.**	**10**
	a) Explain - Convex Hall	
	b) What is point location in Geometric Algorithm?	
Q.6	**Solve any one.**	**10**
	a) Explain PRAM algorithm.	
	b) Explain MESH.	

Seat No.

Set **P**

ME (Semester - I) (CBCS/CGPA) Examination Dec-2019
Computer Science & Engineering
RESEARCH METHODOLOGY

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

Instructions*:* 1) Attempt any Five Questions from each Sections.
2) Assume suitable data if required.
3) Figures to the right indicate full marks.

Section – I

1)	List objectives of research and what are the motivations in research?	**07**
2)	Define Research and explain the types of research with an example.	**07**
3)	What are the problems encountered by the researchers in India?	**07**
4)	What are the points that need to be remembered for selecting a research problem?	**07**
5)	What are the different research designs? Explain any one of them.	**07**
6)	List the three principles of experimental design & explain them in short.	**07**

Section – II

7)	Explain the basic concepts concerning hypothesis testing.	**07**
8)	Explain the procedure for Hypothesis Testing along with Flow Diagram.	**07**
9)	Explain the layout of Research Report.	**07**
10)	Explain the Technical Report in detail.	**07**
11)	Write short note on Intellectual Property Rights.	**07**
13)	Describe patents and Copyrights in short.	**07**

Seat No.

Set **P**

ME (Semester - I) (CBCS/CGPA) Examination Dec-2019
Computer Science & Engineering
MOBILE COMPUTING

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

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

SECTION – I

Q.1 Solve any two.   **10**
   a) Explain basic spread spectrum technique.
   b) How exposed terminals problem can be avoided using MACA?
   c) Draw and explain the protocol architecture of GSM for signaling.

Q.2 Solve any two.   **10**
   a) Explain DAMA scheme in wireless medium access.
   b) How is localization, location update, roaming etc. done in GSM and reflected in databases? What are typical roaming scenarios?
   c) What are advantages and disadvantages of cellular systems with small cells?

Q.3 Solve the following.   **15**
   a) Explain the handover procedure in GSM system.
   b) Draw and explain FHSS transmitter and receiver.
   c) What is multipath propagation? Discuss its effects

SECTION – II

Q.4 Solve any two.   **10**
   a) Explain transaction oriented TCP.
   b) Write a note on power management in IEEE 802.11 using adhoc networks.
   c) Describe architecture of Android OS.

Q.5 Solve any two.   **10**
   a) Explain agent solicitation and agent advertisement in agent discovery phase.
   b) Write a note on Transport layer security in WAP.
   c) Explain agent discovery phase in detail.

Q.6 Solve the following.   **15**
   a) Explain unicast data transfer in WLAN IEEE 802.11.
   b) Explain WML script with example.
   c) Write a note on Blue tooth technology.

Seat No.		Set	P

ME (Semester – II) (CBCS/CGPA) Examination Dec-2019
Computer Science & Engineering
INTERNET ROUTING ALGORITHM

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

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

Section – I

Q.1 Answer any two.   **10**
　　a) What is classful addressing? Explain different address classes.
　　b) What is CIDR? Consuder IP Addresses 10.21.5.90 that is given to be part of a/17 address block. Determine IP Prefix it belongs to in the CIDR notation.
　　c) Draw the functional view of Router architecture and state three functions of the router.

Q.2 Answer any two.   **10**
　　a) Explain message types of BGP: Open, Update, Keepalive, Notification and Route-refresh.
　　b) What are the three main differences between shortest path routing and Widest Path routing?
　　c) Consider the following network Topology. Compute the shortest path from node 6 to the other nodes. If link 3-6 fails, recomputed the shortest paths from node 6 to other nodes using Dijkshtra's algorithm.
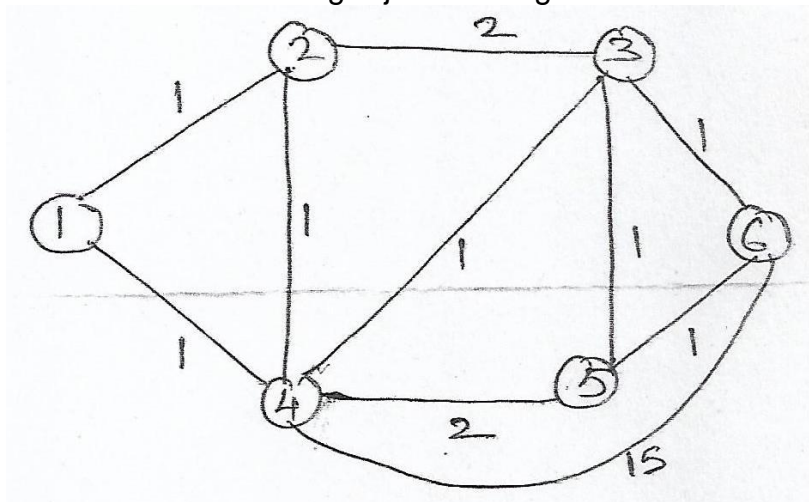
Q.3 a) Give a brief overview of BGP and explain BGP timers.   **10**
　　b) List the main differences between RIPV1 and RIPV2 .   **05**

Section – II

Q.4 **Answer any two.** 10
    a) Explain path vector routing with example.
    b) With example explain the concept of link-state routing Protocol.
    c) With diagram explain shared-nothing architecture of routers.

Q.5 **Answer any two** 10
    a) What are the basic requirements of Longest Prefix matching Algorithm?
    b) Explain Naive's solution for packet classification.
    c) List & explain different types of routers.

Q.6 **a)** Draw the diagram of Packet flow in router. Also explain Ingress & Engress packet processing. 10
    b) What are the sub-protocols of a link state protocol? 05

Seat No.

Set **P**

ME (Semester - II) (CBCS/CGPA) Examination Dec- 2019
Computer Science & Engineering
ADVANCED DATABASE CONCEPTS

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

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

Section – I

Q.1	a)	Write down features of distributed database.	**05**
	b)	Explain various levels of distribution transparency.	**10**

Q.2	**Attempt any one.**		**10**
	a)	Explain Asymetric replicate and join with example.	
	b)	Explain 2 phase commit protocol.	

Q.3	**Attempt any one.**		**10**
	a)	Explain how global queries are converted into fragment queries.	
	b)	Explain a reference model of distributed transaction recovery.	

Section – II

Q.4	a)	Define the given schema with appropriate structured type for each attribute.	**10**

Emp = (emane, childrenset multiset (children), skillset multiset (skills))
Children = (name, birthday)
Skills = (type, Examset set of (Exams))
Exams = (year, city)

	b)	State difference in OODBMS and ORDBMS.	**05**

Q.5	**Attempt any one.**		**10**
	a)	Explain how multimedia data is indexed.	
	b)	Write a short note.	

1) Space filling curve
2) Grid file

Q.6	**Attempt any one.**		**10**
	a)	How 2D and 3D object are stored in database?	
	b)	What are different ways of querying multimedia data?	

Seat No.

Set **P**

ME (Semester-II) (CBCS/CGPA) Examination Dec-2019
Computer Science & Engineering
GRID COMPUTING

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

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

Section – I

Q.1 **Attempt any two:**   **14**
   a) Define Grid Computing. Explain Grid computing business value analysis.
   b) Compare between Cloud Computing and Grid Computing.
   c) Describe the new grid architecture for virtual organizations.

Q.2 **Attempt any two:**   **14**
   a) Explain in detail the Worldwide Large Hadron Collider Computing Grid (WLCG).
   b) Describe the OGSA (Open Grid Services) architecture and its application example.
   c) Explain the need for integrated protocols in grid computing.

Q.3 Explain in detail a service-oriented view of semantic grid.   **07**

Section – II

Q.4 **Attempt any two:**   **14**
   a) Explain the semantic web of astronomical data.
   b) Describe the challenges of the Grid from the perspective of bioinformatics researchers.
   c) What is combinatorial chemistry? Explain the Split & mix ʿapproach to combinatorial chemistry.

Q.5 **Attempt any two:**   **14**
   a) Explain the Chemical markup language (cML) and the Statistics & design of experiments.
   b) Describe the term: pervasive Grid and metadata, Virtual data, Multimedia collaboration.
   c) Explain the GARUDA architecture in detail.

Q.6 Explain GARUDA usage Framework.   **07**

Seat No.		Set	**P**

ME (Semester-II) (CBCS/CGPA) Examination Dec-2019
Computer Science & Engineering
REAL TIME OPERATING SYSTEM

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

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

Section – I

Q.1	Explain Time - relative buffering and ring buffers with example and diagrams.		**07**
Q.2	**a)**	Describe petri nets with example.	**07**
	b)	Explain synchronization mechanism - event flags and signals with example.	**07**
Q.3	**a)**	Describe requirement Phase of software life cycle by explaining Functional and non-functional requirement and rules for requirements/Design documents.	**07**
	b)	Explain use of finite state Automata in design by drawing FSA for Automated Teller Machine.	**07**
Q.4	**a)**	Describe Phase/state driven code and co routines real-time kernels.	**07**
	b)	Describe process stack management in detail.	**07**

Section – II

Q.5	Write short note on - scheduling is NP complete.		**07**
Q.6	**a)**	Describe Analysis of memory requirements in detail.	**07**
	b)	Discuss techniques for performing system integration.	**07**
Q.7	**a)**	Explain unit level Testing.	**07**
	b)	What is response time? How it is calculated?	**07**
Q.8	**a)**	What is software Heisenberg uncertainty principle? Explain.	**07**
	b)	Describe real time databases in detail.	**07**

Seat No.		Set	**P**

ME (Semester-II) (CBCS/CGPA) Examination Dec-2019
Computer Science & Engineering
WEB TECHNOLOGY

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

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

Section – I

Q.1 Create an ASP application that allows to customize a Web page   **07**
     a) User's name and preferences in a text file.
     b) login to check user if known preference taken as it is, if not ask for login. Preference should be foreground color, background color and image.

Q.2 Explain ADO.NET architecture with diagram.   **07**

Q.3 What is XML? Describe the creation of XML file. Explain $Xquery_1$ $Xpath_1$ Xlink and XSLT.   **07**

Q.4 Explain session tracking and cookies in ASP.   **07**

Q.5 What is markup language? What are the features provided by HTML that make it a markup language.   **07**

Q.6 Explain the various E-Business models in detail.   **07**

Section – II

Q.7 With a suitable coding explain how a servlet is used for server side programming.   **07**

Q.8 What is session? Explain how client state is maintained using session and also explain session tracking and management.   **07**

Q.9 Write a short note on RSS and Podcasting.   **07**

Q.10 Explain difference between Web 2.0 and Web 3.0.   **07**

Q.11 Describe problems related to servlet and how to overcome.   **07**

Q.12 Describe JSP lifecycle.   **07**

Seat No.

Set **P**

ME (Semester-II) (CBCS/CGPA) Examination Dec-2019
Computer Science & Engineering
BUSINESS INTELLIGENT SYSTEM

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

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

Section – I

Q.1 **Write answers to any five questions.**   **35**
     a) Compare BSC with six sigma.
     b) Define BI? Explain benefits of BI.
     c) How does NLP relates to text mining?
     d) What is KPI and what are its distinguishing characteristics?
     e) Define business performance management & compare with BI.
     f) Explain text mining with its process? Explain popular application area of text mining.

Section – II

Q.2 **Write answers to any five questions.**   **35**
     a) Define reality mining? Explain types of data used?
     b) What is on-demand BI?
     c) List legal issues of BI. Explain ethics in decision making & supports.
     d) Explain mobile social networking in detail.
     e) What is collaborative decision making? Explain its benefits?
     f) What is RFID? What kinds of data used through RFID?

Seat No.	

ME (Semester-II) (CBCS/CGPA) Examination Dec-2019
Computer Science & Engineering
OBJECT ORIENTED SOFTWARE ENGINEERING AND DESIGN PATTERNS

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

Instructions*:* 1) Q. No. 1 and 5 compulsory.
           2) Answer any two questions in each Section.
           3) Make suitable assumptions if necessary and state them clearly.

Section – I

Q.1 **Answer briefly.**   **15**
    a) Explain Crunching Knowledge with example.
    b) Write a short note on requirement workflow.
    c) Explain Software architecture in the context of the overall software life cycle.

Q.2 **a)** Explain the life cycle of domain object.   **05**
    b) Write a short note on building blocks of model driven design.   **05**

Q.3 **a)** Explain inheritance and polymorphism in detail.   **05**
    b) Draw the use case diagram and activity diagram for saving account banking process.   **05**

Q.4 **Write a short note on architectural styles (Any two)**   **10**
    a) Data abstraction & Object orientation.
    b) Client Server architecture.
    c) Pipes & Filters.

