B.Tech.(VI Sem.)(R14) Suppl.

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)

B.Tech. (VI Semester)(R14) Supplementary Examinations, October 2020

A.Y. 2019-20

TIME TABLE

TIME : 02.00 PM - 05.00 PM

DATE	ASE	CE	CSE	ECE	EEE	EIE	IT	ME
12-10-2020 (Monday)	S360 - Propulsion-II	S185 - Design of Steel Structures	S415 - UML Design	S131 - Antennas and Wave Propagation	S213 - Electrical Distribution Systems	S333 - Opto Electronics and Laser Instrumentation	S288 - Image Processing	S259 - Heat Transfer
13-10-2020 (Tuesday)	S120 - Aircraft Stability and Control	S420 - Waste Water Engineering	S163 - Compiler Design	S194 - Digital Systems Design using Verilog	S345 - Power System Analysis	S325 - Object Oriented Programming using Java	S163 - Compiler Design	S292 - Machine Design–II
14-10-2020 (Wednesday)	S250 - Finite Element Method	S421 - Water Resources Engineering	S425 - Web Technologies	S179 - Data Structures and Object Oriented Programming	S313 - Microprocessors and Microcontrollers	S129 - Analytical Instrumentation	S425 - Web Technologies	S317 - Modern Machining Processes
15-10-2020 (Thursday)	S303 - Mechanics of Composites	S256 - Geo Technical Engineering–II	S272 - Information Security	S419 - VLSI Design	S429 - Optimization Techniques in Engineering	S334 - P. C. Based Instrumentation	S177 - Data Mining and Data Warehousing	S372 - Robotics
16-10-2020 (Friday)	S283 - Introduction to Space Technology	S413 - Transportation Engineering–II	S200 - Distributed Operating Systems	S190 - Digital Image Processing / S307 - Medical Electronics / S311 - Micro Electro Mechanical Systems	S105 - Advanced Electrical Machines / S278 - Intelligent Control Systems	S416 - Virtual Instrumentation / S274 - Instrumentation and Control in Petro chemicals Industries	S383 - Software Testing Methodologies	S302 - Mechanical Vibrations / S414 - Tribology
17-10-2020 (Saturday)	S260 - Helicopter Aerodynamics / S114 - Aero Elasticity	S435 - Matrix Methods of Structural Analysis / S437 - Repair and Rehabilitation of Structures	S137 - Artificial Intelligence	S229 - Embedded Systems Design / S176 - Data Communications / S363 - Radio Frequency Integrated Circuits	S199 - Distributed Generation / S261 - High Voltage Engineering	S139 - Automation Industrial Process / S279 - Intelligent Instrumentation	S152 - Business Intelligence and Big data	S141 - Automobile Engineering

NOTE:
(i) Any omissions or clashes in this time table may please be informed to the Controller of Examinations immediately.
(ii) Even if government/JNTUK/College declares holiday on any of the above dates, the examinations shall be conducted as notified only.
(iii) For any clarification in respect of the above examinations, please contact the Controller of Examinations.

Date: 30-09-2020

CONTROLLER OF EXAMINATIONS

PRINCIPAL

Copy to: 1. All H.o.Ds for N.A.   2. All Notice Boards

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B.Tech. VI Semester ~~Regular~~/Supplementary Examinations

S360-PROPULSION-II
(AE)

Time : 3 hours   Max.Marks : 75

PART-A
(Compulsory question)

Q.No	Questions	Marks	CO	BL
1(a)	What is subcritical operation in Ramjet?	1M	CO1	L1
(b)	Define specific impulse of rocket.	1M	CO2	L2
(c)	What is meant bynon Hypergolic propellants?	1M	CO3	L1
(d)	What is meant by double base propellants?	1M	CO4	L1
(e)	Explain Electrostatic propulsion.	1M	CO5	L2
(f)	Consider an ideal ramjet flying at a Mach 1.2 at ambient temperature of 250K. The exhaust gases are optimally expanded and leave the engine at a temperature of 1000K. What is specific thrust obtained by the engine? Assume specific heat ratio is constant.	2M	CO1	L3
(g)	A rocket has a chamber pressure of 100 bar and chamber temperature of 3000K. The ambient pressure at 1 bar. Assume Cp=1 KJ/Kg-k. Calculate exit static temperature in K.	2M	CO2	L3
(h)	Explain Storable liquid propellants.	2M	CO3	L2
(i)	What are the different types of combustion instabilities in solid rocket motor?	2M	CO4	L1
(j)	What are the various electrostatic propulsion systems?	2M	CO5	L1

PART-B
(Answer any FOUR questions. All questions carry equal marks)

Q.No	Questions	Marks	CO	BL
2(a)	Compare the general features of a turbojet, ramjet and scramjet.	7M	CO1	L2
(b)	Write short notes on the following with respect to the ramjet engines: (i) Net thrust (ii) Effective jet velocity.	8M	CO1	L1
3(a)	Compare between air-breathing engine and rocket engine. How rockets are classified?	7M	CO2	L2
(b)	Derive a expression for the effective jet velocity produced by a chemical rocket.	8M	CO2	L3

4(a)	Elaborate different pressure feed systems in LPRE with a flow chart.	7M	CO3	L6
(b)	Classify various types of propellant tanks used in liquid propellantrocket engine.	8M	CO3	L4
5(a)	Evaluate the criteria of selection of solid propellants?	7M	CO4	L5
(b)	Illustrate various grain configurations used in solid-propulsion motors with the help of diagrams.	8M	CO4	L2
6(a)	Mention the various advanced propulsion systems with its classification.	7M	CO5	L2
(b)	Identify the principle involved in electric propulsion and mention its advantages and applications.	8M	CO5	L3
7.	A rocket projectile has the following characteristics: Initial weight = 200lb, Weight after rocket operation = 130 lb, Payload, non-propulsive structure etc. = 110 lb, Rocket operating duration = 3 sec, Average specific impulse of propellant = 240 sec. Determine mass ratio, propellant mass fraction, propellant flow rate, thrust, specific propellant consumption.	15M	CO2	L5
8(a)	Construct two types of igniters used in solid rocket motor with a neat sketch.	7M	CO4	L6
(b)	Mention any 8 solid propellant characteristics.	8M	CO4	L2

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B.Tech. (VI Semester) ~~Regular~~/Supplementary Examinations

S120-AIRCRAFT STABILITY AND CONTROL
(AE)

Time : 3 hours

Max. Marks : 75

PART-A
(Compulsory question)

1(a)	What is the meaning of static margin?	[1M]
(b)	What is the meaning of High-wing configuration?	[1M]
(c)	What the strongest aircraft control among elevator, aileron and rudder?	[1M]
(d)	What is the meaning of undamped oscillations?	[1M]
(e)	What is the nature of dynamic system "If all the numbers of the first column in the Routh's array have the same sign, then the roots of the characteristic polynominal have negative real parts"?	[1M]
(f)	What is horizontal tail volume ratio?	[2M]
(g)	How does the rolling moment create due to the deflection of ailerons?	[2M]
(h)	Explain the airplane behavior in the case of one engine inoperative condition.	[2M]
(i)	Define dynamics stability of a system.	[2M]
(j)	What are roots of spring mass damper system in terms of undamped natural frequency (ω_n) and damping ratio (ζ)?	[2M]

PART-B
(Answer any FOUR questions. All questions carry equal marks)

2(a) It is known that if angle of attack of airplane is increased, the pitching moment about center of gravity becomes negative and the airplane is no longer trimmed. What would be the philosophy to achieve steady level equilibrium flight at any other angle of attack? [7M]

(b) Derive the expression for elevator angle to trim. The total pitching moment coefficient about the center of gravity for the complete airplane is as given below.

$$C_{M_{cg}} = C_{M_{ac_{wb}}} + C_{L_{wb}}(h - h_{ac_{wb}}) - V_H C_{L_t}$$

[8M]

3(a) Discuss the contribution of various parts of an airplane to the rolling moment. [7M]

(b) What is the function of aileron? Discuss the functions of various types of ailerons. Write short notes on aileron reversal and aileron reversal speed. [8M]

4(a) Explain the control of airplane in the case asymmetric power and control of adverse yaw. [7M]

(b) Explain the need for rudder deflection in a steady level coordinated turn. [8M]

5(a) The longitudinal motion of an airplane is described by the following characteristics equation $\lambda^4 + 5.05\lambda^3 + 13.15\lambda^2 + 0.6735\lambda + 0.593 = 0$. Determine the roots of this equation. [7M]

(b) Find out the period, time and number of cycles of half the amplitude from the roots of the above characteristic equation. Identify the phugoid mode of oscillation and short period oscillation from the roots of the above equation. [8M]

6(a) Consider the motion referred to an orthogonal axis set (oxyz) with the origin 'o' coincident with the center of gravity of the aircraft. The components of velocity and force along the axes ox, oy and oz are denoted (u, v, w) and (X, Y, Z) respectively. The components of angular velocity and moment about the same axes are denoted (p, q, r) and (L', M, N) respectively. The pitch angle is 'θ' and the bank angle is 'φ'. The yawing moment of an aircraft is as given below

$$N = -I_{xz}\dot{p} + I_z\dot{r} + pq(I_y - I_x) + I_{xz}qr$$

Applying the small disturbance theory, show that the linearized yawing moment equation as

$$-N_v\,\Delta v - \left(\frac{I_{xz}}{I_z}\frac{d}{dt} + N_p\right)\Delta p + \left(\frac{d}{dt} - N_r\right)\Delta r = N_{\delta a}\,\Delta\delta_a + N_{\delta r}\,\Delta\delta_r$$

Assume that ΔN is a function of v, p, r and δ_r (change in rudder angle) and δ_a (change on aileron angle). [7M]

(b) Explain Dutch roll mode of motion and Spiral mode of motion of an aircraft of an aircraft with suitable diagrams. [8M]

7(a) Write short notes on a) statically stable b) statically unstable and c) neutral stability with relevant examples. [7M]

(b) Compare and discuss the aft tail and canard (forward tail) aircraft stability issues. [8M]

8(a) Write short notes on phugoid mode of motion and short period mode of motion of an airplane. An airplane in level flight encounters a vertical gust, which excites the phugoid mode. The phugoid motion completes 10 cycles in 50 s and its amplitude reduces to half of its maximum value in 25 s. Find out the relevant complex roots of this airplane which represents phugoid mode of motion. [7M]

(b) Explain the Routh's criteria in dynamic stability. [8M]

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B.Tech. ~~VI~~ Semester ~~Regular~~/Supplementary Examinations

S250-FINITE ELEMENT METHOD
(A S E)

Time : 3 hours   Max.Marks:75

PART-A
(Compulsory question)

1(a) Write the relationship between Shear modulus, Young's modulus and Poisson's ratio. [1M]
  (b) What is node? [1M]
  (c) What is Degree of Freedom? [1M]
  (d) Write the mass matrix, m^e for Axisymmetric triangular element. [1M]
  (e) Write the mass matrix, m^e for beam element. [1M]
  (f) What is Plane Strain Problem? [2M]
  (g) What is Dirichlet Boundary condition? [2M]
  (h) What is the area of the triangular element? [2M]
  (i) Write one-dimensional steady heat conduction equation. [2M]
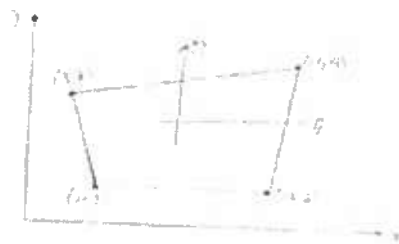 (j) Write the shape function in matrix form [N], for quadrilateral element. [2M]

PART-B
(Answer any FOUR questions all question carry equal marks)

2   What is Shape function? Derive the shape function for a line element in generalized coordinates and natural coordinates. [15M]

3(a) Derive the element stiffness matrix for a Constant Strain Triangle Element (CST). [7M]
  (b) Derive the body force vector (f) for a Constant Strain Triangular Element. [8M]

4(a) Find the Jacobian determinant [J] of the two dimensional element shown in Figure1.

[7M]

  (b) Four noded quadrilateral element is shown in Figure 2, the nodal displacements vector is given by $Q= [0, 0, 0.15, 0.10, 0.10, 0.125, 0.20, 0]^T$ cm. Find X & Y coordinates of a point 'P' whose location in the element is given by $\xi=0.5\ \eta=0.5$.
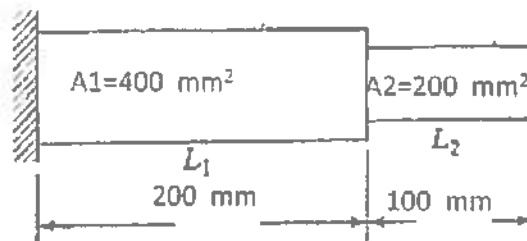

[8M]

5   A uniform circular fin of diameter *2 cm* is extended from the surface as shown in the Figure 3 whose temperature *T1* is *170°C*. The convection takes place from the surface on the top of the fin. Assume *k=14 w/m °C* and T_∞*=25 °C* and *h=25 w/m²°C*. Find the temperatures *T2* and *T3*.

[15M]

6   Evaluate the Eigen values and Eigen vectors for the stepped bar as shown in the Figure 4. Take *E=200GPa* and specific weight= *7850 kg/m³*.