Section – II

Q.5 **Answer briefly.**   **15**
    a) Explain code architecture view with example.
    b) Explain Rule Archetype Pattern.
    c) Compare product and quantity archetype patterns.

Q.6 **a)** Write a short note on IS2000: The Advanced Imaging Solution.   **05**
    b) Explain Literate Modeling.   **05**

Q.7 **a)** Explain model driven architecture with archetype Patterns.   **05**
    b) Write a short note on Archetypes and Archetype Patterns.   **05**

Q.8 Explain creational patterns and access control patterns in detail.   **10**

Seat No.

Set **P**

ME (Semester-II) (CBCS/CGPA) Examination Dec-2019
Computer Science & Engineering
WIRELESS AD-HOC NETWORK

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

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

Section – I

Q.1	**a)**	What is electromagnetic spectrum? High frequency X-rays and gamma rays are not normally used for wireless communication. Explain why?	**06**
	b)	List characteristics of the wireless channel. Explain in detail path loss.	**06**
Q.2	**a)**	What is Packet Radio Network? Explain the Technical Challenges.	**06**
	b)	Draw schematic diagram of ad-hoc wireless internet and discuss its major issues.	**06**
Q.3	**a)**	What is wireless sensor network? Explain different issues involved in WSN.	**06**
	b)	Differentiate between Cellular Network and Ad-Hoc WLAN.	**06**
Q.4	**a)**	List the criteria for classification of Routing Protocols in Ad-hoc WANs. Explain with diagram the DSDV protocol.	**06**
	b)	Explain with neat diagram Zone Routing Protocol (ZRP).	**05**

Section – II

Q.5	**a)**	What it is difficult to design a multicast routing protocol? Explain with diagram receiver- initiated multicast protocols.	**06**
	b)	Write a short note on Energy efficient multicasting in WLAN.	**06**
Q.6	**a)**	Explain ad-hoc TCP and split TCP in details.	**06**
	b)	Give the comparison of various TCP solutions for ad-hoc wireless networks.	**06**
Q.7	**a)**	Explain key management for Cryptography algorithms in ad-hoc wireless Networks.	**06**
	b)	Explain in details Dynamic Core-Based Multicast Routing Protocol (Mesh Based).	**06**
Q.8	**a)**	Explain with diagram tree initialization, maintenance and route optimization phases in BEMRP.	**06**
	b)	What are Issues and challenges in Security Provisioning for ad-hoc wireless networks?	**05**

Seat No.		**Set**	**P**

ME (Semester-I) (CBCS) Examination Dec-2019
Electronics & Telecommunication Engineering
RESEARCH METHODOLOGY

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

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

Section – I

Q.1 Solve any Two.   **10**
   a) What are the principles used in modeling?
   b) Draw the block diagram of research process.
   c) Explain objective and scope of research.

Q.2 Solve any One.   **07**
   a) Discuss the problems encountered by researchers in India.
   b) Explain Monte Carlo method with example.

Q.3 Solve any Three.   **18**
   a) State difference between.
      1) Qualitative and Quantitative Research
      2) Applied research and Fundamental research
   b) Explain the need of simulation.
   c) Explain full corporate model with block diagram.
   d) Write short note on experience survey and pilot survey.

Section – II

Q.4 Solve any Two.   **10**
   a) Explain in detail Type-I and Type-II errors.
   b) Differentiate between bibliography and footnotes or references.
   c) What is role of probability and statistics in simulation?

Q.5 Solve any One.   **07**
   a) What points will you keep in mind while preparing a research report? Explain.
   b) Give in detail considerations for statistical analysis.

Q.6 Write short note. (Any Three)   **18**
   a) E-research
   b) Need of an Abstract
   c) Precision
   d) Virtual Lab

Seat No.

Set **P**

ME (Semester- I) (CBCS) Examination Dec-2019
Electronics & Telecommunication Engineering
ANTENNA THEORY AND DESIGN

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

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

Section – I

Q.1 **Solve any two questions.**   **10**
   a) Explain the radiation mechanism of a micro stripantenna.
   b) Derive an array factor equation for linear array of n-isotropic point sources.
   c) Explain End fire Array radiation pattern with mathematical expression.

Q.2   **Solve any one question.**   **07**
   a) Explain about various micro strip antenna configuration.
   b) Explain different feeding mechanism of micro strip antenna.

Q.3 **Attempt any three questions.**   **18**
   a) Explain transmission line model for the analysis of micro strip antenna.
   b) Explain in brief design consideration of Rectangular micro strip antenna
   c) Derive an equation for Array factor for array of two isotropic point source of Equal amplitude and spacing.
   d) Explain the role of dielectric constant and thickness of antenna at the time of Designing of antenna.

Section – II

Q.4 **Solve any two questions:**   **10**
   a) Write a note on semiconductor substrate.
   b) Justify selection of shape of patch effects on bandwidth of micro strip antenna.
   c) Explain parallel feed, one and two dimension excitation methods for micro strip antenna.

Q.5 **Solve any one questions.**   **07**
   a) Explain about the aperture coupled micro strip antenna for broad band antennas.
   b) Explain linear array design with Micro strip patches using Series feed arrays.

Q.6 **Attempt any three questions:**   **18**
   a) Explain the effects of substrate parameters on Bandwidth.
   b) Explain broad banding using stacked Elements.
   c) Write a note on composite material substrate.
   d) State different techniques for bandwidth enhancement of antenna. Explain any one technique in brief.

Seat No.

Set **P**

ME (Semester - I) (CBCS) Examination Dec-2019
Electronics & Telecommunication Engineering
ADVANCED NETWORK SYSTEMS

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

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

Section – I

Q.1 **Write short notes. (Any Three)** **15**
   a) NFS Implementation
   b) Three and four way hand shaking in TCP
   c) IPV6
   d) Types of firewalls

Q.2 **Answer the following questions.** **10**
   a) Explain various internet security mechanisms.
   b) What is FTP process model? Explain.

Q.3 Explain how domain name resolution is carried out? What is use of caching in name resolution? **10**

Section – II

Q.4 **Answer the following questions. (Any Three)** **15**
   a) Explain the transport stratum functions of ITU NGN.
   b) Explain the TISPAN-NGN overall architecture.
   c) Explain the classical IP over ATM model.
   d) Explain the necessity of carrier extension in Gigabit Ethernet.

Q.5 **Answer the following questions.** **10**
   a) Explain the Reservation styles in ReSerVation Protocol (RSVP).
   b) Explain the ATM cell header format.

Q.6 Explain the functions of ATM Adaptation layer (AAL) sublayers. Explain the process of generating ATM cells by adding headers to user data stream in AALl. **10**

Seat No.		Set	P

ME (Semester - I) (CBCS) Examination Dec-2019
Electronics & Telecommunication Engineering
OPTICAL NETWORKS

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

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

SECTION – I

Q.1 Attempt any two.   10
   a) How the loop diversity can be achieved in SONET/SDH rings?
   b) What are the different topologies used in optical networks?
   c) Explain major characteristics of three generation of transport network. Also explain key nodes in a high capacity optical network.

Q.2 Attempt any one.   07
   a) Discuss in detail SONET and SDH Multiplexing Hierarchy. Also explain different transmission formats and speeds of SONET & SDH.
   b) Explain Optical Add/Drop Multiplexer and tunable DWDM laser.

Q.3 Write short notes. (any three)   18
   a) Control plane and data plane
   b) In-band and Out-band control signaling
   c) OTN layered model
   d) WDM input and output ports and cross-connects

SECTION – II

Q.4 Attempt any two.   10
   a) Explain the migration to IP optical networking.
   b) Explain the key terms used in optical routers.
   c) What is domain service model and unified service model?

Q.5 Attempt any one.   07
   a) Explain internet transport network protocol stack.
   b) Explain the mapping of MPLS labels to WDM channels.

Q.6 Attempt any three.   18
   a) What are the issues in MPLS/optical Interworking?
   b) Explain the process of IP and lambda forwarding.
   c) Describe microelectromechanical systems.
   d) In regard with optical internet, explain IP and optical backbone

Seat
No.

Set **P**

ME (Semester-I) (Old) (CGPA) Examination Dec-2019
Electronics & Telecommunication Engineering
ADVANCED LIGHT WAVE COMMUNICATION

Day & Date: Wednesday, 11-12-2019   Max. Marks: 70
Time: 02:30 PM to 05:30 PM

Instructions*:* 1) All Questions are compulsory.
                    2) Figure to the right indicates maximum marks.
                    3) Assume the data whenever necessary.

Section – I

Q.1 Attempt any Three.   15
    a) Give the advantages and disadvantages of Optical communication.
    b) Draw and explain Transmitter for optical communication system.
    c) Explain time division multiplexing in detail.
    d) Explain Scattering Losses in Optical Fiber.

Q.2 Attempt any Two.   20
    a) Explain Following terms-
        1) Critical Angle and acceptance angle
        2) Numerical Aperture
        3) Multimode fiber
    b) What is the principle of LASER? Draw and explain Semiconductor LASER.
    c) Explain different Losses in optical communication.

Section – II

Q.3 Attempt any Three.   15
    a) Explain PIN diode detector with its diagram and Principle.
    b) Explain working Principle of WDM System.
    c) Explain optical LAN.
    d) Discuss the design consideration for long haul high bandwidth system.

Q.4 Attempt any Two.   20
    a) Explain different passive components required in WDM system.
    b) Explain Soliton System.
    c) Explain the design considerations for Optical Multiplex/ Demultiplex.

Seat No.

ME (Semester - II) (CBCS) Examination Dec-2019
Electronics & Telecommunication Engineering
RF & MICROWAVE CIRCUIT DESIGN

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

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

Section – I

Q.1	**Solve any two questions.**	**10**
	a)	Define S-parameters. Explain calculation of S-parameters from SPICE analysis.
	b)	Explain Two Port Network parameters.
	c)	Explain in brief Diode Mixer Theory.
Q.2	**Solve any one question.**	**07**
	a)	Derive the expression for current gain in terms of S-parameters for two port network.
	b)	Explain stability analysis and limitations of amplifier.
Q.3	**Attempt any three questions.**	**18**
	a)	Explain S-parameter analysis method to design a stable unilateral amplifier.
	b)	Define noise figure of mixer. Derive the relation between noise figure for DSB and SSB input signal.
	c)	Draw circuit diagram of single gate FET mixer and explain its operation.
	d)	State and Explain three different procedures used for the design of unilateral amplifier.

Section – II

Q.4	**Solve any two questions.**	**10**
	a)	Draw oscillator design flowchart and explain in brief.
	b)	State and Explain the image parameters used for T and π network of filter design.
	c)	Explain the properties of substrate used in MMIC technique.
Q.5	**Solve any one question.**	**07**
	a)	State different fabrication techniques used for MMIC. Explain any one in detail.
	b)	Explain in brief Analytical approach to optimum oscillator design using S-parameters.
Q.6	**Attempt any three questions.**	**18**
	a)	Explain kuroda's identities.
	b)	What is a role of Richard transformation in implementation of filter? Explain in brief.
	c)	Define Q factor of oscillator. Explain any one method used for measuring Q of oscillator.
	d)	Explain the process of filter design by insertion loss method.

Seat No.	

ME (Semester-II) (CBCS) Examination Dec-2019
Electronics & Telecommunication Engineering
ADVANCED SIGNAL PROCESSING

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

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

Section – I

Q.1 Attempt any two: **15**
   a) Explain in detail steepest descent method.
   b) Describe briefly Kalman filtering algorithm.
   c) Write short note on Levinson-Predictor.

Q.2 Attempt any two: **12**
   a) Explain in detail Adaptive system with suitable example.
   b) Describe in brief Cramer Rao bound.
   c) Write short note on convergence analysis of RLS algorithm.

Q.3 Attempt any one: **08**
   a) Explain in detail Principle of orthogonality.
   b) Write short note on LMS Algorithm & its applications.

Section – II

Q.4 Attempt any two: **15**
   a) Describe briefly Echo Cancelation in Communications as a application of adaptive filters.
   b) Write short note on CM equalizer and carrier tracking.
   c) Describe briefly Sato algorithm in Adaptive Equalisation.

Q.5 Attempt any two: **12**
   a) Describe briefly Linear Predictive Coding as a application in adaptive filter.
   b) Write short note on Adaptive blind equalizer.
   c) Draw & explain Single and multistage realization with suitable example.

Q.6 Attempt any one: **08**
   a) Design with a example Decimation & Interpolation by integer factor.
   b) Describe briefly Wavelet transform and filter bank implementation of wavelet expansion of signals.

Seat No.