[15M]

7(a) What are the steps involved in Finite Element Analysis.   [7M]
 (b) Write the Stiffness matrix and Shape functions in Generalized coordinates and in natural coordinates for a 2-D Beam Element.   [8M]

8(a) Derive the elemental mass matrices for Axisymmetric element and line element.   [7M]
 (b) Explain basic types of boundary conditions can be used in FEM.   [8M]

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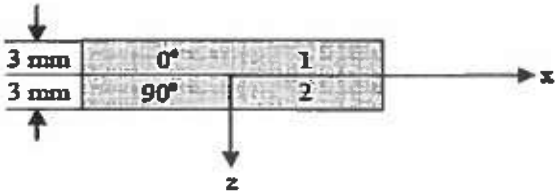### S303-MECHANICS OF COMPOSITES
(AE)

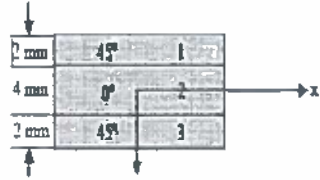Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

Q.No	Questions	Marks	CO	BL
1(a)	Define fiber and aspect ratio.	1M	CO1	L1
(b)	Define macro mechanics.	1M	CO2	L1
(c)	Define angle-ply laminate.	1M	CO3	L1
(d)	List out the materials used for core of sandwich.	1M	CO4	L1
(e)	List out the Resin transfer molding processes.	1M	CO5	L1
(f)	Explain about core shear failure.	2M	CO1	L2
(g)	Explain rule of mixture.	2M	CO2	L2
(h)	Explain stiffness matrix[A].	2M	CO3	L2
(i)	Explain local indentation with neat sketch.	2M	CO4	L2
(j)	List the lay-up fabrication processes.	2M	CO5	L1

PART-B
(Answer any FOUR questions. All questions carry equal marks)

2(a)	Derive the material stiffness matrix Q for a fiber reinforced lamina in terms of elastic constants in principal material direction using generalized Hooke's law.	8M	CO1	L3
(b)	Classify the fibrous composite materials and explain.	7M	CO1	L2
3(a)	Evaluate the four stiffness invariants for a graphite/ epoxy angle lamina. The engineering constants for the lamina are E_1 = 181 GPa, E_2 = 10.3 GPa, μ_{12} = 0.28, G_{12} = 7.17 GPa.	7M	CO2	L4
(b)	Derive the Elastic constants(G_{12} & μ_{12}) by using mechanics of materials approach to stiffness.	8M	CO2	L3
4(a)	Analyze the laminate and find stiffness matrix [A] for the laminate as shown in the figure. Assume stiffness matrix Q as follows:	7M	CO3	L4

$$[\bar{Q}]0 = [Q] = \begin{bmatrix} 13 & 2.5 & 0 \\ 2.5 & 1 & 0 \\ 0 & 0 & 3.5 \end{bmatrix} \text{ GPa}$$

(b)	Prove that the coupling stiffness matrix [B] is zero for symmetric laminate.	8M	CO3	L4
5(a)	Explain the following failure modes in sandwich composite material (i) Local crushing of core (ii) General buckling (iii) Shear crimping (iv) Face wrinkling.	7M	CO4	L2
(b)	Explain the materials used for sandwich construction.	8M	CO4	L2
6.	Sketch the Filament winding process and explain also Describe the advantages and applications.	15M	CO5	L3
7(a)	Explain Resin Transfer Molding with neat sketch. Describe the advantages and limitations.	8M	CO5	L2
(b)	Describe the advantages and limitations of filament winding process.	7M	CO5	L2
8.	Analyze the laminate and find A, B, and D matrices for the 3-ply laminate as shown in the figure. Assume stiffness matrix Q as follows:	15M	CO3	L4

$$[Q]0 = \begin{bmatrix} 2 & 1.5 & 0 \\ 1.5 & 5 & 0 \\ 0 & 0 & 1.5 \end{bmatrix} GPa \qquad [Q]0 = \begin{bmatrix} 13 & 2.5 & 0 \\ 2.5 & 1 & 0 \\ 0 & 0 & 3.5 \end{bmatrix} GPa$$

For layers 1 and 3   For layer 2

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B.Tech. (VI Semester) ~~Regular/~~Supplementary Examinations

S283-INTRODUCTION TO SPACE TECHNOLOGY
(AE)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

Q.No	Questions	Marks	CO	BL
1(a)	What do you mean by radiation belts?	1M	CO1	L1
(b)	Write a short note on various orbital maneuvers.	1M	CO1	L1
(c)	State Ballistic Reentry.	1M	CO2	L1
(d)	Write a short note on steep ballistic reentry.	1M	CO2	L1
(e)	Explain how a battery is charged in satellite?	1M	CO3	L2
(f)	Explain in brief about space mission.	2M	CO1	L2
(g)	Write a short note on ground tracing.	2M	CO1	L1
(h)	How would you classify staging of rockets? Explain with neat sketches.	2M	CO2	L2
(i)	Explain with neat sketches the concept of Ballistic Orbital Re-entry.	2M	CO2	L2
(j)	Write a short note on various thrusters used in spacecraft stability.	2M	CO3	L1

PART-B
(Answer any FOUR questions. All questions carry equal marks)

2(a)	Explain in brief about various types of earth orbits with altitude ranges.	7M	CO1	L2
(b)	Distinguish between pump-fed rocket system and pressure feed rocket system in liquid rocket engine.	8M	CO1	L4
3(a)	Explain basic orbital elements. Also state kepler's laws of Planetary motion.	7M	CO1	L2
(b)	Distinguish between circular and elliptical orbital motion of a body in a non rotating reference frame with its origin at another body.	8M	CO1	L4
4(a)	Explain in brief about sounding rocket.	7M	CO2	L2
(b)	Compare series staged rockets with parallel staged rockets with neat sketch.	8M	CO2	L4
5(a)	Explain in brief about aero braking.	7M	CO2	L2
(b)	Distinguish between skip re-entry and double-dip re-entry for spacecrafts.	8M	CO2	L4
6(a)	Explain how magnetic desaturation is useful in controlling attitude of a spacecraft.	7M	CO3	L2
(b)	Distinguish between spin-stabilization and dual-spin stabilization attitude control mechanisms for spacecrafts.	8M	CO3	L4
7(a)	State and explain the various types of fuel injectors use in liquid rocket engine with neat sketch.	7M	CO1	L2
(b)	Compare the difference between bi-propellant and mono propellant rocket engines.	8M	CO1	L4
8(a)	Explain in brief about In-plane orbit change.	7M	CO1	L2
(b)	Derive an expression for two body motion in elliptic.	8M	CO1	L3

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B.Tech. (VI Semester) ~~Regular~~/Supplementary Examinations

S114-AEROELASTICITY
(AE)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

Q.No	Questions	Marks	CO	BL
1(a)	Define elastic axis.	1M	CO1	L1
(b)	_____ rigidity is considered in divergence of lifting surface.	1M	CO2	L1
(c)	The effectiveness of the aileron control may be expressed in terms of _____	1M	CO2	L1
(d)	Write the assumed mode of torsion of aeroelastic system.	1M	CO2	L1
(e)	_____ flutter is the result of flow separation.	1M	CO1	L1
(f)	What is response problem in aeroelastic system?	2M	CO2	L1
(g)	Define zero-lift line.	2M	CO1	L1
(h)	Define critical-aileron reversal speed.	2M	CO2	L1
(i)	What are the different method to identify the flutter velocity?	2M	CO2	L1
(j)	Give some typical examples of aeroelastic oscillations.	2M	CO1	L1

PART-B
(Answer any FOUR questions. All questions carry equal marks)

2(a)	Discuss about the importance of aeroelasticity in design process.	7M	CO1	L2
(b)	Derive the equations of motion of a cantilever beam subjected to coupled oscillation.	8M	CO1	L3
3(a)	Derive q_{div} using generalized coordinates.	7M	CO2	L3
(b)	Identify the U_{div} for a cantilever wing from $\dfrac{d^2\theta}{dx^2} = -\dfrac{aec^2}{GJ}q_{div}$ with general solution $\theta = A\sin\mu x + B\cos\mu x$.	8M	CO2	L4
4(a)	Identify the elastic efficiency for two-dimensional airfoil.	7M	CO2	L4
(b)	Derive total angle of rotation θ at x for a cantilever wing with aileron.	8M	CO2	L3
5(a)	Discuss about flutter control on a aeroelastic system.	7M	CO2	L2
(b)	Explain the methods of determining the critical speed of the aeroelastic system.	8M	CO2	L2
6(a)	Discuss about the galloping of transmission lines.	7M	CO1	L2
(b)	Explain the flow induced vibrations in suspension bridges.	8M	CO1	L2
7(a)	Identify q_{div} for the semirigid mode of the wing be defined by the function $f = \dfrac{y}{s}$.	7M	CO2	L4
(b)	Derive elementary beam theory.	8M	CO1	L3
8(a)	Explain aileron efficiency versus dynamic pressure with neat sketch for $q_{div} < q_{rev}$.	7M	CO2	L2
(b)	Identify the C_l and C_m using quasi-steady assumption.	8M	CO2	L4

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B.Tech. (VI Semester) Regular/Supplementary Examinations

S260-HELICOPTER AERODYNAMICS
(AE)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

1(a)	Recall Blade Loading.	[1M]
(b)	State ideal twist.	[1M]
(c)	Express Energy method.	[1M]
(d)	Define tilt wing	[1M]
(e)	Mention tip loss.	[1M]
(f)	Differentiate between fixed wing aircraft and rotary wing aircraft.	[2M]
(g)	List drawbacks of momentum theory.	[2M]
(h)	Remember "Weighting Curve".	[2M]
(i)	Classify propellers.	[2M]
(j)	Point out optimum hovering rotor.	[2M]

PART-B
(Answer any FOUR questions. All questions carry equal marks)

2.	Explain about collective and cyclic control mechanism and its usage.	[15M]
3.	Derive expression for induced & climb torque.	[15M]
4.	State rotor blade stall. Compare stall of a fixed wing aircraft and rotors.	[15M]
5.	Deduce equations for estimating the performance of rotor in vertical descent.	[15M]
6.	By using momentum theory show that $u = \sqrt{(T/2\rho \Pi R^2)}$.	[15M]
7.	Describe about various rotor systems.	[15M]
8.	Discuss about the effects of operating conditions on profile drag.	[15M]

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B.Tech. (VI Semester) ~~Regular~~/Supplementary Examinations

S185-DESIGN OF STEEL STRUCTURES
(CE)

Time : 3 hours   Max. Marks : 75

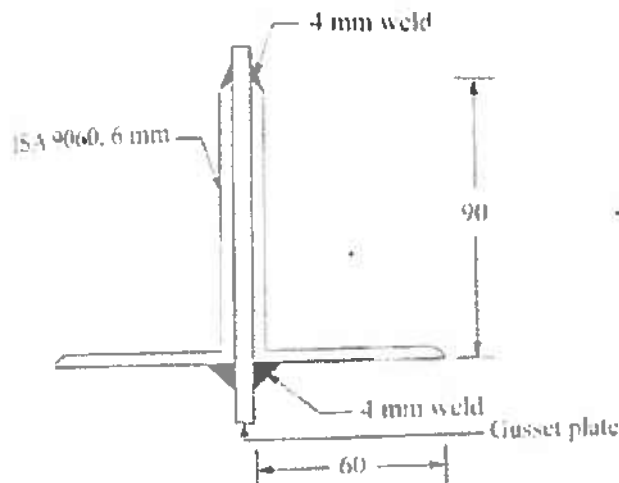**Note :** Steel Tables, IS 800:2007, IS 875 (Part-III) code books are permitted.

PART-A
(Compulsory question)

1(a)	Fillet welds are preferred compared to butt welds justify.	[1M]
(b)	Define shear lag.	[1M]
(c)	State the common aspect where column caps are similar to column base plates.	[1M]
(d)	What is meant by laterally unrestrained beam?	[1M]
(e)	List the types of roof trusses.	[1M]
(f)	Name the reasons; the riveted joints have lost their importance.	[2M]
(g)	Under what circumstance will block shear failure dominate.	[2M]
(h)	What is meant by batten?	[2M]
(i)	How the column buckling and the lateral buckling of beam similar?	[2M]
(j)	Write the different load combinations to be considered in the design of cladding trusses.	[2M]

PART-B
(Answer any FOUR questions. All questions carry equal marks.)

2. Two plates 16 mm are to be joined by using M20 bolt, grade 4.6 butt   [15M]
    joint using 10 mm cover plates. Determine the bolt value and find
    efficiency of bolts.

3. Design a tension member of a tensile strength of roof truss members
    2 ISA 90X60X6 mm connected to the gusset plate of 8 mm thickness by
    4 mm weld shown in figure. The effective length of weld is 200 mm.

[15M]

4. Design a laced column 10 m long to support a factored load of 1100 kN, the column is restrained in position but not in direction at both the ends. Design the column using ISMC channels placed back to back and also design the lacing system. [15M]

5. Design a laterally simply supported beam of effective span 1.5 m carrying a factored concentrated load of 360 kN at mid span. Section is stiff against bending. [15M]

6(a) A roof truss shed is to be built in Lucknow for an industry. The size of shed is 24 mX40 m. The height of building is 12 m at the eves. Determine the basic wind pressure. [8M]

   (b) A roof truss of size 18 mX30m set is to be built Jodhpur for an industrial use. The height of building is 10 m at the eves. Determine the basic wind pressure. [7M]

7. A column 4 m long has to support a factored load of 8000 kN. The column is effectively held at both ends and restrained in direction at one of the ends, f_y 250 N/mm², f_u 410 N/mm², E 2X10⁵ N/mm². Design the column using beam section and plates. [15M]

8. Design a laterally unrestrained beam to carry a UDL of 50 kN/m. The beam is unsupported for a length of 1.5 m and is simply supported placed on longitudinal beam at its ends. [15M]

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B.Tech. (VI Semester) ~~Regular~~/Supplementary Examinations
S420-WASTE WATER ENGINEERING
(CE)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

Q.No	Questions	Marks	CO	BL
1(a)	Define Sewage.	1M	CO1	L1
(b)	What is meant by Oxygen deficit?	1M	CO2	L1
(c)	Identify the various types of treatments.	1M	CO3	L3
(d)	Illustrate the characteristics of Sludge.	1M	CO4	L2
(e)	What is plumbing and its importance?	1M	CO5	L1
(f)	What are the advantages of Combined system?	2M	CO1	L1
(g)	Define Aerobic and Anaerobic decomposition.	2M	CO2	L1
(h)	Write about Oxidation ditches.	2M	CO3	L1
(i)	Explain in brief about soak pit.	2M	CO4	L2
(j)	Write about factors to be considered in Building drainage system.	2M	CO5	L1

PART-B
(Answer any FOUR questions. All questions carry equal marks)

Q.No	Questions	Marks	CO	BL
2(a)	Explain in detail the various steps involved in hydraulic design of sewers.	7M	CO1	L2
(b)	A 30 cm diameter sewer an invert slope of 1 in 400 is flowing 1/3rd of the full depth. Calculate the velocity and the rate of flow in the sewer. Is it self-cleaning? Use n=0.015.	8M	CO1	L3
3(a)	Explain the four important tests that are carried out to know the characteristics of sewage.	8M	CO2	L2
(b)	If the 3 days 25^0 C B.O.D. of a sample of sewage is 200 mg/lit. What will be its 5 day 30^0 C B.O.D.?	7M	CO2	L3
4(a)	Interpret the layout of primary treatment unit operations of wastewater treatment plant.	7M	CO3	L2
(b)	Explain about methods of aeration for activated sludge process.	8M	CO3	L2
5(a)	What are the design criteria for design of septic tank?	7M	CO4	L4
(b)	Interpret anaerobic sludge digestion process with a neat diagram of digester.	8M	CO4	L2
6(a)	Demonstrate one and two pipe system of plumbing along with merits and demerits of each system.	8M	CO5	L2
(b)	Explain the sanitary fittings that are commonly used in buildings.	7M	CO5	L2
7(a)	Interpret the process flow diagram of high rate two stage trickling filter and discuss its function. Explain the importance of recirculation.	8M	CO4	L2
(b)	Write short note on i) Screening and ii) Grit chamber.	7M	CO3	L1
8(a)	Define the terms: BOD, COD and TOC. Discuss their importance in Sewage treatment.	7M	CO2	L1
(b)	Explain the basic mechanism of functioning of Anaerobic Digester with neat sketch.	8M	CO4	L2

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B.Tech. (VI Semester) ~~Regular~~/Supplementary Examinations

S421-WATER RESOURCES ENGINEERING
(CE)

Time : 3 hours

Max. Marks : 75

PART-A
(Compulsory question)

Q.No	Questions	Marks	CO	BL
1(a)	What is flow mass curve?	1M	CO1	L1
(b)	Draw elementary profile of a gravity dam.	1M	CO2	L1
(c)	What is a fish ladder?	1M	CO3	L1
(d)	What is canal lining?	1M	CO5	L1
(e)	Where is canal aqueduct adopted?	1M	CO4	L1
(f)	Write short notes on Galleries in gravity dams.	2M	CO1	L2
(g)	List types of spillway gates.	2M	CO2	L1
(h)	Explain significance of permissible Exit Gradient.	2M	CO3	L2
(i)	What do you understand by economic cross section of a canal?	2M	CO5	L2
(j)	Differentiate between head regulator and cross regulator.	2M	CO4	L4

PART-B
(Answer any FOUR questions. All questions carry equal marks)

2(a)	Explain how the storage capacity of a reservoir is fixed.	7M	CO1	L2
(b)	List out different causes of failure of earth dam and discuss them.	8M	CO1	L4
3(a)	A masonry dam 10 m high is trapezoidal in section with a top width of 1m and bottom width of 8.25m. The upstream face has a batter of 1:10. The water is stored up to 10m height. There is no downstream water. Find the factor of safety against overturning. Consider water force, self weight and full uplift pressure. Assume unit weight of masonry and water suitably.	7M	CO2	L4
(b)	Explain how force due to waves in a reservoir, can be found.	8M	CO2	L4
4(a)	The details of line diagram of a weir on permeable foundation has the following details Length of floor : 40 m Number of piles : 1 (Intermediate pile) Distance of Intermediate pile from upstream end : 10 m Depth of intermediate pile : 5 m Depth of water held on the upstream side : 4 m Draw the line diagram and find out the uplift pressure at 20 m from the downstream point using Bligh's theory.	7M	CO3	L4

(b)	Differentiate between weir and barrage. Explain with neat sketch.	8M	CO3	L4 L2
5(a)	Distinguish between ridge canal and contour canal with neat sketch.	7M	CO5	L4
(b)	Explain procedure of designing Sarda type fall.	8M	CO5	L2
6(a)	List out types of canal outlets and discuss them.	7M	CO4	L1 L2
(b)	Give design principles of aqueduct.	8M	CO4	L2
7(a)	Give definition sketch for zones of storage of a reservoir. Explain the terms : i) Dead storage ii) Useful storage iii) Surcharge storage: and iv) Bank storage.	7M	CO1	L1 L2
(b)	What are the measures to control seepage in earth dams? Explain them.	8M	CO2	L3
8(a)	Discuss the types of failure of a weir founded on a permeable foundation.	7M	CO3	L2
(b)	Design an irrigation channel based on Kennedy's theory with the following details Discharge : 60 cumec Bed Slope : 1 in 6000 Critical Velocity Ratio m : 1.05 Rugosity coefficient : 0.02	8M	CO5	L2

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B.Tech. (VI Semester) ~~Regular~~/Supplementary Examinations

S256-GEOTECHNICAL ENGINEERING-II
(CE)

Time : 3 hours   Max. Marks : 75
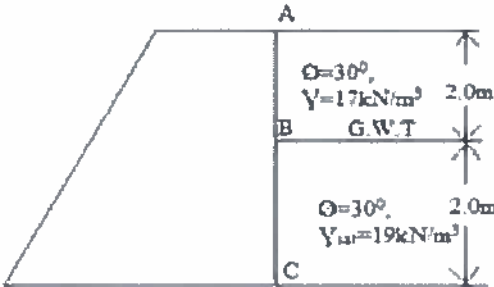
PART-A
(Compulsory question)

Q.No	Questions	Marks	CO	BL
1(a)	List out various types of open exploration methods.	1M	CO1	L1
(b)	State the general expression for ultimate bearing capacity of soils.	1M	CO2	L1
(c)	Classify the types of piles according to materials used.	1M	CO3	L1
(d)	Define earth pressure at passive condition.	1M	CO4	L1
(e)	State the units of circular frequency of motion.	1M	CO5	L1
(f)	Define area ratio and inside clearance of sampling.	2M	CO1	L1
(g)	State the limitations of Terzaghi's bearing capacity theory.	2M	CO2	L1
(h)	State an expression for load carrying capacity of piles according to Hilley.	2M	CO3	L1
(i)	Define depth of tensile crack. Write its formula.	2M	CO4	L1
(j)	List out various types machine foundations.	2M	CO5	L1

PART-B
(Answer any FOUR questions. All questions carry equal marks)

2.	Derive an expression for shear strength of soil by using vane shear test with neat sketch. A vane, 75mm overall diameter and 150mm high, was used in a clay deposit and failure occurred at a torque of 90 meter-Newton's. Compute untrained shear strength of clay.	15M	CO1	L5
3(a)	List out the various assumptions made in the derivation of Terzaghi's bearing capacity theory. Also discuss the effect of water table on the bearing capacity of the soil.	7M	CO2	L1
(b)	Compute the safe bearing capacity of footing of it is (i) square and (ii) circular. Assume that the water table is at greatest depth and the failure is general shear failure. Take $\emptyset=22^0$, $Y=18kN/m^3$, and $c=15kN/m^2$. $N_c=17.7$, $N_q=7.4$ and $N_Y=5.0$ Assume $D_f=1m$ and $B=1m$.	8M	CO2	L3
4(a)	Define the term "negative skin friction" in piles. Explain the causes of negative skin friction.	7M	CO3	L2
(b)	Explain the following formulae (i) Engineers News Record Formula (ii) Danish Formula.	8M	CO3	L2

5.	Determine lateral earth pressure at rest per unit length of the wall shown in fig.3 Also determine the location of the resultant earth pressure. Take $K_0=1-\sin\emptyset^1$ and $\Upsilon_w=10kN/m^3$.	15M	CO4	L3
6(a)	List out and explain the different factors of safety used in the stability of slopes.	7M	CO5	L2
(b)	A cutting of depth 10m is to be made in soil which has $c=30kN/m^2$, $\Upsilon=19kN/m^3$ and $\emptyset=0$. There is a hard stratum below the original soil surface at a depth of 12m. Find the safe slope of cutting if the factor of safety is 1.50. for $D_f=1.20$, $S_n=0.143$ for $i=30^0$ and $S_n=0.101$ for $i=15^0$.	8M	CO5	L3
7(a)	Explain the active and passive states of earth pressure acting on retaining wall.	7M	CO4	L3
(b)	Determine the active pressure by Rankine's theory per unit run for a retaining wall 4m high, with $i=15^0$, $\emptyset^1=30^0$ and $\Upsilon=19kN/m^3$. The back face of wall is smooth and vertical.	8M	CO4	L2
8(a)	Explain the following parameters: i) Free swell test ii) Differential swell test.	8M	CO5	L2
(b)	Explain the free vibration system with damping.	7M	CO5	L2

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B.Tech. (VI Semester) Regular/Supplementary Examinations

S413-TRANSPORTATION ENGINEERING - II
(CE)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

Q.No	Questions	Marks	CO	BL
1(a)	List out two advantages of Railways.	1M	CO1	L1
(b)	What are points?	1M	CO2	L1
(c)	Where is the location of principle signal?	1M	CO3	L1
(d)	What is the importance of airports in nation building?	1M	CO4	L1
(e)	Define a Harbor.	1M	CO5	L1
(f)	Classify different types of rails.	2M	CO1	L2
(g)	Classify different Layouts.	2M	CO2	L2
(h)	Relate BOT and BOLT.	2M	CO3	L2
(i)	Show a typical wind rose diagram.	2M	CO4	L2
(j)	Classify docks.	2M	CO5	L2

PART-B
(Answer any FOUR questions. All questions carry equal marks)

Q.No	Questions	Marks	CO	BL
2(a)	Distinguish different rail joints.	7M	CO1	L4
(b)	Appraise various components of a railway track on an embankment.	8M	CO1	L5
3(a)	Compare different types of layouts.	7M	CO2	L5
(b)	Explain the functioning of diamond crossing.	8M	CO2	L5
4(a)	Evaluate different signals.	7M	CO3	L5
(b)	Discuss different standards of interlocking.	8M	CO3	L6
5(a)	Explain step by step procedure to determine runway length.	7M	CO4	L5
(b)	Draw a typical layout Plan of airport terminal building and explain its functionality.	8M	CO4	L5
6(a)	Explain step by step procedure to carryout hydrographic surveys.	7M	CO5	L5
(b)	Discuss the functioning of various transit sheds.	8M	CO5	L6
7(a)	Identify different standards required for planning a typical airport.	7M	CO4	L3
(b)	Explain basic requirements of a good alignment.	8M	CO1	L5
8(a)	Examine the requirements of a typical harbor.	7M	CO5	L4
(b)	Explain the functions of a railway station.	8M	CO2	L5

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B.Tech. (VI Semester) ~~Regular~~/Supplementary Examinations

S437-REPAIR AND REHABILITAITON OF STRUCTURES
(CE)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

1(a)	Define Maintenance.	[1M]
(b)	Write the methods of corrosion protection.	[1M]
(c)	List the various types of polymer concrete.	[1M]
(d)	Write the methods of corrosion protection.	[1M]
(e)	What are the techniques required for repairing cracks?	[1M]
(f)	What are the steps in repair aspect?	[2M]
(g)	What is the effect of selecting poor quality material for construction?	[2M]
(h)	Define polymer partially impregnated concrete.	[2M]
(i)	Define grouting.	[2M]
(j)	Give short note on Jacketing.	[2M]

PART-B
(Answer any FOUR questions. All questions carry equal marks)

2. How sill level cracks are developed? What are the precautions required to arrest these cracks? Explain the various methods to be adopted to repair the re-cracks. [15M]

3(a) What is quality assurance in concrete construction? Discuss QA of concrete construction. [8M]
 (b) Briefly explain the defects due to climate, chemicals and temperature. [7M]

4. Write detailed note on:
 (i) Chemical coating
 (ii) Flexible and rigid coatings [15M]

5(a) Explain in detail about any two corrosion protection methods in detail. [8M]
 (b) Explain in detail various NDT tests for assessing corrosion potential of concrete. [7M]