ME (Semester-II) (CBCS) Examination Dec-2019
Electronics & Telecommunication Engineering
WIRELESS COMMUNICATION

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

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

Section – I

Q.1	**Solve any four of the following questions.**	**16**

  a) Discuss the basic concept of cellular phone in brief.
  b) Discuss the ground reflection (two ray) model.
  c) Describe the Rayleigh & Ricean fading distributions.
  d) Explain the parameters of mobile multipath channels.
  e) Explain variable tree OVSF in CDMA.

Q.2 **a)** **Solve any two of the following questions.**   **12**
      i) Explain the PN sequences.
      ii) List and explain the multipath access techniques for wireless
           communication.
      iii) Write a note on Walsh codes.
   b) Discuss the concept of frequency reuse in cellular communication.   **07**

Section – II

Q.3 **Solve any four of the following questions.**   **16**
  a) Explain MIMO Channel Capacity.
  b) What are the benefits of Cyclic Prefix in OFDM?
  c) Explain the BER performance of UWB.
  d) Write a note on WiMAX.
  e) Explain the Global System for mobile phones.

Q.4 **a) Solve any two of the following questions.**   **12**
   1) Explain with the help of block diagram operation of OFDM transreceiver.
   2) Explain the non-linear MIMO receiver (V-BLAST).
   3) Consider an *N=4* subcarrier OFDM system with *L=2* channel taps denoted
       by *h(0), h(1).* Conventional channel estimation is employed with the pilot
       symbols on all the subcarrier given as *X(0) = 3-j, X(1) = 2+3j, X(2) = -1-2j,
       X(3) = -2+j.* Let the corresponding received samples in the time domain be
       y(0) = 2+j, y(1) = 3+2j, y(2) = -1-j, y(3) = 2-3j. Let the noise samples v(k)
       $0 \leq k \leq 3$ be zero mean IID Gaussian with variance σ^2. Also let the cyclic
       prefix be of length one symbol. Find the received symbols across the
       subcarriers in the frequency domain.
Q.4 **b)** Explain SVD and Eigen modes of the MIMO channel.   **07**

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No.</td><td></td></tr>
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ME (Semester-II) (CBCS) Examination Dec-2019
Electronics & Telecommunication Engineering
CRYPTOGRAPHY & NETWORK SECURITY

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

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

Section – I

Q.1 **Attempt any two:**   **10**
     a) Discuss challenges of computer security.
     b) Explain the avalanche effect.
     c) Write a note feistel Cipher.

Q.2 **Attempt any one:**   **07**
     a) Explain public key cryptosystem. Discuss elements of public key cryptosystem.
     b) Explain Diffie-Hellman Key Exchange algorithm.

Q.3 **Attempt any three:**   **18**
     a) Explain strength of DES in detail.
     b) Write a note on RSA algorithm. Explain with suitable example.
     c) Explain symmetric key distribution using symmetric encryption.
     d) Write a note on triple DES.

Section – II

Q.4 **Attempt any two:**   **10**
     a) Write a note on security of message authentication code.
     b) What is virus? Explain parts of virus.
     c) What are the desired properties a digital signature.

Q.5 **Attempt any one:**   **7**
     a) What is Kerberos? Explain requirements of Kerberos.
     b) What is X.509 Certificates? Explain elements of X.509 Certificates.

Q.6 **Attempt any three:**   **18**
     a) Write a note on message authentication requirements.
     b) What is birthday attack?
     c) Explain Elgamal Digital Signature Techniques in details.
     d) Explain antivirus techniques.

Seat No.

Set **P**

ME (Semester-II) (CBCS) Examination Dec-2019
Electronics & Telecommunication Engineering
WIRELESS SENSOR NETWORK & OPTIMIZATION

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

Instructions: 1) All questions are compulsory.
2) Figures to right indicate full mark.
3) Draw neat diagram wherever required.

Section – I

Q.1 Attempt any Two.   **10**
   a) What are the advantages and disadvantages of WSN?
   b) Explain Figure of Merits.
   c) List various modes of a sensor node and explain any one.

Q.2 Attempt any One.   **07**
   a) Explain in brief about energy Consumption of Sensor nodes.
   b) What are the major issues and challenges that need to be considered for designing adhoc wireless system?

Q.3 Attempt any Three.   **18**
   a) Explain data dissemination and gathering.
   b) Explain Topology Control.
   c) Explain Gateway concepts.
   d) Design and explain single node architecture.

Section – II

Q.4 Attempt any Two.   **10**
   a) Explain the concept of low duty cycle in MAC protocol.
   b) Explain Need for energy management in WSN.
   c) Explain scheduling mechanism in WSN.

Q.5 Attempt any One.   **07**
   a) Explain in brief about Classifications of MAC Protocols.
   b) Explain power aware routing protocol.

Q.6 Attempt any Three.   **18**
   a) Explain issues in designing routing protocol.
   b) Explain IEEE 802.15.4.
   c) Explain table driven routing protocol.
   d) Explain application of WSN in Military surveillance.

Seat No.		Set	**P**

ME (Semester-II) (CBCS) Examination Dec-2019
Electronics & Telecommunication Engineering
WAVELET TRANSFORM & APPLICATIONS

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

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

Section – I

Q.1 **Attempt any two.**   **24**
    a) Explain Continuous Wavelet Transform and Discrete Wavelet Transform with examples.
    b) Describe Multi resolution analysis (MRA) of $L^2(R)$. Specify Necessary and sufficient condition for orthonormality.
    c) Explain Construction of wavelets using Biorthogonality and biorthogonal basis.

Q.2 **Attempt any one.**   **11**
    a) Explain short comes of Fourier transforms and how it can be overcome by using STFT and wavelet transforms.
    b) Describe the selections of Wavelets and discuss about smoothness and approximation order.

Section – II

Q.3 **Attempt any two.**   **24**
    a) Briefly discuss about audio compression and video coding using multi resolution technique.
    b) Explain ECG Signal Compression using Discrete Wavelet Transform.
    c) Discuss in brief Edge Detection and Object Isolation.

Q.4 **Attempt any one.**   **11**
    a) Explain Transform Coding and Discrete Time Wavelet Transform for Image Compression.
    b) Write a note on Adapted wavelet techniques for encoding MRI diagnosis of coronary artery disease.

Seat No.

Set **P**

ME (Semester-II) (CBCS) Examination Dec-2019
Electronics & Telecommunication Engineering
ADVANCED EMBEDDED SYSTEMS

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

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

Section – I

Q.1 **Attempt any Two.**   **12**
   a) Explain embedded system design challenges.
   b) Explain Operating modes in MP 11.
   c) Explain data types supported by MP 11 CPU processor.

Q.2 **Attempt any Two.**   **12**
   a) Explain different MPCore processor support for extensions to ARMv6.
   b) Draw and explain Big-endian and Little-endian address format of ARM 11.
   c) Draw and explain program status registers of ARM 11 processor.

Q.3 **Attempt any Two.**   **12**
   a) Draw and explain any one type of register format in CP15 registers of MPCore control coprocessor.
   b) Explain MP Core architecture with Jazelle technology.
   c) Give the details of exceptions in MP 11.

Section – II

Q.4 **Attempt any Two.**   **12**
   a) Explain software development process life cycle and its model in detail.
   b) Explain the concept of mailbox, message queue and semaphore in inter task communication of μ C/OS II.
   c) Explain mutex management and semaphore management.

Q.5 **Attempt any Two.**   **12**
   a) Explain kernel structure of embedded system.
   b) Explain time management in RTOS.
   c) Keyboard interfacing with Raspberry Pi.

Q.6 **Attempt any Two.**   **10**
   a) Explain memory management and porting in RTOS.
   b) Interface 16x2 LCD to Raspberry Pi.
   c) Interface LED to any GPIO pin of Raspberry Pi. Write a program to blink LED after 500msec delay.

Seat No.

Set **P**

ME (Semester - I) (CBCS/CGPA) Examination Dec-2019
Mechanical – CAD/CAM Engineering
COMPUTER AIDED MANUFACTURING

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

Instructions: 1) Q.No.4 and Q.No.7 compulsory. Solve any two questions from remaining
   three questions from each section.
2) Figures to right indicate full marks.
3) Assume suitable data if required and state clearly.

Section – I

Q.1	**a)**	Explain the drive system of CNC machine tool.	**05**
	b)	Explain with the help of sketch principle of operation CNC system.	**05**
Q.2	**a)**	Explain thermal aspects of metal cutting.	**05**
	b)	Explain role of cutting fluid.	**05**
Q.3	**a)**	Explain routine and canned cycle with example.	**05**
	b)	Which machining parameters are responsible for economics of machining?	**05**
Q.4	**Write short note on:**		**15**
	a)	ISO nomenclature of tools	
	b)	Cutting tool material	
	c)	Effect of heat treatment on machining operations	

Section – II

Q.5	**a)**	Explain abrasive water jet machining process and state its advantages.	**05**
	b)	Explain working principle of wire cut EDM.	**05**
Q.6	**a)**	Explain Laser machining process.	**05**
	b)	Explain process planning with suitable example.	**05**
Q.7	**Write short note on:**		**15**
	a)	Tool path generation	
	b)	CNC controller	
	c)	Importance of various types of fits	
Q.8	**a)**	Explain quick change attachment automation for CMC tool.	**05**
	b)	Explain CMC slideways.	**05**

Seat No.

Set **P**

ME (Semester - I) (CBCS/CGPA) Examination Dec-2019
Mechanical – (CAD/CAM Engineering)
FINITE ELEMENT ANALYSIS

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

Instructions: 1) Q. No. 1 and Q. No. 4 are compulsory. Solve any one question from section – I.
2) Q. No. 6 and Q. No. 8 are compulsory. Solve any one question from section – I.
3) Make suitable assumptions if necessary and state them clearly.

Section – I

Q.1	**a)**	Explain the factors affecting accuracy of finite element analysis.	**06**
	b)	What is meant by discretization of a structure? Discuss the various aspects to be considered while discretising a structure for finite element analysis.	**06**
Q.2	**a)**	Write short note on principal of virtual work.	**05**
	b)	Explain weighted residual approach applied to finite element analysis.	**06**
Q.3	**a)**	Derive an expression for stiffness matrix for beam element.	**06**
	b)	Explain general procedure of finite element method.	**05**
Q.4		**Write short note.**	**12**
	a)	Hermite polynomials	
	b)	Solving and Post processing in FEM	

Section – II

Q.5	**a)**	Using Lagrangian Polynomial find shape function for two noded and three noded bar element. Plot the variation of shape function.	**06**
	b)	Explain Local, Global and natural coordinate system.	**05**
Q.6	**a)**	Discuss in brief iterative methods used in static and dynamic finite element analysis.	**06**
	b)	Differentiate lumped mass and consistent mass formulation of internal properties.	**06**
Q.7		Determine the temperature distribution in the wall as shown in figure and calculate heat flow through the wall thickness.	**11**

and calculate heat flow through the wall thickness.

K_1=7.2W/mm^{0}c; K_2= 3.8W/mm^{0}c, K_3= 7.2W/mm^{0}c ;
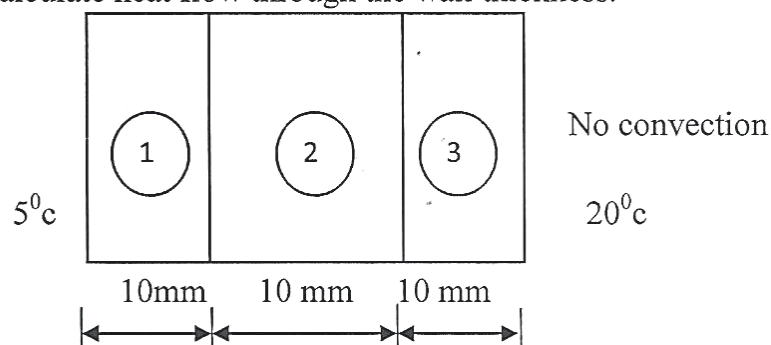
h=60 W/mm^{2o}c. Assume unit cross sectional area of wall.

Q.8 **Write short note.** **12**
    a) Eigen value analysis
    b) Review of software in FEM

Seat No.

Set **P**

ME (Semester-I) (CBCS/CGPA) Examination Dec-2019
Mechanical – (CAD/CAM Engineering)
DESIGN OF EXPERIMENTS & RESEARCH METHODOLOGY

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

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

Section – I

Q.1	**a)**	What is research? Explain in detail the steps involved in research with flow chart.	**09**
	b)	What is different type of error in research? Explain with suitable examples.	**08**
Q.2	**a)**	What is literature review in research? Explain its importance and methods.	**09**
	b)	What are types of data? Explain sources of data collection.	**08**
Q.3	**Write short notes. (Any Three)**		**18**
	a)	Types of research	
	b)	Selection of samples	
	c)	Creative problem solving method	
	d)	Research design	

Section-II

Q.4	**a)**	Explain concept of robust design with suitable example.	**09**
	b)	Explain Taguchi method in detail.	**08**
Q.5	**a)**	What is Two factor factorial design? Explain with suitable examples.	**09**
	b)	Explain writing research paper for publication.	**08**
Q.6	**Write short notes. (Any Three)**		**18**
	a)	Principles of thesis writing	
	b)	Parametric and non-parametric tests	
	c)	Analysis of variance	
	d)	Concept of design of experiments	

Seat No.