6. Write in detail about thermal and shrinkage cracks. How is it eliminated in a building? [15M]

7. Describe in detail about various strengthening methods in concrete. [15M]

8(a) What are the checks you will make on the day of concreting to ensure quality? [8M]
 (b) Explain the need for evaluation of structures. [7M]

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B.Tech. (VI Semester) ~~Regular~~/Supplementary Examinations

S415-UML DESIGN
(CSE)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

Q.No	Questions	Marks	CO	BL
1(a)	What is an Aggregation relationship?	1M	CO1	L2
(b)	What is a stereotype?	1M	CO2	L2
(c)	What do you mean by forward engineering in UML?	1M	CO3	L2
(d)	When do we use include relationship?	1M	CO4	L3
(e)	Define thread.	1M	CO5	L2
(f)	How do you define Object Oriented Modeling?	2M	CO1	L2
(g)	Write syntax to represent operation in its full form in classes.	2M	CO2	L3
(h)	Write the notation for the following. i) Anonymous Object ii) Named Object	2M	CO3	L2
(i)	Differentiate Link and Connector.	2M	CO4	L4
(j)	Write the different types of Events.	2M	CO5	L2

PART-B
(Answer any FOUR questions. All questions carry equal marks)

2(a)	Give any three reasons which can justify the importance of modeling.	7M	CO1	L2
(b)	Explain the following common mechanisms with examples i) Adornments ii) Stereotype iii) Constraint iv) Tagged value.	8M	CO1	L2
3(a)	How to model single inheritance? Explain with an example.	7M	CO2	L3
(b)	What are the stereotypes that can be applied on dependency relationship between classes? How those relationships are used?	8M	CO2	L3
4(a)	Write the steps need to be followed to Forward engineer a class diagram. Transform the following Model into code through a mapping to Java/C++ language. EventHandler (Java) - currentEventID : Integer - source : Strings handleRequest() : void △ GUIEventHandler (Java)	7M	CO3	L3

(b)	Write the steps involved in modeling object structure in object diagram.	8M	CO3	L3
5(a)	How to model flows of control by time ordering when we model dynamic aspects of a system?	7M	CO4	L4
(b)	Design activity diagram for ATM System.	8M	CO4	L4
6(a)	Using examples, explain the parts of a State and advanced state along with UML notations.	7M	CO5	L3
(b)	Using examples, explain the parts of a Transition.	8M	CO5	L3
7(a)	Write the notations and the purpose of the following i) things ii) relationships	7M	CO1	L2
(b)	How to model a system from different views? What is the corresponding diagram needed to express model in different views?	8M	CO2	L3
8(a)	When and how the following are used in activity diagram? i) Activity ii) Branching iii) Synchronization bar iv) Swimlanes.	7M	CO4	L4
(b)	Define the following: i) Active Object ii) Active Class iii) Process iv) Thread	8M	CO5	L2

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B.Tech. (VI Semester) ~~Regular~~/Supplementary Examinations

S163-COMPILER DESIGN
(CSE & IT)

Time : 3 hours

Max. Marks : 75

PART-A
(Compulsory question)

1(a)	Define token, lexeme and pattern.	[1M]
(b)	Define top-down parsing.	[1M]
(c)	LR(0) stands for what?	[1M]
(d)	Define inherited attribute.	[1M]
(e)	What is Constant folding?	[1M]
(f)	Identify the tokens of the following statement. printf ("sum of a and b=",a+b);	[2M]
(g)	Define LL (1) grammar.	[2M]
(h)	Consider the grammar S→ABc ,A→a | € , B-> b |€ . Find Follow (A).	[2M]
(i)	List the fields of an Activation Record.	[2M]
(j)	What are the applications of DAG?	[2M]

PART-B
(Answer any FOUR questions. All questions carry equal marks)

2(a)	Illustrate the process of compilation with neat diagram.	[8M]
(b)	Write a regular expression and design a transition diagram torecognize identifiers and numbers(both integers and floating-point).	[7M]
3.	Construct predictive parsing table for the following grammar.S→iEtS|iEtSeS|a E->b	[15M]
4.	Construct SLR parsing table for the following grammar and identify the inadequate states(S-R/R-R conflict) if any? S→L=R | R, L→ *R | id, R→ L.	[15M]
5(a)	Design a type checker for expression grammar.	[7M]
(b)	Construct quadruples, triples and indirect triples for the following statement. -(a+b)*(c+d)-(a+b+c)	[8M]
6.	Discuss about the principal sources of code optimization.	[15M]
7(a)	Write a YACC program for advanced desk calculator.	[8M]
(b)	Implement Shift Reduce Parser for the following grammar using Stack, and handle pruning to Parse the input string: (a,(a,a)). S→ (L)|a L→L,S|S	[7M]
8(a)	Consider the grammar S→(L)|a, L→L,S|S. Find the LMD & RMD and construct corresponding derivation trees for the string (a, ((a, a),(a,a)))	[8M]
(b)	Find the FIRST and FOLLOW values for following grammar. E→TE' , E'→÷TE'|€ , T→FT' , T→*FT'|€ , F→ (E)|id	[7M]

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B.Tech.VI Semester ~~Regular~~/Supplementary Examinations

S425-WEB TECHNOLOGIES
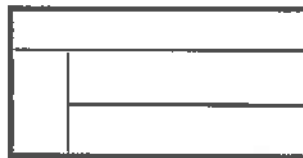(CSE & IT)

Time : 3 hours

Max.Marks:75

PART-A
(Compulsory question)

1(a)	What is HTML? List out any four Text Formatting tags in html	[1M]
(b)	What is XML DOM?	[1M]
(c)	How to create an object for HttpSession? Give syntax.	[1M]
(d)	Define JSP Scriptlet.	[1M]
(e)	Is Swings Thread-safe.	[1M]
(f)	What is the use of <font> tag? Explain its attributes.	[2M]
(g)	What are the basic rules to write XML document?	[2M]
(h)	How to create, delete a Cookie in servlet?	[2M]
(i)	List out the Advantages of JSP over Servlet.	[2M]
(j)	Write any two differences between Swing and AWT.	[2M]

PART-B
(Answer any FOUR questions all question carry equal marks)

2(a) Explain in detail about various elements of <table> tag in HTML with an example program. [8M]

(b) Develop a webpage based on the following diagram using frames concept.

[7M]

3. Develop XML document for the following Employee details.
1) empid   2) empname
3) empaddr with Childs (city, pincode) 4) phnum.   [15M]
Write XML Schema to validate the above XML file.

4. What are the lifecycle methods of servlet? Explain in detail the process of building and testing a simple servlet that displays HELLO WORLD! in [15M] bold type in the browser display area.

5(a) Describe the purpose of JSP config implicit object with an example program. [7M]

(b) Draw and explain the Life Cycle Architecture of JSP in web server. [8M]

6(a) Explain in detail about MVC architecture in java. [7M]

(b) What do you mean by JButton? Explain its constructors, methods and events. [8M]

7. How can you forward and include servlet pages by using Request Dispatcher? Give an example program. [15M]

8(a) Explain Ordered List & Unordered List with suitable examples. [7M]

(b) Write a java bean program for student with fields (sid, sname, sage) by using setter and getter properties. [8M]

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B.Tech. (VI Semester) ~~Regular~~/Supplementary Examinations

S272-INFORMATION SECURITY
(CSE)

Time : 3 hours | Max. Marks : 75

PART-A
(Compulsory question)

Q.No	Questions	Marks	CO	BL
1(a)	Define Encryption and Decryption.	1M	CO1	L1
(b)	Find the primitive roots of an integer 5.	1M	CO2	L1
(c)	List out different MIME transfer encodings.	1M	CO3	L1
(d)	Which SSL protocol is used to indicate cipher suite change?	1M	CO4	L1
(e)	What do you mean by Logic bomb malicious program?	1M	CO5	L1
(f)	Define strong and weak collision resistance in Hash function.	2M	CO1	L1
(g)	Distinguish between secret key and private key.	2M	CO2	L4
(h)	Distinguish between link and end-to-end encryption.	2M	CO3	L4
(i)	Define payment gateway.	2M	CO4	L1
(j)	What properties are required of a reference monitor?	2M	CO5	L1

PART-B
(Answer any FOUR questions. All questions carry equal marks)

2(a)	Illustrate different ways of providing Message Authentication using MAC (Message Authentication Code) and hash functions.	7M	CO1	L2
(b)	Construct message digest using HMAC algorithm.	8M	CO1	L3
3(a)	Analyze the requirements for a digital signature.	7M	CO2	L4
(b)	Describe how Digital Signature Algorithm (DSA) is used to generate digital signature.	8M	CO2	L2
4(a)	Discuss how PGP Message Generation and Reception is done form user A to user B.	7M	CO3	L2
(b)	Describe the Encapsulating Security Payload (ESP) protocol with neat sketch.	8M	CO3	L2
5(a)	Identify the role of payment gateway in payment Authorization.	7M	CO4	L3
(b)	Differentiate between SSL and TLS.	8M	CO4	L4
6(a)	Examine the concept of trusted systems.	7M	CO5	L4
(b)	List and analyze different phases of a virus during its lifetime.	8M	CO5	L1
7(a)	Classify and illustrate various types of Security Attacks.	7M	CO1	L2
(b)	List and briefly define the principal categories of SET participants.	8M	CO4	L1
8(a)	Find Encryption and decryption using RSA algorithm. (i) P=3;q=11,e=7; M=5 (ii) P=7;q=11;e=17;M=8.	7M	CO2	L1
(b)	Describe the Authentication Header (AH) protocol With neat sketch.	8M	CO3	L2

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B.Tech. (VI Semester) ~~Regular~~ /Supplementary Examinations

S200-DISTRIBUTED OPERATING SYSTEMS
(CSE)

Time : 3 hours　　　　　　　　　　　　　　　　　　　　　　Max. Marks : 75

PART-A
(Compulsory question)

1(a)	What is a distributed System?	[1M]
(b)	Define fault tolerance.	[1M]
(c)	Expand UTC.	[1M]
(d)	List various shared memory systems.	[1M]
(e)	What are the features of CHORUS?	[1M]
(f)	Differentiate distributed operating system and network operating system.	[2M]
(g)	What is a real time distributed system?	[2M]
(h)	What is meant by clock skew?	[2M]
(i)	Compare Bus and Ring based multiprocessors.	[2M]
(j)	Mention the goals of CHORUS.	[2M]

PART-B
(Answer any FOUR questions. All questions carry equal marks)

2(a)	Explain in detail about design requirements for distribute system.	[7M]
(b)	What is meant by RPC? Explain its implementation.	[8M]
3(a)	Compare the worker pool multi-threading architecture with the thread-per-request architecture.	[7M]
(b)	Briefly explain the implementation of SUN network file system.	[8M]
4(a)	Discuss in detail about any two mutual exclusion algorithms.	[7M]
(b)	Write short notes on	
	i) Lamport time stamping　　　ii)Distribution Protocols.	[8M]
5(a)	Describe the concept of distributed shared memory.	[8M]
(b)	Compare switched and NUMA multiprocessors.	[7M]
6.	Explain in detail about case study MACH.	[15M]
7(a)	Describe how to handle the deadlocks in distributed system.	[7M]
(b)	What are logical clocks? Explain the Berkeley algorithm for synchronization of clocks.	[8M]
8(a)	Mention and explain goals of distributed system.	[7M]
(b)	Briefly explain threads in distributed systems.	[8M]

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B.Tech. (VI Semester) ~~Regular~~/Supplementary Examinations

S137-ARTIFICIAL INTELLIGENCE
(CSE)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

Q.No	Questions	Marks	CO	BL
1(a)	Define the term 'Artificial Intelligence'.	1M	CO1	L1
(b)	List various quantifiers in first order logic.	1M	CO2	L1
(c)	Define Certainty factor.	1M	CO3	L1
(d)	What is Continuous Planning?	1M	CO4	L1
(e)	How can you define a Knowledge acquisition?	1M	CO5	L1
(f)	List out various Uninformed search methods.	2M	CO1	L1
(g)	Outline the term 'Resolution'.	2M	CO2	L2
(h)	Summarize the importance of plausibility.	2M	CO3	L2
(i)	Explain Inductive Learning Method.	2M	CO4	L2
(j)	What is MYCIN?	2M	CO5	L1

PART-B
(Answer any FOUR questions. All questions carry equal marks)

Q.No	Questions	Marks	CO	BL
2(a)	Illustrate the importance of heuristic search strategies.	7M	CO1	L2
(b)	Demonstrate Constraint satisfaction problem using suitable example.	8M	CO1	L2
3(a)	Summarize the issues of Knowledge representation.	7M	CO2	L2
(b)	Illustrate strong slot filler structures with the help of Scripts.	8M	CO2	L2
4(a)	Explain how a Basic probability notation used to deal uncertainty.	7M	CO3	L2
(b)	Illustrate Bayesian Belief Networks in the context of uncertainty.	8M	CO3	L2
5(a)	Distinguish the term 'supervised learning' with 'unsupervised learning'.	7M	CO4	L4
(b)	How can you make use of Decision tree for supervised learning?	8M	CO4	L3
6(a)	Classify Robotic Hardware and software in terms of Robotics.	7M	CO5	L4
(b)	Outline the importance of Expert Systems and their features.	8M	CO5	L2
7(a)	Compare and contrast the features of different Uninformed search methods.	7M	CO1	L2
(b)	Demonstrate Resolution Algorithm using Propositional logic.	8M	CO2	L2
8(a)	Compare and contrast the techniques of Monotonic reasoning with non monotonic reasoning.	7M	CO3	L2
(b)	What is the importance of Reinforcement learning?	8M	CO4	L1