Set | **P**

ME (Semester - I) (CBCS/CGPA) Examination Dec 2019
Mechanical – (CAD/CAM Engineering)
ADVANCED MATERIAL AND PROCESSING

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

Instructions: 1) Q.2 and Q.7 are compulsory
2) Solve any two questions from each section.
3) Figures to the right indicate full marks.

Section – I

Q.1	**a)**	What are the important heat treatment processes used for non-ferrous alloys?	**06**
	b)	What is HSLA steel? Give properties, composition & applications of HSLA?	**06**
Q.2	**a)**	What are composites? What are the important types and their application?	**06**
	b)	Give the classification of heat treatments for steel. Explain the Hardening treatment.	**05**
Q.3	**a)**	Explain in detail the concept of Creep phenomenon.	**06**
	b)	Explain in detail the tensile strength properties of ceramics, concrete and polymers.	**06**

Q.4 Write short notes. (Any Three)   **12**
   a) Al-Si alloys
   b) Shape memory alloys
   c) P and N type semiconductors
   d) Squeeze casting

Section – II

Q.5	**a)**	What are MEMs devices? Explain the basic MEMs processing.	**06**
	b)	What are the cost and service requirements for materials selection?	**06**
Q.6	**a)**	What is Rapid Prototyping (RP)? What is it's effect on product development time?	**06**
	b)	With a neat sketch explain the working principles of Selective Laser Sintering (SLS).	**06**
Q.7	**a)**	Differentiate between PVD and CVD process.	**05**
	b)	Explain EDM process with applications?	**06**

Q.8 Write short notes (Any Three)   **12**
   a) Effect of amplitude of vibration, frequency of vibration and grain size.
   b) Types of abrasives used in USM
   c) Tribology
   d) Stereolithography
   e) Thermal spraying

Seat No.	

ME (Semester – II) (CBCS/CGPA) Examination Dec-2019
Mechanical -- (CAD/CAM Engineering)
MANUFACTURING SYSTEM DESIGN

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

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

Section – I

Q.1	a)	Explain decision making procedure in manufacturing system design.	05
	b)	Explain optimum production scale in mass production.	05
Q.2	a)	Explain product life cycle.	05
	b)	Explain computer aided process planning.	05
Q.3	a)	Explain optimization of multi stage manufacturing.	05
	b)	Explain industrial cost estimation practice.	05
	c)	Explain setup time estimation.	05

Section – II

Q.4	a)	Explain query languages.	05
	b)	Explain offline data collection system.	05
Q.5	a)	Explain general design framework.	05
	b)	Explain applications of probability and statistics	05
Q.6	a)	Explain group technology.	05
	b)	Explain lean production.	05
	c)	Explain agile manufacturing.	05

Seat No.		Set	P

ME (Semester-II) (CBCS/CGPA) Examination Dec-2019
Mechanical – (CAD/CAM Engineering)
PRODUCT LIFE CYCLE MANAGEMENT

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

Instructions*:* 1) Questions No-1 from section-I compulsory. Solve any two questions out of remaining three question from section-I.
2) Question No-8 from section-II compulsory. Solve any two questions out of remaining three question from section-II.
3) Make suitable assumptions, if necessary.
4) Figures to the right indicate full marks.

Section – I

Q.1 Consider single cavity blanking press tool assembly consisting of at least six parts imagine a fresh market demand explain in details the overall product data management process, Bom, product structure architecture and product platform.   **13**

Q.2 **a)** Explain in details about product reliability and quality of the product.   **05**
b) What are the different advantages of the PLM. System in product life cycle management.   **06**

Q.3 **a)** What do you understand about concurrent engineering? How it is useful for product life cycle management.   **05**
b) With the help of a block diagram discuss the comparison of PLM with SCM.   **06**

Q.4 **a)** Explain in brief control factors, noise factors and performance metrics considered for Robust design procedure.   **05**
b) Brief about product structure. Explain with the help of neat block diagram the product structure of any gear box.   **06**

Section – II

Q.5 **a)** Explain with one example how to estimate the product cost of manufacturing.   **05**
b) Explain in brief about the Taguchi method for design of experiments.   **06**

Q.6 **a)** What do you understand about product modeling explain in brief about various types of product model.   **05**
b) What is an intelligent information system.   **06**

Q.7 a) Explain with one suitable example advanced database design for integrated manufacturing.   **05**
b) Explain in brief about an effective design for assembly helps to improve the serviceability of the product.   **06**

Q.8 a) Explain with block diagram how CIM integrates the various aspects of product manufacturing.   **07**
b) What do you understand about competition analysis and economic analysis explains with one suitable.   **06**

Seat No.		**Set**	**P**

ME (Semester-II) (CBCS/CGPA) Examination Dec-2019
Mechanical - (CAD/CAM Engineering)
OPTIMIZATION TECHNIQUES

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

Instructions*:* 1) All Questions are Compulsory.
           2) Figures to the right indicate full marks.

Section – I

Q.1	**Solve Any Two:**	**11**
	a) Kuhan-Tucker Conditions	
	b) Single-Variable Problem	
	c) Lagrange Multipliers Method	
Q.2	**Solve Any Two:**	**12**
	a) Exhaustive Search Method	
	b) Fibonacci method	
	c) Quasi-Newton Method	
Q.3	**Solve Any Two:**	**12**
	a) Pattern Search Method	
	b) Conjugate Direction Method	
	c) Davidon-Fletcher-Powell Method	

Section – II

|		
Q.4	**Write note on:**	**11**
	a) Operations of Genetic Algorithm	
	b) Simulated Annealing Methods	
	c) SolveAnyTwo:	**12**
	1) Neural Networks	
	2) Exterior Penalty Method	
	3) Interior Penalty Method	
	d) Solve Any Two:	**12**
	1) Nine Principles of OPT	
	2) Comparison of TOC and Local Optimization Techniques	
	3) Five focusing steps of TOC.	

Seat No.		Set	P

ME (Semester-II) (CBCS/CGPA) Examination Dec-2019
Mechanical – (CAD/CAM Engineering)
AUTOMATIC CONTROL ENGINEERING

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

Instructions: 1) Answer any five questions.
                2) Figures to the right indicate full marks.
                3) Make suitable assumptions and mention clearly.
                4) Use of non-programmable calculator is allowed.

Q.1 **a)** Explain in detail open and closed loop control system.   **07**
      b) Describe hydraulic servo-motor system and obtain block diagram for the same.   **07**

Q.2 **a)** Explain rules used for obtaining block diagram.   **07**
      b) Obtain the Transfer function for given block diagram.   **07**
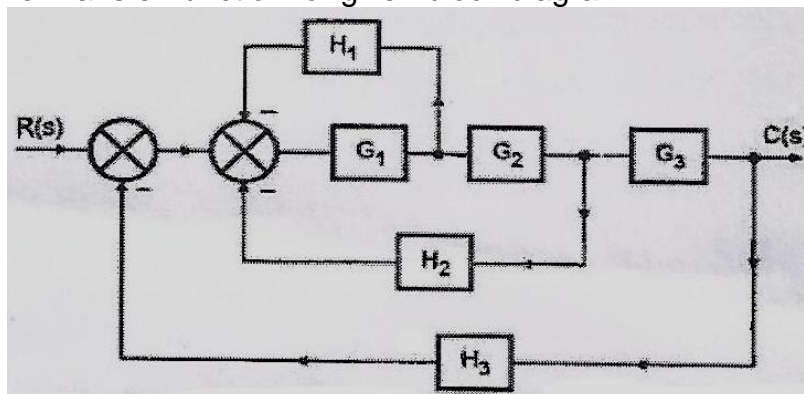
Q.3 **a)** Explain Pneumatic system with block diagram.   **07**
      b) Explain jet pipe amplifier with block diagram.   **07**

Q.4 **a)** Explain basic modes (Proportional, integral, derivative and PID) of control system.   **07**
      b) Explain feedback and feed forward control systems.   **07**

Q.5 **a)** Write rules of root locus methods.   **05**
      b) Sketch the root locus for the system with.   **09**

$$G(s)H(s) = \frac{K(s+4)}{s(s^2 + 2s + 2)}$$

Q.6 **a)** Explain the following terms.   **06**
         1) Phase margin
         2) Gain margin
         3) Phase cross over frequency
      b) A unity feedback system has $G(s) = \frac{80}{s(s+2)(s+20)}$ Draw the bode plot. Determine G.M., P.M., ω_{gc} and ω_{pc}.   **08**

Q.7 **a)** Explain theorems of Z- transforms.   **08**
      b) For given equation, $y(t) = \frac{D+3}{(D+1)(D+2)} f(t)$
         Determine the computer diagram and state space representation by using direct programming method.   **06**

Seat No.

Set **P**

ME (Semester-II) (CBCS/CGPA) Examination Dec-2019
Mechanical – (CAD/CAM Engineering)
CAD/CAM/CAE PRACTICES IN METAL FORMING

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

Instructions*:* 1) Q.No.4 and Q.No.8 are compulsory. Solve any two questions from
        remaining three Questions from each section.
      2) Figures to right indicate full marks.
      3) Assume suitable data if required and state clearly.

Section – I

Q.1	**a)**	Explain process modeling with diagram.	**05**
	b)	Explain rolling & forming process.	**05**
Q.2	**a)**	Explain solid formulation and flow formulation.	**05**
	b)	Classify and describe metal forming process	**05**
Q.3	**a)**	Explain stress, strain and strain rate.	**05**
	b)	Explain upper bond method.	**05**
Q.4	**Write short notes on.**		**15**
	a)	Coining operation	
	b)	Temperature in metal forming	
	c)	Visco plasticity	

Section – II

Q.5	**a)**	Explain concept of rezoning in FEM.	**05**
	b)	Explain multi pass bar drawing and extrusion.	**05**
Q.6	**a)**	Discuss element assemblage in solving a problem by using FEM analysis.	**05**
	b)	Explain backward tracing method.	**05**
Q.7	**a)**	Explain compression of solid cylinder and heading of cylindrical bars.	**05**
	b)	Explain perform design procedure for hot forging.	**05**
Q.8	**Write short note on.**		**15**
	a)	Draw ability	
	b)	Rolling mill	
	c)	Drop forging stages	

Seat No.

Set **P**

ME (Semester – I) (CBCS/CGPA) Examination Dec-2019
Mechanical Engineering
DESIGN OF EXPERIMENT AND RESEARCH METHODOLOGY

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

Instructions: 1) Q.3 and Q.6 are compulsory. Solve any one from remaining question from each section.
2) Figures to right indicate full marks.

Section – I

Q.1	a)	List the steps involved in research work and Describe each of them emphasizing how those are accomplished.	09
	b)	How do you prepare a research proposal? Elaborate on its content.	08
Q.2	a)	Explain the different types of research design used in research work.	09
	b)	Describe the procedure adopted for steps to analyze the data collected about a process.	08
Q.3	**Write short notes. (Any Three)**		18
	a)	Process of simulation	
	b)	Error in research	
	c)	Delphi method	
	d)	Design of feedback form	

Section – II

Q.4	a)	What are the different types of experimental design based on objective and number of factors to be investigated? Explain each one in brief.	09
	b)	Explain the basic approach of Response Surface Method and discuss its important properties and features.	08
Q.5	a)	A 2^2 factorial experiment conducted for Golf play. The following table shows score obtained for two runs of play and influencing factor.	09

Type of Driver	Type of Ball			
	X		Y	
	Run 1	Run 2	Run 1	Run 2
A	88	90	88	91
B	93	91	92	94

Find which factor's effect is more on the game.

	b)	Elaborate Taguchi approach to Parameter Design.	08
Q.6	**Write short notes. (Any Three)**		18
	a)	Fitting response curves	
	b)	Formats of report writing	
	c)	Analysis of variance (ANOVA)	
	d)	Steps of DOE using any software	

Seat No.		Set	**P**

ME (Semester – II) (CBCS/CGPA) Examination Dec-2019
Mechanical Engineering
DESIGN ENGINEERING

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

Instructions: 1) Q. No. 1 & Q. No. 4 is compulsory. Solve any one question from section - I.
2) Q. No. 5 & Q. No. 7 is compulsory. Solve any one question from section - II.
3) Figures to right indicate full marks.
4) Assume suitable data if necessary and state it clearly.