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B.Tech. (VI Semester) Regular/Supplementary Examinations

S131-ANTENNAS AND WAVE PROPAGATION
(ECE)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

1(a)	Explain the term 'Effective aperture' of an antenna.	[1M]
(b)	State antenna Excitation methods.	[1M]
(c)	State two applications of UHF antennas.	[1M]
(d)	Explain the terms 'Near field' and 'Far field' ranges.	[1M]
(e)	What is mean by Virtual height?	[1M]
(f)	Can we Use a single metallic wire as antenna? Justify your answer.	[2M]
(g)	List various forms of antenna arrays.	[2M]
(h)	Distinguish resonant and non-resonant antennas.	[2M]
(i)	What are the steps to be followed to measure antenna directivity with least accuracy?	[2M]
(j)	List two applications of sky wave propagation and Ground wave propagation.	[2M]

PART-B
(Answer any FOUR questions. All questions carry equal marks)

2(a) Explain how network theorems are applicable to antennas. [7M]

(b) Determine the radiation efficiency a resonant half wavelength dipole made out of copper (conductivity = **5.7 x 10^7** S/m) wire at a frequency of 100 MHz. The radius of the wire is **3 x 10^-4 λ** and radiation resistance of the **λ/2** dipole is **73 Ω**. [8M]

3(a) Derive the expression for the radiation pattern of uniform linear array of 'N' half wave dipoles. [7M]

(b) Elaborate on Dolph-Chebyshev method of antenna synthesis. [8M]

4(a) Explain the construction and working of a log periodic antenna. Draw its radiation pattern. [7M]

(b) Design a Yagi-Uda array having five elements to operate at 600 MHz with a folded dipole feed. What are the lengths of reflector, directors and driven elements? What is the spacing between directors, spacing between reflectorand driven element? What is the bandwidth and gain? [8M]

5(a) Explain briefly about Circular patch Microstrip antenna. [7M]

(b) Explain how antenna polarization is measured using polarization pattern method. [8M]

6(a) Distinguish ground wave and sky wave propagation. [7M]

(b) Derive the expression for field strength of a tropospheric wave. [8M]

7(a) Derive the Expression for radiation pattern of centre fed vertical Dipole. [8M]

(b) Discuss about Rhombic antenna. [7M]

8(a) Explain the loss calculations of a space wave propagation. [7M]

(b) Explain Three antenna method of gain measurement for an antenna. [8M]

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B.Tech. (VI Semester) ~~Regular~~/Supplementary Examinations

S194-DIGITAL SYSTEM DESIGN USING VERILOG
(ECE)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

Q.No	Questions	Marks	CO	BL
1(a)	Design D-latch using gate primitives.	1M	CO5	L6
(b)	Analyze force-release construct of Verilog.	1M	CO3	L4
(c)	Choose appropriate operator to check the parity of a given number.	1M	CO2	L3
(d)	Interpret different symbols used in sequential UDP.	1M	CO4	L5
(e)	Show the general structure of FPGA.	1M	CO1	L1
(f)	Construct a Verilog module for half subtractor using gate primitives.	2M	CO2	L3
(g)	Design a 2-input nmos Nor gate using switch primitives.	2M	CO5	L6
(h)	Examine Relational operators used in verilog.	2M	CO3	L4
(i)	Evaluate UDP for positive edge triggered D flip-flop.	2M	CO4	L5
(j)	Illustrate an SM block.	2M	CO1	L2

PART-B
(Answer any FOUR questions. All questions carry equal marks)

Q.No	Questions	Marks	CO	BL
2(a)	Illustrate the following relevant to Verilog HDL : (i) Concurrency (ii) Module (iii) Test benches.	7M	CO1	L2
(b)	Design a 4x1 mux using tri-state gates with tri-state output.	8M	CO5	L6
3(a)	Examine case construct of Verilog to design an 8 input priority encoder.	7M	CO3	L4
(b)	Develop a test bench module to verify the functionality of above module.	8M	CO2	L3
4.	Build a 4-bit ring counter at data flow level along with a test bench for simulation.	15M	CO5	L6
5(a)	Design a sequence generator to sequence through eight distinct states. The states and the sequence are to be as specified 1000→1100→0100→0110→0010→0011→0001→1001→1000...	7M	CO5	L6
(b)	Develop verilog code for the above sequence generator.	8M	CO2	L3
6.	Explain the architecture of ALTERA FLEX 10K series CPLDs with neat sketch.	15M	CO1	L2
7(a)	Design two input NOR gate, using switch- level modeling.	7M	CO5	L6
(b)	Choose appropriate switch primitives to design a RAM cell.	8M	CO2	L3
8(a)	Analyze the working of assign-deassign constructs by considering a suitable example.	7M	CO3	L4
(b)	Design a positive edge triggered D-flip-flop using gate primitives.	8M	CO5	L6

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B.Tech. VI Semester Regular/Supplementary Examinations

S179-DATA STRUCTURES AND OBJECT ORIENTED PROGRAMMING
(ECE)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

1(a)	What are the Array Applications?	[1M]
(b)	What is a Queue?	[1M]
(c)	What is meant by Dynamic Binding?	[1M]
(d)	What is Compile time Polymorphism with example?	[1M]
(e)	What is the purpose of throws keyword?	[1M]
(f)	Differentiate between Linear and Non Linear Data Structure.	[2M]
(g)	List the Applications of Circular Queue.	[2M]
(h)	What is a Byte code?	[2M]
(i)	What is Method overriding?	[2M]
(j)	What are predefined Exceptions?	[2M]

PART-B
(Answer any FOUR questions all question carry equal marks)

2(a)	Write a C program to search an element among array of elements using Linear search.	[7M]
(b)	Explain Quick sort procedure with an example.	[8M]
3	State the syntax of Double Linked-List. Prepare a program using Double Linked-List for the following operations. i) Node Creation ii) Node Insertion iii) Display Nodes in reverse.	[15M]
4(a)	Write a Java Program to check whether the given number is palindrome or not.	[7M]
(b)	What is plat-form independent? How java is plat-form independent?	[8M]
5(a)	Explain the overloading of constructors with example.	[7M]
(b)	State the purpose of super keyword with an example.	[8M]
6(a)	List out various exceptions in java.	[7M]
(b)	Write various methods of Thread class.	[8M]
7(a)	Write a JAVA program to perform matrix multiplication.	[7M]
(b)	Distinguish between String and String Buffer class with example.	[8M]
8(a)	Write an example for Array Index Out of Bounds Exception.	[7M]
(b)	Explain the role of Public and Private Keywords in JAVA.	[8M]

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H.T.No [ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]   **R14**

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B.Tech. (VI Semester) ~~Regular~~/Supplementary Examinations

S419- VLSI DESIGN

Time : 3 hours   (ECE)   Max.Marks:75

PART-A
(Compulsory question)

1(a)	Define thresh hold voltage V_t in MOS transistors.	[1M]
(b)	Draw CMOS inverter circuit.	[1M]
(c)	Write the equations for generation and propagation of carry in CLA.	[1M]
(d)	Give an example for hierarchy in structured design strategies.	[1M]
(e)	Write two faults in manufacturing tests.	[1M]
(f)	List out the processing techniques in IC fabrication.	[2M]
(g)	Design NOR gate using CMOS Inverter.	[2M]
(h)	Draw the symbol of Multiplier cell.	[2M]
(i)	What is a circuit level simulation?	[2M]
(j)	Classify the CMOS Testing Techniques.	[2M]

PART-B
(Answer any FOUR questions. All questions carry equal marks)

2(a)	Determine the pull-up to pull-down ratio for an NMOS inverter driven through one or more pass transistors.	[7M]
(b)	Sketch the transfer characteristics of CMOS inverter and describe its operation with current load graph.	[8M]
3(a)	Illustrate driving large capacitive loads with relevant examples.	[7M]
(b)	What is meant by standard unit of capacitance and Sheet Resistance applied to MOS Transistors?	[8M]
4(a)	Design a Half adder using CMOS transistors and verify any one condition.	[8M]
(b)	Describe modified Booth's multiplier with example.	[7M]
5(a)	Classify the design strategies and structured design strategies? Explain any two methods.	[8M]
(b)	Compare Behavioral synthesis with RTL synthesis.	[7M]
6(a)	Illustrate automatic test pattern generation with relevant examples.	[7M]
(b)	Describe scan based test techniques.	[8M]
7(a)	Derive drain current I_{ds} at non saturation and saturation regions.	[7M]
(b)	Describe the fabrication steps in depletion mode MOSFET.	[8M]
8(a)	Draw the complete layout diagram of AND gate using CMOS logic.	[7M]
(b)	Design OR-AND-INVERTER gates with the help of stick diagrams.	[8M]

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B.Tech.VI Semester ~~Regular~~/Supplementary Examinations

S190-DIGITAL IMAGE PROCESSING
(ECE)

Time : 3 hours   Max.Marks:75

PART-A
(Compulsory question)

1(a)	Which image processing step extracts the internal parts of given image.	[1M]
(b)	State the condition to be satisfied for symmetric matrix.	[1M]
(c)	If input grey level of an 8 bit image is 100, what is the negative transformed value.	[1M]
(d)	State the meaning of Radiance.	[1M]
(e)	What are different types of redundancies?	[1M]
(f)	What is quantization?	[2M]
(g)	List out the properties of Slant Transform.	[2M]
(h)	Denote the mask used of Laplacian operator.	[2M]
(i)	List out numerous noise models.	[2M]
(j)	Specify the areas of application of lossless compression.	[2M]

PART-B
(Answer any FOUR questions all question carry equal marks)

2. Discuss about various types of connectivity and obtain 4,8 and m connectivities between pixels p(2,2) and q(0,2) for the given image

$$f(x,y)=\begin{bmatrix} 0 & 1 & 1 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$ (Assume the condition for similarity V = {1}).

[15M]

3. Determine the Hadamard transform matrix for N=8.   [15M]

4(a) Describe about the importance of image smoothing in spatial domain using linear and order statics filters.   [7M]

(b) Summarize the significance of Laplacian operator in spatial domain image enhancement with necessary equations.   [8M]

5(a) Differentiate the image enhancement with image restoration.   [7M]

(b) Explain CMY and CMYK color model.   [8M]

6(a) Draw and explain the source encoder and decoder.   [8M]

(b) With a neat diagram precise the concepts of Transform coding.   [7M]

7. State and prove the properties of 2D DFT.   [15M]

8(a) Construct the Huffman coding for the given 3 bit image

$$f(x,y) = \begin{bmatrix} 1 & 3 & 5 \\ 4 & 4 & 3 \\ 5 & 2 & 2 \end{bmatrix}$$

[7M]

(b) Discuss about arithmetic coding with an example.   [8M]

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B.Tech. (VI Semester) ~~Regular~~/Supplementary Examinations

S229-EMBEDDED SYSTEM DESIGN
(ECE)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

1(a)	Expand the term ASIC.	[1M]
(b)	Name the architectures of Micro Controller/Processor.	[1M]
(c)	Select any two Software interrupts.	[1M]
(d)	Define Task.	[1M]
(e)	What is Kernel?	[1M]
(f)	List any two Pros of the super loop based firmware design approach.	[2M]
(g)	Classify ROM.	[2M]
(h)	Outline the context switching.	[2M]
(i)	Draw the structure of multiple processes.	[2M]
(j)	Compare OS and RTOS.	[2M]

PART-B
(Answer any FOUR questions. All questions carry equal marks)

2(a)	Illustrate the different characteristics of embedded system.	[7M]
(b)	Remember the function of i) Reset circuit. ii) Real time clock in embedded system.	[8M]
3(a)	Classify the RAM used for embedded system design and describe each.	[7M]
(b)	Interpret the role of i) Load store architecture. ii) Instruction interface.	[8M]
4(a)	Importance of Interrupt Service Routine with an example.	[7M]
(b)	Select the sources of interrupts and explain it.	[8M]
5(a)	Summarize the Concept of Semaphores.	[7M]
(b)	Draw the multi threaded structure with an example.	[8M]
6(a)	Discuss the goal of an OS services.	[7M]
(b)	Choose any two common scheduling models used by the scheduler and elaborate it.	[8M]
7(a)	Show the differences between Microprocessor and Microcontrollers.	[7M]
(b)	Relate the role of PLDs in embedded system design.	[8M]
8(a)	Evaluate the functions of OS Mail box.	[7M]
(b)	Illustrate the details about kernel Objects in RTOS.	[8M]

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B.Tech. (VI Semester) ~~Regular~~/Supplementary Examinations

S213-ELECTRICAL DISTRIBUTION SYSTEMS
(EEE)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

Q.No	Questions	Marks	CO	BL
1(a)	What is diversity factor?	1M	CO1	L2
(b)	What are the disadvantages of radial distribution feeder?	1M	CO2	L2
(c)	What is the advantage of Gas Insulated Substation?	1M	CO3	L2
(d)	What is Distribution Automation?	1M	CO4	L2
(e)	What are the different methods to improve Power factor?	1M	CO5	L2
(f)	Write the significance of load factor?	2M	CO1	L2
(g)	List out the advantages of AC distribution over DC.	2M	CO2	L2
(h)	What is DAS software?	2M	CO3	L2
(i)	Write different methods of voltage control.	2M	CO4	L2
(j)	What are the causes of low power factor?	2M	CO5	L2