Section – I

Q.1	**a)**	Explain standard contour cams and standard motion cams.	**06**
	b)	What is meant by polynomial cam? Explain the procedure for kinematic design of a 3-4-5 cam for a RDFD (Rise-Dwell-Fall-Dwell) cam follower system.	**06**
Q.2	**a)**	Explain Laws of cam design for high-speed cams.	**05**
	b)	Derive an expression for a single DOF system (cam-follower) subjected to a ramp input.	**06**
Q.3	**a)**	Explain the significance of thermal stresses in machine design. Derive an expression for thermal stresses in flat wall subjected to a temperature gradient.	**06**
	b)	Explain with suitable sketches two methods of reducing thermal stresses.	**05**
Q.4	**Write short notes. (Any Three)**		**12**
	a)	Selection of Electrical Drive	
	b)	Laws of creep	
	c)	Polydyne cam	
	d)	Combination of stresses due to pressure and temperature	

Section – II

Q.5	**a)**	Explain the terms system reliability, series combination and parallel combination.	**06**

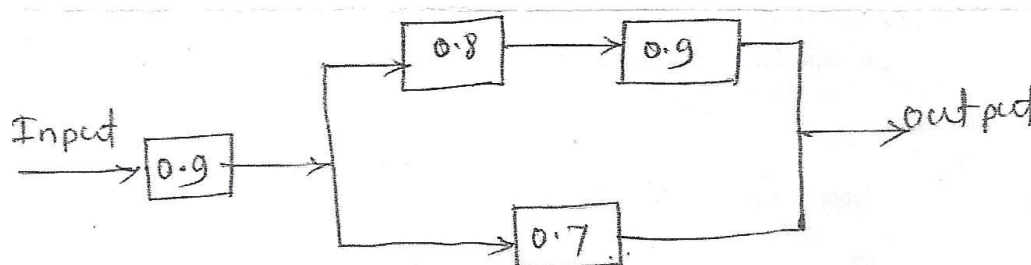Fig. V (b)

	b)	Determine the system reliability of the following system shown in Fig. V (b).	**06**
Q.6	**a)**	Discuss the discontinuity stresses developed in the cylindrical pressure vessels with elliptical heads.	**06**
	b)	Explain the residual stresses in plastic bending.	**05**

Q.7	**a)**	Explain the terms MTTF and MTBF. Derive the relation for MTTF in terms of R(t).	**06**
	b)	Define the terms:	**06**
		1) Failure Density	
		2) Failure Rate	
		3) Reliability	
Q.8	**a)**	Write a note on contiguity constraint and form constraint.	**05**
	b)	Write a note on Rayleigh distribution in reliability analysis.	**06**

Seat No.

Set **P**

ME (Semester - II) (CBCS/CGPA) Examination Dec-2019
Mechanical Engineering
THEORY & ANALYSIS OF COMPOSITE MATERIALS

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

Instructions*:* 1) Q. No. 3 is compulsory and attempt any one from Section – I.
2) Q. No. 6 is compulsory and attempt any one from Section – II.
3) Figures to right indicate full marks.
4) Assume suitable data if necessary and mention it clearly.

Section – I

Q.1	**a)**	Explain Classification and Characteristics of Composite Materials.	**09**
	b)	List out the applications of Composite Materials with suitable examples.	**08**
Q.2	**a)**	Explain Stress-Strain Relations for Anisotropic Materials.	**09**
	b)	What is stiffness? Explain Comparison of Approaches to Stiffness.	**08**
Q.3		**Write short notes. (Any Three)**	**18**
	a)	Basic Terminology of fiber-reinforced composite material	
	b)	Strengths of an Orthotropic Lamina	
	c)	Elasticity Approach to Stiffness	
	d)	Maximum Stress theory	

Section – II

Q.4	**a)**	Explain Classical Lamination Theory.	**09**
	b)	Discuss Mechanics of Materials Approach to Strength.	**08**
Q.5	**a)**	What is Bending? Explain Governing Equations for Bending.	**09**
	b)	Explain Basic Principles of fracture mechanics.	**08**
Q.6		**Write short notes. (Any Three)**	**18**
	a)	Inter-laminar stresses	
	b)	Buckling of laminated plates	
	c)	Effect of discontinuity in laminates	
	d)	Design of composite structures	

Seat No.

Set **P**

ME (Semester-II) (CBCS/CGPA) Examination Dec-2019
Mechanical Engineering
MECHATRONICS SYSTEM DESIGN

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

Instructions: 1) Answer any five full questions.
2) Draw meaningful sketches wherever necessary in pencil only.
3) Figures to right indicate full marks.
4) Make suitable assumptions, if required and state them clearly.

Section – I

Q.1	Describe, in details, any one diagnostic application of PLC.		**14**
Q.2	**Write notes on the following:**		**14**
	a)	Modes of control	
	b)	Internal relays in PLC	
	c)	Mechatronic System Design steps	
Q.3	**Write short notes on.**		**14**
	a)	Micro- sensors in Mechatronics	
	b)	Fuzzy logic applications in Mechatronics	
	c)	Mechatronic monitoring system for a machine tool	
Q.4	**a)**	Describe the factors to be considered while selecting a sensor for a particular application.	**07**
	b)	Write a short note on Digital Signal Processing.	**07**
Q.5	**a)**	Describe the elements of data acquisition and control system.	**07**
	b)	Describe over-framing.	**07**
Q.6	**a)**	Explain the basic elements of a closed loop control system with suitable example.	**07**
	b)	Explain: 1)Proximity switches. 2)Optical encoders.	**07**
Q.7	**a)**	With appropriate example explain sequencing in PLC.	**07**
	b)	Compare Microprocessor with Microcontroller.	**07**
Q.8	**a)**	Describe briefly hydraulic actuation systems.	**07**
	b)	Explain the basic internal structure of a PLC.	**07**

Seat No.

Set **P**

ME (Semester-II) (CBCS/CGPA) Examination Dec-2019
Mechanical Engineering
INDUSTRIAL PRODUCT DESIGN

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

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

Q.1	**a)**	Explain the importance of creativity in design & development of new products.	**07**
	b)	Explain the design & development process of industrial products.	**07**
Q.2	**a)**	Explain the process of setting specifications of a product.	**07**
	b)	Explain interpretation of information in product design.	**07**
Q.3	**a)**	Discuss effect of color with reference to ergonomics of consumer products.	**07**
	b)	Explain the ergonomic aspect of design of machine tools.	**07**
Q.4	**a)**	Explain the aesthetic expressions of balance & symmetry.	**07**
	b)	Explain the mechanics of seeing.	**07**
Q.5	**a)**	Explain the concept of design for production.	**07**
	b)	Write a note on "Standardization & Cost Reduction".	**07**
Q.6	**a)**	Explain value analysis & cost reduction.	**07**
	b)	Discuss conceptual (Conceptional) design.	**07**
Q.7	**a)**	Write a note on influence of line & form.	**07**
	b)	Write a note on rhythm, & radiance with reference to aesthetics of product.	**07**

Seat No.

Set **P**

ME (Semester-II) (CBCS/CGPA) Examination Dec-2019
Mechanical Engineering
MATERIAL HANDLING EQUIPMENT DESIGN

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

Instructions: 1) Q.No.3 and Q.No.6 are compulsory. Attempt any one questions from remaining two question from each section.
2) Figures to right indicate full marks.
3) Assume suitable data if necessary and mention it clearly.

Section – I

Q.1	**a)**	Explain Classification and selection of material handling system.	**09**
	b)	Explain Characteristics and applications material handling system.	**08**
Q.2	**a)**	Explain the functions and parameters effecting service in material handling system.	**09**
	b)	Explain construction and design of Wire ropes of mechanical handling devices.	**08**
Q.3		**Write short notes on (any three).**	**18**
	a)	Chains and pulleys	
	b)	Gears and power transmission systems	
	c)	Sprockets and drums	
	d)	Controls of travel mechanisms	

Section – II

Q.4	**a)**	Explain Dynamic analysis of elevators.	**09**
	b)	Explain System design and economics.	**08**
Q.5	**a)**	Explain applications of conveyors and related equipment.	**09**
	b)	Explain Design process of any one type of conveyor and their elements.	**08**
Q.6		**Write short note on (any three).**	**18**
	a)	Stability and structural analysis	
	b)	Kinematic analysis of cranes	
	c)	Failure analysis of material handling systems	
	d)	Principles of conveyors	

Seat No.

Set **P**

ME (Semester-II) (CBCS/CGPA) Examination Dec-2019
Mechanical Engineering
ROBOTICS

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

Instructions: 1) Answer any five full questions.
               2) Draw meaningful sketches wherever necessary with pencil only.
               3) Figures to right indicate full marks.
               4) Make suitable assumptions, if required and state them clearly.

Q.1	**a)**	What are pitch, yaw and roll motions of a robot wrist? Describe with a sketch.	**07**
	b)	Explain the work envelopes of various robot configurations.	**07**
Q.2	**a)**	Describe various types of actuators used for robots. Discuss the relative advantages and limitations.	**07**
	b)	Explain control based classification of the robot end-effector. Describe a cam actuated gripper used for robots with a neat sketch.	**07**
Q.3		Describe various types of pneumatic drives used in the robots with advantages.	**14**
Q.4	**a)**	Describe four main types of motion control used in robot programming.	**07**
	b)	Describe textual robot language structure.	**07**
Q.5	**Write notes.**		**14**
	a)	Spray painting Robot	
	b)	Inspection Robot	
Q.6		Describe the working principle and applications of:	**14**
	a)	Range sensors	
	b)	Tactile sensors	
Q.7		Describe inverse kinematics problem. Explain the solution to the inverse kinematics problem with an example.	**14**

ME (Semester - I) (CBCS/CGPA) Examination Dec-2019
Mechanical - (Manufacturing Process Engineering)
RELIABILITY & TEROTECHNOLOGY

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

Instructions: 1) Answer any five full questions.
2) Figures to right indicate full marks.
3) Make suitable assumption whenever necessary and state it clearly.

Q.1	Explain Breakdown, Preventive, Periodic, and Conditional type Maintenance.	**14**
Q.2	How do you use TPM in process type of industry?	**14**
Q.3	Discuss Reliability, availability and maintainability in brief.	**14**
Q.4	Define and Explain FMEA and its procedure with a case example.	**14**
Q.5	Write a note on system reliability for various configurations with a case example.	**14**
Q.6	Discuss in brief Non-parametric Reliability using Variable and attribute methods.	**14**
Q.7	Explain AGREE and ARINC method in brief.	**14**

Seat No.	

ME (Semester-I) (CBCS/CGPA) Examination Dec-2019
Mechanical – (Manufacturing Process Engineering)
COMPOSITE MATERIALS

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

Instructions*:* 1) Answer any five full questions.
2) Draw meaningful sketches wherever necessary in pencil only.
3) Figures to the right indicate full marks.
4) Assume suitable data if required.
5) Make suitable assumption, if required and state them clearly.

Section – I

Q.1 **a)** Classify composite materials on the basis of matrix and reinforcement. Explain. **06**

b) What are ceramic matrix composites? Enumerate the advantages of ceramic matrix composites. **08**

Q.2 **a)** What is the difference between the thermosets and thermoplastics? Give some examples of both. **06**

b) Enumerate six primary material selection parameters that are used in evaluating the use of a particular composite material. **08**

Q.3 **a)** Explain pultrusion processes for composites. **06**
b) Explain with a schematic diagram the Filament winding process for manufacturing a polymer matrix composite. **08**

Q.4 **a)** Write the number of independent elastic constants for three-dimensional Orthotropic, and monoclinic materials. **04**

b) Find the compliance and stiffness matrix for a graphite/epoxy lamina. The material properties are given as

$$E_1 = 181GPa, \ E_2 = 10.3GPa, \ E_3 = 10.3GPa$$
$$v_{12} = 0.28, \ v_{23} = 0.60, \ v_{13} = 0.27$$
$$G_{12} = 7.17GPa, \ G_{23} = 3.0GPa, \ G_{31} = 7.00GPa$$

Section-II

Q.5 **a)** Evaluate the Four Elastic Moduli of a unidirectional lamina by strength of materials approach **10**
    1) Longitudinal Young's modulus, E1
    2) Transverse Young's modulus, E2
    3) Major Poisson's ratio, v12
    4) In-plane shear modulus, G12

b) What fiber factors contribute to the mechanical performance of a composite? **04**

Q.6 **a)** Explain the assumptions made in the classical lamination theory. **06**
b) Derive the linear relationship of the strains in a laminate to the curvatures of the laminate. **08**

Q.7 **a)** Explain the measurement of constituent of composite materials and properties. **06**

b) Explain the measurement of following basic composite properties: **08**
   1) Tensile test
   2) Compression test

Seat No.		Set	P

ME (Semester – I) (CBCS/CGPA) Examination Dec-2019
Mechanical – (Manufacturing Process Engineering)
MANAGEMENT OF TECHNOLOGY

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

Instructions: 1) Attempt any five questions.
2) Assume suitable data wherever necessary and state it clearly.
3) Draw appropriate sketches wherever required.
4) Figures to the right indicate full marks.