PART-B
(Answer any FOUR questions. All questions carry equal marks)

Q.No	Questions	Marks	CO	BL
2(a)	The annual input to a sub-transmission system is 87,000 MW. On the peak-loadday of the year, the peak is 25 MW and the energy input that day is 300 MWh. Find the load factor for the year and for the peak load day.	7M	CO1	L4
(b)	Define (i) average load (ii)load factor (iii)demand factor (iv)Contribution factor.	8M	CO1	L1
3(a)	What are the types of primary feeders and discuss the merits and demerits of them?	7M	CO2	L2
(b)	Discuss the basic design practice of secondary distribution system.	8M	CO2	L4
4(a)	Discuss different types of bus bar arrangements.	7M	CO3	L2
(b)	Explain about the equipment in Gas Insulated substation.	8M	CO3	L2
5(a)	State the different communication systems used in DA.	7M	CO4	L2
(b)	Explain the following: i) Hybrid communication ii) Fiber optics communications used in DA with a block diagram.	8M	CO4	L2
6(a)	Explain how an AVB controls the voltage with a neat diagram.	7M	CO5	L2
(b)	With the help of a phasor diagram, show how a series capacitor boosts the voltage. What are the limitations in this method?	8M	CO5	L2
7(a)	Explain about the line drop compensation with a neat diagram.	7M	CO5	L2
(b)	Explain different categories of Distribution Automation benefits.	8M	CO4	L2
8(a)	The average load factor of a substations is 0.65 Determine the loss factor for rural and urban areas.	7M	CO1	L4
(b)	A synchronous motor improves the p.f of a load of 250W from 0.8 lagging to 0.95lagging. Simultaneously the motor carries a load of 100KW. Find the leading KVAR taken by the motor, KVA rating of the motor and the p.f at which the motor operates.	8M	CO5	L4

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B.Tech. (VI Semester) ~~Regular~~/Supplementary Examinations

S345-POWER SYSTEM ANALYSIS
(EEE)

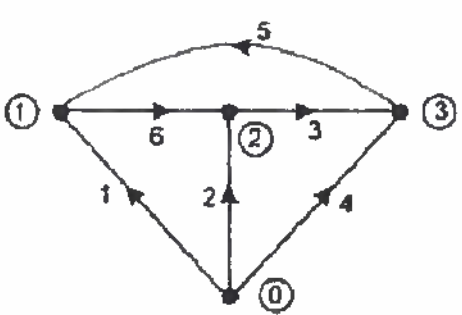Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

Q.No	Questions	Marks	CO	BL
1(a)	Define oriented graph.	1M	CO1	L1
(b)	What are the features of admittance matrix?	1M	CO2	L1
(c)	What are unsymmetrical faults?	1M	CO3	L1
(d)	Write the symmetrical components of three phase system.	1M	CO3	L2
(e)	What is a zero sequence network?	1M	CO3	L1
(f)	What is advantage of ZBUS for fault analysis than Y_{BUS} ?	2M	CO1	L2
(g)	What is the significance of symmetrical components?	2M	CO3	L1
(h)	Give the applications of the ZBus building algorithm.	2M	CO2	L2
(i)	What are the harmful effects of short circuit faults on the power system?	2M	CO4	L1
(j)	List the assumptions made in the transient stability solution technique.	2M	CO4	L2

PART-B
(Answer any FOUR questions. All questions carry equal marks)

Q.No	Questions	Marks	CO	BL
2(a)	Discuss the steps necessary to convert system parameters into per unit values.	7M	CO1	L2
(b)	What is fundamental cut-set? Obtain cut-set matrix for the following graph.	8M	CO1	L3
3(a)	Develop load flow solution equations of Gauss-Seidel method.	7M	CO2	L2
(b)	Derive the power flow solution using DC Load flow study.	8M	CO2	L2
4(a)	Mention the differences between Fast Decoupled & Newton Raphson Power flow solution methods.	7M	CO2	L2
(b)	The Single line diagram of a simple power system with generators at buses 1 and 3 as shown in fig. The magnitude of voltage at bus 1 is 1.05 p.u. and Voltage magnitude at bus 3 is fixed at 1.04 p.u. with active power generation of 200MW. A load consisting of 400 MW and 250 MVAR is taken from bus 2. The line impedances are marked in p.u. on a 100 MVA base and the line charging susceptances are neglected. Obtain the power flow solution using Fast Decoupled method after first iteration.	8M	CO2	L3

5(a)	Discuss short circuit of an unloaded synchronous machine.	7M	CO3	L2	
(b)	Describe sequence impedance of transmission lines.	8M	CO3	L2	
6(a)	Describe the sequence networks of three phase transformer and draw its sequence networks.	7M	CO3	L2	

(b)	Compare Gauss-Seidel , Newton Raphson, Decoupled and Fast decoupled methods with respect to
	   i) Number of iterations
	   ii) Convergence characteristics
	   iii) Initial values
		8M	CO2	L	

7(a)	The power system network is shown in fig., bus 1 is considered as a slack bus of voltage 1.04∠00 p.u. The line impedances are indicated in the network on 100MVA base and neglect the line shunt admittance. 	7M	CO2	L3	
(b)	Obtain the power flow solution for the following power system using FD method after first iteration. 	8M	CO2	L3	
8(a)	Describe the application of equal area criterion to determine stability of a synchronous machine connected to an infinite bus through a transmission line.	7M	CO4	L2	
(b)	Derive the expression for the fault current and terminal voltage for a line to line fault occurs at the terminal of an unloaded 3-phase alternator. Assume that the alternator has an isolated neutral.	8M	CO4	L2	

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B.Tech. (VI Semester) ~~Regular~~/Supplementary Examinations

S313-MICROPROCESSORS AND MICROCONTROLLERS
(EEE)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

Q.No	Questions	Marks	CO	BL
1(a)	Discuss the function of bus interface unit (BIU) in 8086.	1M	CO1	L1
(b)	Distinguish between static RAM and EPROM.	1M	CO2	L1
(c)	Explain the advantages of DMA transfer over the conventional data transfer from memory to Microprocessor.	1M	CO3	L2
(d)	What are RS232 standards?	1M	CO4	L1
(e)	Differentiate between microprocessor and microcontroller.	1M	CO5	L2
(f)	List the different flag available in status register of 8086.	2M	CO1	L1
(g)	Distinguish between minimum and maximum mode present in 8086.	2M	CO2	L2
(h)	Describe the control word in 8255.	2M	CO3	L2
(i)	Illustrate the concept of Interrupt vector table.	2M	CO4	L2
(j)	Differentiate between timer and counter in 8051 with an example.	2M	CO5	L2

PART-B
(Answer any FOUR questions. All questions carry equal marks)

Q.No	Questions	Marks	CO	BL
2(a)	Illustrate the register organization model in 8086 with examples.	7M	CO1	L2
(b)	Discuss the following addressing modes in 8086 with examples. (i) Immediate (ii)Direct (iii) Register Indirect (iv) Register Relative.	8M	CO1	L2
3(a)	With the help of neat sketch, analyze the timing diagram of read cycle for minimum mode configuration for 8086 microprocessor.	8M	CO2	L4
(b)	Design and Interface a 2K of EPROM and 1K RAM memory to 8086. Assume the starting address appropriately.	7M	CO2	L3
4(a)	Discuss simple I/O and BSR mode 0 configuration in 8255 with the help of examples.	7M	CO3	L2
(b)	Interface an ADC 0808 with 8086 using 8255 ports. Use port A of 8255 for transferring digital data output of ADC to the CPU and port C for control signals. Assume that an analog input is present of the ADC and a clock input of suitable frequency is available for ADC. Draw the interfacing diagram and write the necessary ALP to read the analog voltage and store in AL register.	8M	CO3	L3
5(a)	Sketch and analyze the interface of USART 8251 to the 8086 microprocessor in minimum mode.	7M	CO4	L4
(b)	Draw the block diagram of 8259 and explain the following (i) IRR (ii) ISR (iii) IMR (iv) Priority Resolver.	8M	CO4	L2
6(a)	Analyze the addressing modes in 8051 with examples.	7M	CO5	L4
(b)	Discuss the Architecture of 8051 with the help of neat diagram.	8M	CO5	L2
7(a)	Explain the functions and their significance following pins with respect to 8086 microprocessor. (i) ALE (Address Latch Enable) (ii) HOLD.	8M	CO1	L2
(b)	Analyze Mode 1 configuration in 8255 with the relevant timing waveforms.	7M	CO3	L4
8(a)	Discuss different software and hardware interrupts in 8086 and hence explain what happens when an interrupt occur.	7M	CO4	L2
(b)	Analyze how the Timer can be programmed with examples.	8M	CO5	L4

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B.Tech. (VI Semester) ~~Regular~~/Supplementary Examinations

S429-OPTIMIZATION TECHNIQUES IN ENGINEERING
(EEE)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

Q.No	Questions	Marks	CO	BL
1(a)	State the necessary condition for the minimum of a multi variable objective function f(X).	1M	CO1	L1
(b)	Define a point and line.	1M	CO1	L1
(c)	List out one merit of Davidson-Fletcher-Powell method.	1M	CO2	L1
(d)	State the convex optimization problem.	1M	CO2	L1
(e)	Define the terms global velocity vectors in PSO.	1M	CO4	L1
(f)	Interpret the local and global minima of quadratically constrained quadratic optimization problem.	2M	CO3	L2
(g)	Define a concave set.	2M	CO1	L1
(h)	Calculate the gradient of the following quadratic form $f(x) = \frac{1}{2}\left(2x_1^2 + 2x_1x_2 + 4x_1x_3 - 6x_2^2 - 4x_1x_3 + 5x_3^2\right).$	2M	CO2	L3
(i)	Mention any two applications of LPP.	2M	CO1	L1
(j)	Define the terms global best velocity and local best velocity vectors in PSO.	2M	CO4	L1

PART-B
(Answer any FOUR questions. All questions carry equal marks)

2(a)	Classify the optimization problems for engineering applications.	7M	CO1	L2
(b)	Find the maxima and minima if any of the function $f(x) = 4x^3 - 18x^2 + 27x - 7$	8M	CO2	L3
3(a)	Interpret the Two-phase simplex method with a flow chart.	7M	CO2	L4
(b)	Solve the given LPP using Simplex method $$\text{max: } 12x_1 + 15x_2$$ $$2x_1 + 5x_2 < 10$$ $$4x_1 + 3x_2 < 12$$	8M	CO2	L3
4(a)	Develop the algorithmic steps of DFP method for minimization of an unconstrained optimization problem.	7M	CO2	L4
(b)	Find the minimum solution of the given function $f(x) = x_1 - x_2 + 2x_1^2 + 2x_1x_2 + x_2^2$ using the Newton's method at starting point $(0, 0)^T$.	8M	CO2	L3
5(a)	Construct the φk function, according to Exterior penalty function method and plot its contours for the following problem. Maximize f=2x Subject to 2≤x≤10.	7M	CO3	L4
(b)	Describe the characteristics of a constrained nonlinear optimization problem.	8M	CO2	L1
6(a)	Compute the procedure of finding the minimum of a given function using Particle Swarm Optimization.	7M	CO4	L3
(b)	List out the difference between Genetic Operators and PSO operators.	8M	CO4	L4
7(a)	Compare the different indirect methods of unconstrained non-linear optimization problem.	7M	CO2	L4
(b)	Outline the basic types of parameter changes that affect the optimal solution of LPP.	8M	CO2	L2
8(a)	Show that the Newton method finds the minimum of a quadratic function in one iteration.	7M	CO2	L3
(b)	Convert the given LPP to the standard form and write its dual. Maximize $f = x_1 + 2x_2 + x_3$ S.T $2x_1 + x_2 - x_3 \leq 2$ $-2x_1 + x_2 - 5x_3 \geq -6$ $4x_1 + x_2 + x_3 \leq 6$ $x_1, x_2, x_3 \geq 0$	8M	CO2	L3

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B.Tech. (VI Semester) ~~Regular~~/Supplementary Examinations
S278-INTELLIGENT CONTROL SYSTEMS
(EEE)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

1(a)	Draw the architecture of single layer feed forward neural networks.	[1M]
(b)	Write the formula for hidden layer weight adjustment in BP algorithm.	[1M]
(c)	Is recurrent neural networks are feed forward networks. Justify it.	[1M]
(d)	What is crisp set?	[1M]
(e)	Define cardinality of a Fuzzy set.	[1M]
(f)	Distinguish between supervised and unsupervised learning.	[2M]
(g)	Draw the BAM Architecture.	[2M]
(h)	Define Universe of Discourse.	[2M]
(i)	Define power of a Fuzzy set with example.	[2M]
(j)	Mention any four properties of Fuzzy sets.	[2M]

PART-B
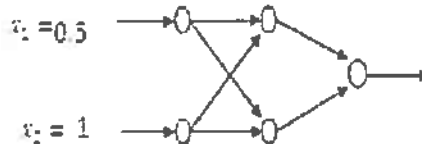(Answer any FOUR questions. All questions carry equal marks)