Q.1	Describe the utility of Actor-Network theory related to Technology Management.	**14**
Q.2	Explain how the eleven commandments related to Technology forecasting can help the Organization.	**14**
Q.3	Explain High, Low and Medium Technology.	**14**
Q.4	Explain how innovation management can help in a competitive market scenario.	**14**
Q.5	What is the process of Technology Change? Explain.	**14**
Q.6	What is Technology Life Cycle? Explain with example.	**14**

Seat No.		Set	P

ME (Semester – II) (CBCS/CGPA) Examination Dec-2019
Mechanical – (Manufacturing Process Engineering)
ADVANCED MANUFACTURING TECHNIQUES – II

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

Instructions: 1) Q. No. 3 is compulsory. And solve any one question from section – I.
2) Q. No. 6 is compulsory. And solve any one question from section – II.
3) Figures to right indicate full marks.
4) Assume suitable data if necessary and state it clearly.

Section – I

Q.1	**a)**	What are the applications and special features of Full Mould casting? Explain with neat sketch.	**10**
	b)	Write in detail solidification process in casting for sound casting manufacturing.	**07**
Q.2	**a)**	Explain super finishing process in detail.	**10**
	b)	Discuss the lapping in detail.	**07**
Q.3		**Write short notes. (Any Three)**	**18**
	a)	Investment mould casting	
	b)	Deburring process	
	c)	Burnishing	
	d)	Shell mould casting	

Section – II

Q.4	**a)**	Explain HERF in detail.	**10**
	b)	Discuss the Transfer molding process.	**07**
Q.5	**a)**	Explain Isostatic molding.	**10**
	b)	What do you mean by hot pressing in powder metallurgy?	**07**
Q.6		**Write short notes. (Any Three)**	**18**
	a)	Explosive forming	
	b)	Solid phase welding	
	c)	Sintering	
	d)	Directional solidification	

Seat No.	

ME (Semester-II) (CBCS/CGPA) Examination Dec-2019
Mechanical – (Manufacturing Process Engineering)
TOTAL QUALITY CONTROL

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

Instructions*:* 1) Answer any five full questions.
         2) Figures to right indicate full marks.
         3) Make suitable assumptions whenever necessary and state it clearly.

Q.1	Explain core concept of quality control, dimensions of quality and quality spiral in detail.	**14**
Q.2	Explain cost of quality, estimating and analyzing quality cost by taking a suitable example.	**14**
Q.3	Discuss old and new QC tools by taking a suitable case example.	**14**
Q.4	Explain QFD process and its matrix by taking a suitable example.	**14**
Q.5	Write a note on Taguchi's recommended design technique.	**14**
Q.6	Discuss in brief quality standards.	**14**
Q.7	Explain six sigma and tolerance in brief.	**14**

Seat No.

Set | **P**

ME (Semester-II) (CBCS/CGPA) Examination Dec-2019
Mechanical – (Manufacturing Process Engineering)
FINITE ELEMENT METHODS

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

Instructions: 1) Q. No.4 and Q. No.8 is compulsory and attempt any two questions from
each section.
2) Make suitable assumptions if required and state them clearly.
3) Use of non-programmable calculator is allowed.
4) Figures to right indicate full marks.

Section – I

Q.1	**a)**	Derive the general equation for determining the stiffness of an element with usual notations.	**05**
	b)	Explain applications of FEM in detail.	**05**
Q.2	**a)**	Explain Lagrange's shape functions.	**05**
	b)	Explain different types of element.	**05**
Q.3	**a)**	Explain principle of minimization of weighted residual method.	**05**
	b)	Explain in detail on what basis the size and number of elements are approximated.	**05**

Q.4   Write short notes. (Any Three)   **15**
a) Cubic elements
b) Simplification through symmetry
c) Super-parametric element
d) Stiffness matrix

Section – II

Q.5	**a)**	With an example explain in detail the Eigen value analysis	**05**
	b)	Explain harmonic response analysis using FEM.	**05**
Q.6	**a)**	Explain shock spectrum analysis.	**05**
	b)	Explain validation of FE solutions.	**05**
Q.7	**a)**	Integrate the following using loan integration formula.	**05**

$$1)\ \int_A N_i N_j\, dA$$

$$2)\ \int_A N_i N_j^2\, dA$$

	b)	Explain element distortion.	**05**

Q.8   Write shorts notes. (Any Three)   **15**
a) Transient thermal analysis
b) Results processing
c) Inter-elemental continuity
d) Modal analysis using FEM

Seat No.

ME (Semester-I) (CBCS/CGPA) Examination Dec-2019
Mechanical – (Thermal Engineering)
ADVANCE HEAT & MASS TRANSFER

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

Instructions: 1) Answer any two questions from each section.
2) Assume suitable data if necessary.
3) Use of non-programmable calculator is allowed.
4) Figures to the right indicate full marks.

Section – I

Q.1 a) The exposed surface ($x = 0$) of a plane wall of thermal conductivity k is subjected to microwave radiation that causes volumetric heating to vary as **08**

$$\dot{q}(x) = \dot{q}_o \left(1 \frac{x}{L}\right)$$

Where $\dot{q}_o (W/m^3)$ is a constant. The boundary at $x = L$ is perfectly insulated, while the exposed surface is maintained at a constant temperature T_o. Determine the temperature distribution $T(x)$ in terms of $x, L, k, \dot{q}_o$, and T_o

b) A Nicrome wire of resistivity $1\mu\Omega m$ is to dissipate a power of 10 KW into surrounding fluid which is at 60 ℃. If maximum operating temperature of wire is 900 ℃, find diameter of wire. Take h = 900 W/m^2℃ and K = 60 W/mk. **09**

Q.2 a) A 10 cm diameter apple, approximately spherical in shape, is taken from 20 ℃ environment and placed in a refrigerator where temperature is 5 ℃ and average convective heat transfer co-efficient over the surface of apple is 6 W/m^2℃. Calculate the temperature ta the center of the apple after a period of 1 hour. Thermo-physical properties of apple are: $\rho = 998\ kg/m^3$, $c = 4180\ J/kgK$ and $k = 0.6\ W/mK$ **09**

b) You are required to design fins for four stroke motorbike engine. Enlist various parameters you will consider and discuss them in detail. **09**

Q.3 a) Derive the differential equation of continuity. **08**
b) Derive Navier-Stokes equation. **09**

Section – II

Q.4 a) Explain the effect of radiation on temperature measurement. **06**
b) What is shape factor? Explain in detail and write various remark of shape factor. **06**
c) Write short note on radiation shield. **06**

Q.5 a) What is compact heat exchanger? **04**
b) Explain principle and application of heat pipe. **04**
c) A concentric tube counter flow heat exchanger has length 500 mm with a thin walled inner tube of 60 mm diameter. The blood enters the heat exchanger at 20℃ and 0.05 kg/s is warmed by water at 60 ℃ and 0.12 kg/s. Determine the temperature of blood at exit from the heat exchanger and heat flow rate. Assume the following data: C$_p$ of blood= 3500J/kgK, Overall heat transfer co-efficient U$_o$ = 475 W/m^{2}K. **09**

Q.6 Write short notes.
  a) Drop condensation promoters   **05**
  b) Nucleate boiling   **04**
  c) Flow pattern in natural convection   **04**
  d) Fick's law of diffusion   **04**

Seat No.

Set **P**

M.E. (Semester – I) (CBCS/CGPA) Examination Dec-2019
Mechanical - (Thermal Engineering)
ADVANCED THERMODYNAMICS

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

Instructions: 1) Answer any two questions from each section.
2) Figures to right indicate full marks.
3) Assume suitable data if necessary and state it clearly.
4) Use of non-programmable calculator is allowed.

Section – I

Q.1	**a)**	State statements of second law of thermodynamics and explain second law efficiency?	**09**
	b)	Derive Maxwell equation.	**09**
Q.2	**a)**	Explain limitations of second law of thermodynamics and what is mean by thermodynamic temperature scale?	**09**
	b)	Derive $C_p - C_v = \frac{Tv\beta 2}{K}$	**08**
Q.3	**a)**	Explain law of corresponding states and compressibility factor.	**09**
	b)	What is mean by Fugacity and activity?	**08**

Section – II

Q.4 **a)** In a gas to water heat exchanger, 1000kg/hr of water is to be heated from 50°C to 120°C by hot gases which enter the heat exchanger at 200°C with a mass flow rate of 2000kg/hr. Determine the change of availability.   **09**
1) of the water
2) of the gas
Assume $T_0 = 25^0$C. Cp of gas 0.24

b) Define.   **09**
1) Standard heat of reaction
2) Standard heat of formation
3) Standard heat of combustion
4) Adiabatic flame temperature

Q.5	**a)**	Write note on FD, BE and MB statics.	**09**
	b)	Explain exergy, exergy effiecncy, exergy balance and exergy losses.	**08**
Q.6	**a)**	What are the postulates of the kinetic theory of gases?	**09**
	b)	Write a note on quantum effect.	**08**

Seat No.

Set P

ME (Semester-II) (CBCS/CGPA) Examination Dec-2019
Mechanical – (Thermal Engineering)
COMPUTATIONAL TECHNIQUES IN THERMAL ENGINEERING

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

Instructions*: 1) Questions No-1 from section-I compulsory. Solve any one questions out of remaining two question from section-I.
2) Questions No-6 from section-II compulsory. Solve any two questions out of remaining three question from section-II.
3) Assume suitable data, if necessary.
4) Use of non-programmable calculator is allowed.
5) Figures to the right indicate full marks.

Section – I

Q.1 **a)** What is matrix inversion method? Explain, solve following set of equation by matrix inversion.
X+Y+Z=8,   X-Y+2Z=6,   3X+5Y-7Z=14   **10**

b) By using Newton Raphson method, find the following equation correct to four decimal places, xe^x= cosx.   **08**

Q.2 a) What are the methods to obtain solution of linear algebraic equation? Compare direct & iterative methods.   **09**

b) Evaluate $\int_0^6 dx/(1 + x^2)$ by using Trapezoidal rule.   **08**

Q.3 a) Using Runge-Kutta method to find approximate value of y for x=0.2 in steps of 0.1, if dy/dx=(x+y^2) given that y = 1 where x=0.   **08**

b) Predict the mean radiation intensity at an attitude of 3000 meter by fitting an exponential curve y = ab^x for following data.   **09**

Attitude (x) in meter	50	450	780	1200	4400	4800	5300
Intensity of Radiation	28	30	32	36	51	58	69

Section – II

Q.4 **a)** Explain forward & central differences schemes along with tables.   **09**
b) Evaluate.   **08**
   1. $\Delta \tan^{-1}(x)$
   2. $\Delta(e^x log 2x)$
   3. $\Delta(x^2/cos2x)$
   4. $\Delta^2 cos2x$

Q.5 **a)** Explain application Finite difference techniques in 1D heat conduction problem.   **09**

b) Explain application of Finite difference techniques in convection heat problem.   **08**

Q.6 **Write short notes on any three of the following.**   **18**
   a) Elements in F.E. Analysis
   b) Galerkin Method
   c) Rayleigh Ritz Method.
   d) Difference between FDM & FEM

Seat No.

Set **P**

ME (Semester-I) (CBCS) Examination Dec-2019
Electronics & Telecommunication Engineering -
(Digital Elect. & Comm. System)
RESEARCH METHODOLOGY

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

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

Section – I

Q.1	**a)**	Briefly describe the different steps involved in a research process.	**06**
	b)	Write short note on objective of research.	**06**
Q.2	**a)**	Which are the problems encountered by researchers in India.	**06**
	b)	How do you define a research problem? Explain with one example.	**06**
Q.3	**a)**	Explain the techniques of simulation.	**05**
	b)	What you mean by mathematical modeling. Explain techniques used for the mathematical modeling.	**06**

Section – II

Q.4	**a)**	Explain the role of probability and statics in simulation?	**06**
	b)	Give guidelines for design of experiment.	**06**
Q.5	**a)**	Explain types of errors in design of experiment.	**06**
	b)	What points will you keep in mind while preparing a research report? Explain.	**06**
Q.6	**a)**	Explain ethical issues in research.	**05**
	b)	Explain precautions required in writing research report.	**06**

Seat No.	

Set **P**

ME (Semester- I) (CBCS) Examination Dec-2019
Electronics & Telecommunication Engineering –
(Digital Elect. & Comm. System)
COMMUNICATION NETWORKS

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

Instructions*:* 1) All questions are compulsory.
2) Figures to right indicate maximum marks.
3) Assume the data whenever necessary.