2(a) Using ADALINE model train the following ANN with 2 input neurons,2 hidden neurons and 1 output neuron and use linear Activation function (with threshold 0.5) for the data

$$X=\begin{bmatrix}1\\1\end{bmatrix}, \quad d=0.5, \eta=0.3, V=\begin{bmatrix}0 & 1\\0.5 & 1\end{bmatrix}, W=\begin{bmatrix}0.5\\0.5\end{bmatrix}.$$

[7M]

(b) Illustrate Mc-Culloch Pitts model. [8M]

3. Apply Back Propagation algorithm for multi layer feed forward networks for testing sets. $U = \begin{bmatrix}-0.5 & -0.6\\-0.8 & -0.2\end{bmatrix}, V=\begin{pmatrix}0.4\\0.6\end{pmatrix}, \eta=0.2, D=0.6$

[15M]

4(a)	Describe the algorithm for kohenen's self organizing mapping network.	[7M]
(b)	Illustrate Generalized Delta Rule training algorithm.	[8M]
5(a)	Discuss how decision making and rules are framed in fuzzy logic with an example.	[7M]
(b)	Discuss about following defuzzification methods i) Height ii) First of maxima iii) Centre of largest area.	[8M]
6(a)	Outline the properties and operations of fuzzy relations.	[7M]
(b)	Consider two universes of discourses described by X={1,2,3,4} and Y={1,2,3,4,5,6}. Let two fuzzy set A and B be given by A={(2,0.8),(3,1),(4,0.3)} B={(2,0.4),(3,1),(4,0.6), (5,0.2)} Find the fuzzy relation R corresponding to IF A' Then B'.	[8M]
7(a)	Using MADALINE model train the following ANN with 2 input neurons,2 hidden neurons with biases b1 and b2 and 1 output neuron with bias b3 and use binary Activation function (with threshold 0.5) for the data	

$$X=\begin{bmatrix}1\\1\end{bmatrix}, \quad d=1, \eta=0.2, V=\begin{bmatrix}1 & 2\\0.5 & 1\end{bmatrix}, W=\begin{bmatrix}0.6\\0.8\end{bmatrix}, b1=b2=b3=0.5.$$

[7M]

(b)	What is activation function? Discuss the classification of the activation Function.	[8M]
8(a)	Describe fuzzy rule based system with an example.	[7M]
(b)	Define the fuzzy membership Function along with an example.	[8M]

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B.Tech. (VI Semester) Regular /Supplementary Examinations

S199-DISTRIBUTED GENERATION
(EEE)

Time : 3 hours　　　　　　　　　　　　　　　　　Max. Marks : 75

PART-A
(Compulsory question)

Q.No	Questions	Marks	CO	BL
1(a)	Is the wind energy renewable?	1M	CO1	L1
(b)	What is solar distiller?	1M	CO2	L1
(c)	Is the maximum power point of a solar cell may vary from manufacturer to manufacturer?	1M	CO2	L1
(d)	Define betz's limit.	1M	CO2	L1
(e)	Write the chemical reaction equations of SOFC.	1M	CO3	L1
(f)	Illustrate the working principle of Stirling engine.	2M	CO2	L2
(g)	Draw the block diagram of active solar water heater system.	2M	CO2	L2
(h)	Mention the expression of optimal power and torque developed by wind turbine.	2M	CO2	L2
(i)	Draw the schematic of PMSG variable speed wind energy grid connected system.	2M	CO2	L2
(j)	What are the merits of mini hydro power plant?	2M	CO3	L2

PART-B
(Answer any FOUR questions. All questions carry equal marks)

2(a)	Outline the benefits of distributed generation.	7M	CO1	L2
(b)	Illustrate the different distributed generation technologies.	8M	CO1	L2
3(a)	Define :solar constant, extra terrestrial constant, angle of incidence, Longitude , Latitude, Declination, Solar Time, Hour Angle, Surface Azimuthal angle, Zenith angle, Sun set hour angle .	7M	CO2	L2
(b)	Describe the working principle of PV cell and define the PV cell, PV array and PV module.	8M	CO2	L2
4(a)	What are the factors to be considered in site selection for wind power plants?	7M	CO2	L3
(b)	Exemplify the different parts of wind turbine.	8M	CO2	L2
5(a)	Draw the schematic of squirrel cage induction generator fixed speed wind energy grid connected system and list the advantages and limitations.	7M	CO2	L3
(b)	Develop the modeling of wind turbine and wind speed for steady state and transient analysis.	8M	CO2	L3
6(a)	Illustrate the working principle of fuel cell and different parts of fuel cell.	7M	CO3	L2
(b)	Exemplify the working principle and components of micro turbine.	8M	CO3	L2
7(a)	Discuss the factors to be considered while planning and developing the grid integrated energy.	7M	CO1	L3
(b)	Draw the schematic of solar PV power plant.	8M	CO2	L3
8(a)	Draw the characteristics of wind turbine and explain the different modes of operation. In which mode there is a possibility of MPP operation of wind turbine and justify the same.	7M	CO2	L3
(b)	Illustrate the working principle of alkaline fuel cell (AFC) and phosphoric acid fuel cell (PAFC).	8M	CO3	L2

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B.Tech. (VI Semester) ~~Regular~~/Supplementary Examinations

S261-HIGH VOLTAGE ENGINEERING
(EEE)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

1(a) Write any two advantages of finite element method.   [1M]
 (b) What are the various theories which explain the breakdown in commercial
      liquid dielectric?   [1M]
 (c) Write down the applications of impulse current wave of high magnitude.   [1M]
 (d) What is a mixed potential divider?   [1M]
 (e) What is meant by insulation coordination?   [1M]
 (f) What do you understand by field enhancement factor?   [2M]
 (g) Write down the factors that influence conduction in pure liquid dielectrics. [2M]
 (h) Define the front and tail times of an impulse wave.   [2M]
 (i) What are the general methods used for measurement of high frequency and
      impulse currents?   [2M]
 (j) Why is grounding very important in a H.V laboratory?   [2M]

PART-B
(Answer any FOUR questions. All questions carry equal marks)

2(a) Discuss briefly the Finite Element Method? Give the outline of this method for
      solving the field problems.   [8M]
 (b) Discuss in detail the relative advantages and disadvantages of different
      numerical methods for solution of field problems.   [7M]

3(a) What are the factors that influence conduction in pure liquid dielectrics and
      in commercial liquid dielectrics?   [7M]
 (b) Explain the different mechanisms by which breakdown occurs in solid
      dielectrics in practice.   [8M]

4(a) Explain any one method of controlled tripping of impulse generator.   [7M]
 (b) A 12-stage impulse generator has 0.126 µF condensers. The wave front and
      wave tail resistances connected are 800 ohms respectively. If the load
      condenser is 100pF, draw the impulse wave and find the front and tail times
      of the impulse wave produced.   [8M]

5(a) What are the different types of resistive shunts used for impulse current
      measurements? Discuss their characteristics and limitations.   [8M]
 (b) Discuss the different methods of measuring high DC voltages. What are the
      limitations in each method?   [7M]

6(a) What do you understand by grounding grids? Describe a typical grounding
      system used for high voltage.   [7M]
 (b) Explain the different aspects of insulation design and insulation coordination
      adopted for EHV systems.   [8M]

7(a) Briefly explain the various theories that explain breakdown in commercial
      liquid dielectrics.   [7M]
 (b) What is the significance of impulse tests? Briefly explain the impulse testing
      of insulators.   [8M]

8(a) What is a capacitance voltage transformer? Explain with phasor diagram how
      a tuned capacitance voltage transformer can be used for voltage
      measurements in power systems   [8M]
 (b) Explain the importance of RIV measurements for EHV power apparatus.   [7M]

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B.Tech. (VI Semester) ~~Regular~~ /Supplementary Examinations

S325-OBJECT ORIENTED PROGRAMMING USING JAVA
(EIE)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

1(a)	What is over riding?	[1M]
(b)	What is sub type?	[1M]
(c)	What are thread groups?	[1M]
(d)	What is life cycle of an applet?	[1M]
(e)	What is J component?	[1M]
(f)	Explain data types.	[2M]
(g)	Explain package.	[2M]
(h)	Explain termination models.	[2M]
(i)	Explain adapter classes.	[2M]
(j)	Explain check boxes.	[2M]

PART-B
(Answer any FOUR questions. All questions carry equal marks)

2(a)	Discuss features of OOP.	[7M]
(b)	Explain constructors with an example.	[8M]
3(a)	What is inheritance? Discuss Extension and Specification with suitable programming Examples.	[7M]
(b)	Discuss various steps involved in creating a package.	[8M]
4(a)	Clearly distinguish between Multithreading and Multitasking.	[7M]
(b)	What is an Exception? What are the three categories of exceptions? Also discuss the advantages of exception handling.	[8M]
5(a)	Distinguish between Applets and Applications.	[7M]
(b)	What is AWT class? Explain in detail?	[8M]
6(a)	What are the swing component classes? Explain in detail.	[7M]
(b)	"Java supports the creation of simple tables using Swings" - Support this statement with suitable example.	[8M]
7(a)	What is the objective of passing parameters in Java? Explain various ways of passing parameters with suitable examples in Java.	[7M]
(b)	Differentiate between PATH and CLASSPATH in Java.	[8M]
8(a)	Explain clearly how synchronization is achieved in Java threads.	[7M]
(b)	How one applet communicates with other applet? Explain in detail.	[8M]

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B.Tech. (VI Semester) ~~Regular~~/Supplementary Examinations

S129-ANALYTICAL INSTRUMENTATION

(EIE)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

1(a) List out the types of Electro chemical cells. [1M]
(b) Determine the importance of Prism in single Beam Spectrophotometry. [1M]
(c) Classify different types of liquid chromatography. [1M]
(d) Estimate the disadvantages of mass Spectroscopy. [1M]
(e) What is the need of monitoring environmental conditions? [1M]
(f) Name the two different material compositions used in calomel electrode. [2M]
(g) What are the different types of Industrial Gas Analysers? [2M]
(h) Formulate the expression to find area of a peak in chromatography. [2M]
(i) What is the need of using mica window in G.M.counter? [2M]
(j) Classify the types of various gas pollutants. [2M]

PART-B
(Answer any FOUR questions. All questions carry equal marks)

2(a) Describe the concept ofPolarography in detail with the help of neat sketch. [8M]
(b) Give a short note on selective ion electrode. [7M]

3(a) Sketch the optical diagram of single Beam IR Spectrometer and write its operation. [8M]
(b) Discuss the FTIR spectroscopy principle and operation with the help of block diagram. [7M]

4(a) Analyse the content of oxygen that is present in a given sample by using paramagnetic oxygen analyser. [8M]
(b) Construct the method to analyse the gas density in a given sample and also write its working principle and operation. [7M]

5. Discuss the details of construction, principle and operation of the following counters
i) G.M. counter. ii) Proportional counter. [15M]

6(a) Classify different types of gas pollutant detectors and brief about them. [8M]
(b) Discuss how CO laser is used to detect nitric oxide. [7M]

7 (a) Sketch the basic block diagram of analytical instrument and discuss function of each block in detail. [8M]
(b) How do you Apply Null detector method to pH meter? [7M]

8 (a) What is Beer- Lamberts Law? Justify with the deviation for Beer's law. [8M]
(b) How can we use dual beam type atomic absorption spectroscope and formulate the relation between absorption and transmittance? [7M]

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B.Tech. (VI Semester) ~~Regular~~/Supplementary Examinations

S334-P.C. BASED INSTRUMENTATION
(EIE)

Time : 3 hours | Max. Marks : 75

PART-A
(Compulsory question)

Q.No	Questions	Marks	CO	BL
1(a)	What are the types of USB devices?	1M	CO1	L1
(b)	IEEE stands for.	1M	CO2	L2
(c)	Draw the figure to representing of logic 1 and logic 0 to illuminate the LED.	1M	CO3	L2
(d)	Define strain.	1M	CO4	L1
(e)	What is analog input board?	1M	CO5	L2
(f)	Explain the general PC expansion methods.	2M	CO1	L1
(g)	Give some Multi-line commands of IEEE-488 Bus.	2M	CO2	L2
(h)	What are the characteristics of digital I/O ports?	2M	CO3	L3
(i)	What is a load sequencer?	2M	CO4	L1
(j)	Give some advantages of data acquisition.	2M	CO5	L1

PART-B
(Answer any FOUR questions. All questions carry equal marks)

2(a)	Discuss the PC ISA and EISA expansion systems.	7M	CO1	L3
(b)	Write short notes the following (i) Applications of PC-based systems. (ii) Accelerated Graphic Port.	8M	CO1	L2
3(a)	Draw and explain simplified block schematic for the PDISO-8.	7M	CO2	L2
(b)	Discuss the IEEE-488 signals and briefly explain the role of each type of signals.	8M	CO2	L2
4(a)	What are the various types sensors and explain briefly each sensors?	7M	CO3	L2
(b)	What are the various types output devices and with neat figure explain any tow?	8M	CO3	L1
5(a)	Discuss the applications of networked/distributed PC systems.	7M	CO4	L2
(b)	With neat figure explain the procedure for strain measurement and display.	8M	CO4	L3
6(a)	What are the analog I/P and O/P devices in data acquisition and control system? Explain the function of analog and digital devices in detail.	7M	CO5	L2
(b)	What is RS422 interface? Explain the advantages, limitations and specifications.	8M	CO5	L1
7(a)	What are the types of IEEE-488 devices and briefly examine the role of each type of device?	7M	CO2	L3
(b)	What are the various types output drivers and write short note on any two output drivers?	8M	CO3	L2
8(a)	Discuss the backplane bus based systems.	7M	CO4	L2
(b)	What are the digital I/O boards in data acquisition and control system? Explain the function of I/O boards in detail.	8M	CO5	L2