Section – I

Q.1 **Attempt any three.**   **15**
    a) What is datagram and explain in brief.
    b) Explain Name to address resolution.
    c) Explain pining in detail.
    d) Explain primary and secondary servers defined by DNS.

Q.2 **Attempt any two.**   **20**
    a) What is ARP? Explain it in brief.
    b) Draw and explain ICMP.
    c) What is IP in IP encapsulation? Explain.

Section – II

Q.3 **Attempt any three.**   **15**
    a) Write a note on B-ISDN.
    b) Explain principle of FTP?
    c) Draw ATM cell header format.
    d) What are the different functions of ATM layers?

Q.4 **Attempt any two.**   **20**
    a) Explain Gigabit Ethernet architecture.
    b) Explain RSVP message format.
    c) Explain MPLS format in detail.

Seat No.

ME (Semester – I) (CBCS) Examination Dec-2019
Electronics & Telecommunication Engineering
(Digital Elect. & Comm. System)
CMOS VLSI DESIGN

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

Instructions: 1) Q. No. 4 & Q. No. 8 are compulsory. Attempt any two question from each Section.
2) Figures to right indicate full marks.

Section – I

Q.1	**a)**	Give physical structure of NMOS transistor.	**05**
	b)	Explain MOS device design equations.	**05**
Q.2	**a)**	Define Noise margin and explain how it can be obtained from voltage transfer characteristics of CMOS Inverter?	**05**
	b)	Draw and explain static CMOS Inverter and switch model of CMOS Inverter.	**05**
Q.3	**a)**	Design half adder using CMOS logic.	**05**
	b)	Explain Signal integrity issues in dynamic design.	**05**
Q.4		**Write notes. (any three)**	**15**
	a)	Cascading dynamic gates	
	b)	Dynamic behavior of CMOS Inverter	
	c)	Pseudo MOS Inverter	

Section – II

Q.5	**a)**	Explain C^2 MOS register.	**05**
	b)	Draw and explain master-slave edge triggered register. Write timing properties of multiplexer based master-slave registers.	**05**
Q.6	**a)**	Explain various timing issues.	**05**
	b)	Explain clock synthesis and synchronization using a phase locked loop.	**05**
Q.7	**a)**	How PLL can be used for clock synchronization?	**05**
	b)	Explain the designing of SRAMS.	**05**
Q.8		**Write notes. (any three)**	**15**
	a)	Designing fast adders	
	b)	True single phase clocked register (TSPCR)	
	c)	Clock distribution	
	d)	Timing classification methods	

Seat No.

Set | **P**

ME (Semester – I) (CBCS) Examination Dec-2019
Electronics & Telecommunication Engineering -
(Digital Elect. & Comm. System)
MODERN DIGITAL SIGNAL PROCESSING

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

Instructions: 1) All questions are compulsory.
2) Figures to right indicate full marks.
3) Assume suitable data if necessary and state it clearly.
4) Use of non-programmable calculator is allowed.

Section – I

Q.1	a)	Derive equation of Schur algorithm for prediction coefficient.	06
	b)	Explain the design of optimum equirriple linear phase FIR filter.	06

Q.2   Design an ideal high pass filter with a frequency response.   **12**

$$Hd(e^{jw}) = 1 \quad \text{for} \quad \frac{\pi}{4} \le |w| \le \pi$$
$$= 0 \quad \text{for} \quad |w| \le \pi/4$$

Find the values of $h(n)$ for $N = 11$. Find $H(z)$. Plot the magnitude response.

Q.3	a)	Define the bias of an estimator. When an estimator is asymptotically unbiased?	02
	b)	Design an ideal differentiator with frequency response.	09

$$Hd(e^{jw}) = jw \qquad -\pi \le w \le \pi$$

Using rectangular window with $N = 8$.

Section – II

Q.4	a)	Derive the relation between 'S' and 'Z' variable. Explain the effect of prewarping.	06
	b)	Using the bilinear transform, design a highpass filter, monotonic in passband with cutoff frequency of 1000 Hz and down 10 dB at 350 Hz. The sampling frequency is 5000Hz.	
Q.5	a)	Explain polyphase structures in detail.	06
	b)	Explain the method of sampling rate conversion by a factor I/D. Explain design of interpolator and decimation filter.	06
Q.6	a)	Describe Haar wavelet transform. Give two properties of Haar wavelet transform.	05
	b)	What is need for antialiasing filter prior to downsampling a signal?	03
	c)	What is need for anti-imaging filter after upsampling a signal?	03

Seat No.			**Set**	**P**

ME (Semester-I) (CBCS/CGPA) Examination Dec-2019
Electrical Engineering
POWER ELECTRONICS

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

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

Section – I

Q.1 **a)** How many structures are there for power MOSFETs and describe any one of them with their advantages and disadvantages?   **10**

OR

b) Explain operating modes of TRIAC with suitable diagrams.   **10**

Q.2 Explain role of power electronics interface to connect the following renewable energy sources with neat sketches: **10**
a) Photovoltaic
b) Wind

Q.3 **a)** Explain with waveforms, three phase full bridge diode rectifier with a pure resistive load and derive expressions for load average, r.m.s voltages and currents.   **15**

OR

b) A single phase full bridge diode rectifier is supplied from 230V, 50Hz source. The load consists of R=10 ohm and a large inductance so as to render the load current constant. Determine: **15**
     1) Average values of output voltage and output current
     2) Average and rms values of diode currents
     3) rms values of output and input currents and supply power factor

Section – II

Q.4 Explain buck converter in detail with a neat circuit diagram and waveforms. Also derive the expressions for average output voltage and peak-peak ripple current in terms of duty cycle.   **10**

Q.5 **a)** Derive the expression for the following performance factors of single phase fully controlled bridge converter with R- load.   **15**
     1) Input displacement factor
     2) Input power factor
     3) Input distortion factor
     4) Input harmonic factor
     5) Ripple factor

OR

b) Derive an expression for output voltage of a three phase, fully controlled bridge converter by conducting the following factors: **15**
     1) overlap angle
     2) source inductance

Q.6 **a)** Explain with neat circuit diagram of three phase 120^0 mode inverter circuit **10**
with resistive load. Also draw suitable waveforms.

OR

b) Draw the relevant circuit diagram and wave diagrams of a 3-phase full wave **10**
AC voltage regulator feeding an star connected load.

Seat No.		Set	**P**

ME (Semester-I) (CBCS/CGPA) Examination Dec-2019
Electrical Engineering
POWER SYSTEM DYNAMICS & CONTROL

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

Instructions*: 1) All questions compulsory.
                   2) Assume suitable data if necessary & mention it clearly.
                   3) Figures to right indicate full marks.

Section – I

Q.1 Explain in detail the control hierarchy of power system in India and also explain the typical feedback control used in power system control.   **18**

Q.2 **a)** With the help of dynamics model of system explain small disturbance stability of single machine connected to infinite bus.   **08**
        b) Write the proof of parks transformation.   **09**
                                        OR
        b) Explain the three phase short circuit transient analysis of a synchronous Machine.   **09**

Section – II

Q.3 **a)** What is the necessity of prime mover control? And also explain the basic structure of prime mover and energy supply system.   **09**
        b) Explain D-Q transformation using $\alpha - \beta$ variables.   **09**

Q.4 **a)** Explain the effect of change in excitation on stability.   **09**
        b) Explain the effect of change in prime mover input on synchronous generator connected to infinite bus bar by keeping field excitation constant.   **08**
                                        OR
        b) Write the advantage of the unit-exciter scheme over the common exciter bus scheme.   **08**

| Seat No. | | Set | P |

ME (Semester-I) (CBCS/CGPA) Examination Dec-2019
Electrical Engineering
D.C. DRIVES

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

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

Section – I

Q.1 Attempt all

  a) Draw and explain speed torque characteristics single phase full wave half control converter fed dc drive in continues and discontinues mode for various value of firing angle.   **08**

  b) Draw the speed torque characteristics of separately exited dc motor in constant torque and constant hp region.   **09**

OR

A 220 V ,1500 rpm ,10 A separately exited dc motor is fed from single phase full wave half controlled rectifier with an AC source voltage of 230 V , 50 Hz , R_a = 2 Ohm , conduction can be assume to be Continuous.
Calculate firing angle for:
1) Half the rated motor torque and 1000 rpm
2) Rated motor torque And 500 rpm

Q.2 Solve any two questions from the following   **18**

  a) Derive condition for steady state stability of operating point of motor load combination.

  b) How 4 quadrant operation of dc motor is obtained with single unit of full control converter?

  c) Draw circuit schematics for following,
     1) 3-phase converter fed single quadrant drive
     2) 3-phase converter fed four quadrant drive

Section – II

Q.3 Attempt all

  a) Compare the circulating current mode and circulating current free mode in case of dual converter fed dc drive.   **08**

  b) Draw the block diagram speed control drive & state the application of speed control drive.   **09**

OR

Explain with neat Circuit diagram operation of two quadrant chopper fed dc drive.

Q.4 Solve any two questions from the following   **18**

  a) Why performance chopper fed dc drive is better as compare to converter fed dc drive?

  b) Draw the waveform of armature voltage and armature current for single quadrant chopper fed dc drive.

  c) Draw the block diagram closed loop speed control drive operate in Constant torque and Constant HP region.

Seat No.

Set **P**

ME (Semester – I) (CBCS/CGPA) Examination Dec- 2019
Electrical Engineering
CONTROL ENGINEERING

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

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

Section – I

Q.1 Attempt any four.   24
   a) What are the different kinds of control systems? Explain in detail.
   b) Explain with the aid of a sketch, the construction and operation of a linear variable differential transformer (LVDT).
   c) Explain the characteristics of the proportional controller.
   d) Explain the effect of feedback on system sensitivity in control systems.
   e) Derive an expression for the transfer function of an armature controlled dc servo motor.

Q.2 Attempt any one.   11

   a) Obtain the transfer functions for the following mechanical translational systems.
      1)   2)
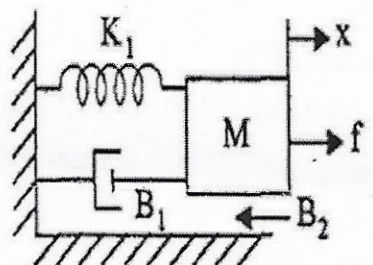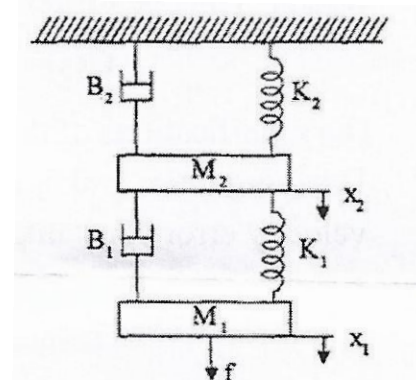
Fig. (a)   Fig. (b)

   b) Using appropriate diagrams, give the constructional and operational features of a hydraulic actuator. Derive the transfer function of the actuator.

Section – II

Q.3 Attempt any four.   24

   a) State space representation of speed control system.
   b) Explain the performance specifications in frequency domain.
   c) Obtain the state-space representation of the systems using controllable canonical form
      1) $\dfrac{2}{s^3 + 2s^2 + 4s + 8}$
      2) $\dfrac{10(s + 4)}{s(s + 1)(s + 3)}$

d) A unity feedback system is characterized by the open loop transfer function

$G(s) = \dfrac{10}{s(0.1s+1)(0.5s+1)}$

    1) Determine the steady state errors to unit step, unit ramp and unit parabolic inputs.

    2) Determine the rise time, peak time, peak overshoot and settling time of the unit step response of the system.

e) Determine the centroid, angle of asymptotes, breakaway points, angles of departure, value of K and crossing point on jw- axis for the system,

$G(s)H(s) = \dfrac{K}{s(s + 4)(s + 11)}$

Q.4 Attempt any one.   **11**

a) The block dia. of fig.(c) shown below represents a position control system. The open-loop transfer function of the uncompensated system is

$$G(s) = \dfrac{k}{s(s + 1)(s + 4)}$$

The specifications of the system are as follows:

Damping ratio, $\xi = 0.5$, undamped natural frequency, $\omega_n = 2\,\text{rad/sec}$, velocity error constant, $K_v \geq 5\,\text{sec}^{-1}$
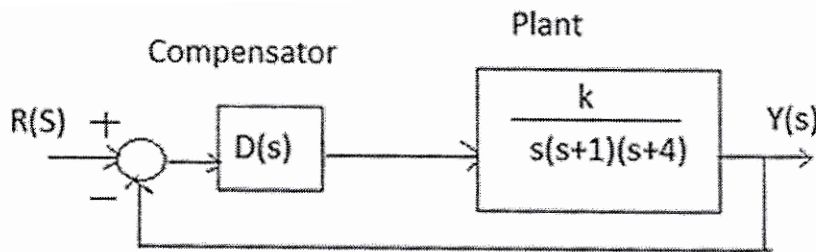
fig. (c)

b) Explain the concept of controllability and abservability. Detemine whether the following systems are completely state controllable and observable using

1)

$\dot{X} = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -6 & -11 & -6 \end{bmatrix} X + \begin{bmatrix} -1 \\ 1 \\ 1 \end{bmatrix} U$ $Y = \begin{bmatrix} 1 & 1 & 0 \end{bmatrix} X$

2)

$\dot{X} = \begin{bmatrix} 2 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 3 & 1 \end{bmatrix} X + \begin{bmatrix} 0 & 1 \\ 1 & 0 \\ 0 & 1 \end{bmatrix} U$ $Y = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \end{bmatrix} X$

Seat No.	

ME (Semester- I) (CBCS/CGPA) Examination Dec-2019
Electrical Engineering
EXTRA HIGH VOLTAGE TRANSMISSION SYSTEMS

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

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

Section – I

Q.1 **Attempt the following questions.**
     a) Explain about basic engineering aspects in ehv ac transmission.   **08**
     b) Explain the need of Bundled conductors for EHV AC lines.   **09**
                                   OR
     Derive Maximum Surface Voltage Gradients for $N \geq 3$.

Q.2 **Attempt any two of the following questions.**   **18**

     a) A power of 12000 MW is required to be transmitted over a distance of 1000km. At voltage levels of 400kv, 750kv, 1000kv, and 1200kv determine.
        1) Possible no of circuits required with equal magnitudes for sending and receiving end voltages with 30° phase difference;
        2) The currents transmitted and
        3) The total line losses.

     b) Explain the relation between the temperature rise and current carrying Capacity of EHV- AC line.

     c) Derive an expression for Maximum Charge Condition on a 3-Phase Line.

Section – II

Q.3 **Attempt the following questions.**

     a) Explain if the Transmission line is Open-Ended and is excited when Double-exponential wave response.   **08**
     b) Explain the lightning stroke mechanism.   **09**
                                     OR
     What is the purpose and significance of power circle diagram and its uses and also explain in detail the receiving end circle diagram for calculating reactive compensation for voltage control buses?

Q.4 **Attempt any two of the following questions.**   **18**

     a) Obtain the time function of open end voltage equation using step response considering:
        1) Omit losses
        2) Omit only g

     b) Explain different type of lightning arresters and protective characteristics.

     c) Derive the generalized constants of a distributed parameter transmission line.

Seat No.

ME (Semester-I) (CBCS/CGPA) Examination Dec-2019
Mechanical – (Manufacturing Engineering)
MATERIAL REMOVAL PROCESSES

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

Instructions: 1) Solve any three questions from Q.1 to Q.4.
               2) Q.5 is compulsory.
               3) Make suitable assumptions, if required and state them clearly.

Q.1 **a)** During orthogonal cutting a bar of 90 mm diameter is required to 87.6 mm. **10**
If the mean length of the cut chip is 88.2 mm and rake angle is 15^0.
Calculate:
1) Cutting ratio
2) shear angle

     b) Explain in brief factors influencing formation of various type of chips. **08**

Q.2 **a)** Following data relate to an orthogonal cutting process. **10**
1) Depth of cut=0.3 mm
2) Chip thickness = 0.85 mm
3) Breadth of cut = 2.5 mm.
4) Tool rake angle = 10^0 (ten degree)
5) Tangential force = 900 N
6) Feed force = 450 N
      Determine
       i) Coefficient of friction between the tool and chip
       ii) Ultimate shear stress of the work material

     b) Give the broad classification of fluids and explain them briefly. **08**

Q.3 **a)** How to determine the design of active grains and explain in brief about **10**
testing of grinding wheel.

     b) Name the abrasives and currier gases used in AJM. Write the application **08**
of AJM.

Q.4 **a)** What is the principle of EDM? Explain the function of the dielectric fluid in **10**
EDM.

     b) Explain in brief about ECM. **08**

Q.5 **Write short notes. (Any two)** **16**
     a) Grinding wheel
     b) Ultrasonic machining
     c) Tool life and wear

Seat No.

Set **P**

ME (Semester- I) (CBCS/CGPA) Examination Dec-2019
Mechanical – (Manufacturing Engineering)
CNC AND ADAPTIVE CONTROL

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

Instructions: 1) Q. No. 3 & Q. 6 are compulsory.
2) Solve any one questions from each section.
3) Figures to the right indicate full marks.
4) Assume additional suitable data, if necessary and mention it clearly.

Section – I

Q.1	**a)**	What are the functions of interpolators and Explain the different types of interpolators.	**10**
	b)	Discuss the accessories for a CNC milling centre.	**07**
Q.2	**a)**	Explain the significance of feedback system in CNC system. Discuss the different types of closed loop systems in CNC.	**10**
	b)	Explain the features of a modern CNC system.	**07**
Q.3		**Write short notes on. (any three)**	**18**
	a)	CNC turret punch press	
	b)	ATC	
	c)	Components of a NC system	
	d)	Speed sensors	

Section – II

Q.4	**a)**	Explain the part programming process in detail.	**10**
	b)	"CNC plays vital role in CIM Scenario" - Discuss.	**07**
Q.5	**a)**	Explain adaptive control with suitable example.	**09**
	b)	Discuss the fundamental requirements of a NC part program.	**08**
Q.6		**Write short note on (any three)**	**18**
	a)	Installation of CNC system	
	b)	Solids based part programming	
	c)	Verification of CNC programs	
	d)	Computer assisted part programming	

Seat No.

Set **P**

ME (Semester – I) (CBCS/CGPA) Examination Dec-2019
Mechanical – (Manufacturing Engineering)
ADVANCED JOINING TECHNOLOGY

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

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

Q.1	**a)**	Explain in brief the principles of welding design.	07
	b)	Give comparison of welding and allied joining processes.	07
Q.2	**a)**	List the factors which affect the selection of electrodes for electric ARC welding.	07
	b)	Explain briefly soft soldering and hard soldering.	07
Q.3	**a)**	What points should be kept in view to avoid the weld defects? Name the common welding troubles.	07
	b)	Explain about diffusion welding and applications of diffusion welding.	07
Q.4	**a)**	Explain in brief about testing and inspection of welded joints.	07
	b)	What is weld ability? Explain in brief about weld ability of various metals.	07
Q.5	**a)**	Explain in brief about LASER beam welding.	07
	b)	Explain in brief about electron beam welding.	07
Q.6	**a)**	What are the various welding processes for plastics depending upon the source of heat?	07
	b)	What do you know about adhesive bonding? State its advantages and disadvantages.	07
Q.7	**Write short notes. (any two)**		14
	a)	Metallurgy of welding	
	b)	USW	
	c)	Classification of metal joining processes	

Seat No.

Set **P**

ME (Semester- I) (CBCS/CGPA) Examination Dec 2019
Mechanical – (Manufacturing Engineering)
MACHINE TOOL DESIGN

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

Instructions: 1) Q. No. 2 and Q. No. 6 are compulsory. Solve any one from remaining question from each section.
2) Draw meaningful sketches wherever necessary in pencil only.
3) Figures to the right indicate full marks.

Section – I

Q.1	a)	What are the essentials of Machine Tools? Explain.	05
	b)	Explain in detail the criteria for the selection of operating capacity and design parameters.	12
Q.2	a)	Explain the general requirements machine tool drives in detail.	08
	b)	Explain in detail the stepped and step-less drive.	10
Q.3	a)	Derive an expression for deflection of spindle axis due to compliance of spindle support.	10
	b)	Explain in detail the design criteria of slide-ways.	07

Section – II

Q.4	a)	Explain design of beds.	07
	b)	State and explain various column sections with their application. Explain design of columns.	10
Q.5	a)	What are Micro-feeding mechanisms? Enlist the different Micro-feeding mechanisms. Explain in detail any one Micro-feeding mechanism.	07
	b)	Explain in brief the concepts of aesthetic and ergonomics applied to machine tools.	10
Q.6	a)	Write a note on the CAD techniques used for machine tool design.	08
	b)	Explain machine tool conditioning procedure in details.	10

Seat No.		Set	P

ME (Semester – II) (CBCS/CGPA) Examination Dec-2019
Mechanical – (Manufacturing Engineering)
METAL FORMING PROCESSES

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

Instructions: 1) Q. No. 1 is compulsory. And solve any one question from section – I.
                 2) Q. No. 4 is compulsory. And solve any one question from section – II.
                 2) Figures to right indicate full marks.
                 3) Assume suitable data if necessary and state it clearly.

Section – I

Q.1 a) Explain the classification of metal forming processes in detail with neat sketches. **10**

    b) Explain the von mises criteria for isotropic material with assumptions. **08**

Q.2 a) Explain the properties of cold forming with advantages and limitations. **09**

    b) What is cold forming? Explain with suitable example. **08**

Q.3 a) What are slip lines? What are Henkey's stress equation along slip line? **09**

    b) State upper bound theorem and explain its various terms. **08**

Section – II

Q.4 a) Explain the hydrostatic extrusion process. **08**

    b) A rectangular disc is forged between two flat dies. Describe how the metal flow? **10**
Sketch the resulting shapes of the disc after forging. How these shapes would change if height of specimen is increased from strip to rectangular block?

Q.5 a) Explain lubrication in Extrusion. **08**

    b) Explain the term barreling and bulging in connection with forging of Non-circular shapes between two flat dies. **09**

Q.6 a) What is isothermal forging? Explain the significance of it. **09**

    b) Explain near-net-shape manufacturing. **08**

Seat No.		**Set**	**P**

ME (Semester-II) (CBCS/CGPA) Examination Dec-2019
Mechanical – (Manufacturing Engineering)
FINITE ELEMENT METHOD

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

Instructions: 1) Q.No-3 and Q.No.4 from section-I compulsory. Solve any one questions out of remaining two question from section-I.
2) Q.No-7 and Q.No.8 from section-II compulsory. Solve any one questions out of remaining two question from section-II.
3) Make suitable assumptions if necessary and state them clearly.

Section – I

Q.1	**a)**	Using potential energy method to derive the element stiffness matrix and element equation for a simple bar element.	**06**
	b)	Distinguish between Galerkin & Ritz method.	**05**
Q.2	**a)**	Explain Software used in FEM.	**05**
	b)	Find the approximate solution of differential equation of cantilever beam subjected to uniform axial load using weighted residual method.	**06**
Q.3	a)	Explain steps involved in finite element Method.	**06**
	b)	Compare finite element method and exact solution.	**06**
Q.4	**Write short note on (attempt any two)**		**12**
	a)	Discritization of Finite element problem	
	b)	Characteristics of shape function	
	c)	Weighted Residual Technique	

Section – II

Q.5	**a)**	Explain different types of elements used in FEM and how to select them for different applications.	**05**
	b)	Explain modeling procedure of Drilling operations in manufacturing using finite element method along with its application.	**06**
Q.6	**a)**	Describe 1 -D,2-D and 3-D elements.	**05**
	b)	Discuss in brief dynamic analysis in finite element method.	**06**
Q.7	**a)**	Explain Local ,Global and natural coordinate system.	**06**
	b)	Using Lagrangian Polynomial find shape function for two noded and three noded bar element. Plot the variation of shape function.	**06**
Q.8	**Write short note on (attempt any two)**		**12**
	a)	Formulation of Isoparametric Elements	
	b)	Structural beam , plate and shell element	
	c)	Applications of FEM in axisymmetric field problem	

Seat No.		Set	P

ME (Semester-II) (CBCS/CGPA) Examination Dec-2019
Mechanical – (Manufacturing Engineering)
QUALITY CONTROL AND RELIABILITY

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

Instructions*:* 1) Attempt any five full questions.
2) Figures to right indicate full marks.
3) Make suitable assumptions, if required and state them clearly.

Q.1		What is Quality? What are the dimensions of quality? Discuss Juran's quality trilogy.	**14**
Q.2	a)	Explain TQM Philosophy & Explain TQM axioms.	**07**
	b)	Classify Quality Cost.	**07**
Q.3	a)	Discuss statistical process control charts in detail.	**07**
	b)	Compare six-sigma with specification limits. Explain OC curve.	**07**
Q.4		Explain Quality Function Deployment (QFD) in detail.	**14**
Q.5	a)	What is hypothesis testing? Explain it by taking suitable example.	**07**
	b)	How do you interpret the control charts?	**07**
Q.6	a)	What is reliability? Explain bath tub curve.	**07**
	b)	How to calculate system reliability?	**07**