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B.Tech. (VI Semester) ~~Regular~~/Supplementary Examinations

S139-AUTOMATION INDUSTRIAL PROCESS
(EIE)

Time : 3 hours

Max. Marks : 75

PART-A
(Compulsory question)

Q.No	Questions	Marks
1(a)	What is Network management?	1M
(b)	What is Data logging?	1M
(c)	Use of RGA.	1M
(d)	What is gain scheduling?	1M
(e)	What is the function of Data Highway in DCS?	1M
(f)	List the benefits of using Computers in Process Control.	2M
(g)	Describe Topology of Field bus.	2M
(h)	Drawbacks of deadbeat control.	2M
(i)	What did you mean by Dead time?	2M
(j)	Explain the PLC arithmetic functions.	2M

PART-B
(Answer any FOUR questions. All questions carry equal marks)

2(a)	With the help of neat sketch, Classify the sib process of manufacturing technology.	7M
(b)	Explain various functional blocks of Dire t digital control(DDC) system.	8M
3(a)	Explain the role of Link Active Scheduler inFoundation Fieldbus communication.	7M
(b)	Write the Differences between Bus, Ring and Star topology.	8M
4(a)	Explain the Design procedure of Discrete-time controller design.	7M
(b)	Design a Dahlin's digital controller for the system to achieve a closed-loop time constant of 5 sec. Assume that the sampling period, $T = 1$ s.	8M
5(a)	How would you summarize the operation of optimal Control with a neat Block Diagram?	7M
(b)	Classify Optimal Control into different types and explain.	8M
6(a)	Compare Advantages and Limitations of various Network Access protocols.	7M
(b)	Describe DCS Communications and explain feature of Data Highway.	8M
7(a)	With the help of block diagram explain basic elements of computer aided measurement and control system. Explain automation hierarchy of computer aided process control.	7M
(b)	What did you mean by (i) Smart sensor (ii) MODBUS (iii) PROFI BUS?	8M
8(a)	With a suitable example explain the role of SCADA in Automation.	7M
(b)	With some suitable example explain the "Sequential function Chart."	8M

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B.Tech. (VI Semester) Regular/Supplementary Examinations

S268-IMAGE PROCESSING
(IT)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

Q.No	Questions	Marks	CO	BL
1(a)	Define the term pixel.	1M	CO1	L1
(b)	Write the general form of log transformation.	1M	CO2	L1
(c)	List the primary colors.	1M	CO3	L1
(d)	Define Compression ratio.	1M	CO4	L1
(e)	What is a quad tree?	1M	CO5	L1
(f)	What is m-adjacency?	2M	CO1	L1
(g)	Apply Mean filter at each point of the given image. 2 1 2 1 4 5 5 6 3 2 1 4 6 2 1 6	2M	CO2	L3
(h)	What is the probability density function of Rayleigh noise and also give the mean and variance of it.	2M	CO3	L1
(i)	Compare the thinning and thickening operations.	2M	CO4	L2
(j)	List the applications of Thresholding.	2M	CO5	L4

PART-B
(Answer any FOUR questions. All questions carry equal marks)

2(a)	Discuss the basic relationship between pixels.	7M	CO1	L6
(b)	Illustrate the fundamental steps of image processing with a block diagram.	8M	CO1	L2
3(a)	Outline the role of Arithmetic operations in enhancement of an image.	7M	CO2	L2
(b)	Apply histogram equalization on the given data where r_k is the gray level value and p_k is the no of pixels also sketch the histogram of original and new image?	8M	CO2	L3
4(a)	Discuss Adaptive median filtering method for image restoration.	7M	CO3	L6
(b)	Illustrate the HSI model and give equations in converting colors from HSI to RGB.	8M	CO3	L2
5(a)	Elaborate the run length coding technique.	7M	CO4	L6
(b)	Discuss the region filling operation with an example.	8M	CO4	L6
6(a)	Elaborate edge linking and boundary detection using graph theoretic techniques.	7M	CO5	L6
(b)	Describe edge detection process in image segmentation.	8M	CO5	L2
7(a)	Apply the Huffman coding technique to calculate the entropy and code length for the word COMMITTEE.	7M	CO4	L3
(b)	Survey various applications of image processing.	8M	CO1	L4
8(a)	What is image restoration? Compare between the Gaussian noise and Impulse noise.	7M	CO3	L2
(b)	Write about Adaptive filters used in image restoration.	8M	CO3	L1

For question 3(b):

(r_k)	0	1	2	3	4	5	6	7
(p_k)	8	10	10	2	12	16	4	2

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H.T.No

R14

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
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B.Tech. VI Semester ~~Reguler~~/Supplementary Examinations

S177-DATA MINING AND DATA WAREHOUSING
(IT)

Time : 3 hours   Max.Marks:75

PART-A
(Compulsory question)

1(a)	Define outlier.	[1M]
(b)	Define data generalization.	[1M]
(c)	Define strong association rule.	[1M]
(d)	Define clustering.	[1M]
(e)	What is a text database?	[1M]
(f)	Why data mining is important?	[2M]
(g)	What is the need of preprocessing?	[2M]
(h)	Describe iceberg queries with an example.	[2M]
(i)	Define binary and nominal variables.	[2M]
(j)	Define visual data mining and audio data mining.	[2M]

PART-B
(Answer any FOUR questions all question carry equal marks)

2(a)	Explain KDD process in detail.	[7M]
(b)	Explain three-tier data warehouse architecture.	[8M]
3(a)	Define data integration and explain in detail.	[7M]
(b)	Explain about attribute oriented induction.	[8M]
4.	Explain apriori algorithm with an example.	[15M]
5(a)	Discuss the issues regarding classification and prediction.	[7M]
(b)	Describe the techniques to improve Classification Accuracy.	[8M]
6(a)	How to choose a data mining system? Explain.	[7M]
(b)	Explain social impacts of data mining.	[8M]
7(a)	Distinguish between OLAP and OLTP.	[7M]
(b)	Explain the architecture of a data mining system.	[8M]
8(a)	Discuss about objective measures for pattern interestingness.	[7M]
(b)	Define concept hierarchy. Give an example. And write the types of concept hierarchies.	[8M]

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B.Tech. (VI Semester) ~~Regular~~/Supplementary Examinations

S383-SOFTWARE TESTING METHODOLOGIES
(IT)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

Q.No	Questions	Marks	CO	BL
1(a)	Why should software testing be done?	1M	CO1	L1
(b)	What is a flow graph?	1M	CO2	L1
(c)	Compare between open and closed domain.	1M	CO3	L2
(d)	Relate the use of reduction procedure in testing.	1M	CO4	L2
(e)	Identify the use of state table in testing.	1M	CO5	L2
(f)	Differentiate between Alpha and Beta testing.	2M	CO1	L2
(g)	What is absorption in transaction flow testing?	2M	CO2	L1
(h)	Choose over-specified domains in software testing.	2M	CO3	L3
(i)	How KV chart helps in testing?	2M	CO4	L2
(j)	How cyclomatic complexity is calculated for a given program?	2M	CO5	L2

PART-B
(Answer any FOUR questions. All questions carry equal marks)

Q.No	Questions	Marks	CO	BL
2(a)	Define a test case. What are the objectives of test case design? Discuss the various steps involved in test case design.	7M	CO1	L1
(b)	Verification and validation are used interchangeably many times. Analyze these terms and establish their relationship with testing.	8M	CO1	L3
3(a)	Conclude with help of an example that a very high level of statement coverage does not mean that the program is defect-free.	7M	CO2	L4
(b)	Differentiate between black box and white box testing. Consider a program to find the largest number among three numbers. Generate test cases using one black box testing and one white box testing technique.	8M	CO2	L3
4(a)	How testing can be done in two dimensional domains? Explain one dimensional domain bugs in open and closed boundaries.	7M	CO3	L2
(b)	Briefly discuss about domains and interface testing.	8M	CO3	L2
5(a)	Consider a banking system which provides various banking services. Design test cases to transfer money from one savings bank account to another savings bank account operation using use cases.	7M	CO4	L5
(b)	How the mean processing time of a routine is calculated? Write the rules/arithmetic for it. Explain its significance in testing with help of an example.	8M	CO4	L3
6(a)	Draw finite state machine for a Queue and generate test cases from it using state based testing.	7M	CO5	L3
(b)	Briefly explain the procedure for node reduction using graph matrices with a suitable example.	8M	CO5	L3
7(a)	Discuss about various types of software bugs and write the consequences of bugs.	7M	CO1	L1
(b)	What is state-based testing? Draw the state machine model for a "Traffic Light Controller". Generate test cases using state-based testing for this controller.	8M	CO5	L3
8(a)	Consider a program to find NextDate. Find all du paths and dc paths. Design test cases for every definition to every usage.	8M	CO2	L4
(b)	Suppose a program has 5 predicates (A,B,C,D, E). Find out minimum number of test cases for the program using the following function: $F(A,B,C,D,E) = \sum(0,1,2,3,8,10,11,14,15,16,17,18,19,22,23,29)$.	7M	CO4	L3

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B.Tech. (VI Semester) ~~Regular~~/Supplementary Examinations

S152-BUSINESS INTELLIGENCE AND BIG DATA
(IT)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

Q.No	Questions	Marks	CO	BL
1(a)	What are the legal implications of data scraping?	1M	CO1	L1
(b)	What tool or method offers the best starting point for data analysis?	1M	CO2	L1
(c)	Explain the operation systems in BI.	1M	CO3	L1
(d)	Define BI cycle.	1M	CO4	L1
(e)	How to implement a BI solution?	1M	CO5	L1
(f)	List and explain the tools used to handle the big data.	2M	CO1	L1
(g)	Illustrate the newsroom stack in applications of data.	2M	CO2	L2
(h)	Explain the BI systems.	2M	CO3	L1
(i)	Explain about operation systems in BI.	2M	CO4	L1
(j)	Outline the Audi AG case study in implementation of BI solution.	2M	CO5	L2

PART-B
(Answer any FOUR questions. All questions carry equal marks)

Q.No	Questions	Marks	CO	BL
2.	Explain in detail about SMAQ stack for big data.	15M	CO1	L1
3(a)	How data and analytics can improve education?	7M	CO2	L1
(b)	Explain the role of data science in academic disciplines.	8M	CO2	L1
4.	How to bridge the analysis gap in business intelligence?	15M	CO3	L1
5(a)	Identify the BI opportunities.	7M	CO4	L3
(b)	Explain about reporting and analysis in BI.	8M	CO4	L1
6(a)	Discuss about BI implementation strategy.	7M	CO5	L2
(b)	What are the fundamental decisions of implementing a BI solution?	8M	CO5	L1
7(a)	Explain the process of scraping, cleaning and selling big data.	7M	CO2	L1
(b)	Discuss about data journalism and data tools in applications of data.	8M	CO2	L3
8(a)	Explain the process of scraping, cleaning and selling big data.	7M	CO3	L1
(b)	Identify the visualization deconstructed on mapping facebook's friends.	8M	CO3	L4

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B.Tech. (VI Semester) ~~Regular~~/Supplementary Examinations

S259-HEAT TRANSFER
(ME)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

1(a)   Define conduction and convection.   [1M]
 (b)   What is lumped system analysis? When is it applicable?   [1M]
 (c)   Explain the term dimensional homogeneity.   [1M]
 (d)   Define the terms absorptivity, reflectivity and transmisivity of radiation. [1M]
 (e)   What is meant by fouling and give the causes for fouling in Heat
       exchangers?   [1M]
 (f)   How does heat transfer differ from thermodynamics? Is it true to say
       that heat transfer is essentially thermodynamics with rate equations   [2M]
       added.
 (g)   Explain the significance of Biot and Fourier numbers used in unsteady
       state heat transfer.   [2M]
 (h)   Distinguish the Forced and Natural convections and give example for
       each.   [2M]
 (i)   Define and explain the film and drop wise condensation.   [2M]
 (j)   What is the difference between parallel flow and counter flow heat
       exchanger?   [2M]

PART-B
(Answer any FOUR questions. All questions carry equal marks)

2(a)   Derive the expression for temperature distribution associated with
       radial conduction through a sphere.   [7M]
 (b)   A composite slab consists of 250mm fire clay brick (k = 1.09 W/mk)
       inside, 100 mm fired earth brick (k = 0.26 W/mK) and the outer layer of
       common brick(k = 0.6 W/mK) of thickness 50 mm. If the inside surface
       is at 1200 C and outside surface is at 100 C find (i) heat flux (ii) the
       temperature of the interfaces and (iii)the temperature at 200 mm from
       the outer surface of the wall.   [8M]

3(a)   Explain the significance of Heisler charts in solving transient
       conduction problems.   [7M]
 (b)   The initial uniform temperature of a large mass of material
       (α = 0.42m²/hour) is1200°C. The surface is suddenly exposed to and
       held permanently at 60°C. Calculate the time required for the
       temperature gradient at the surface to reach4000C/m.   [8M]

4(a)   A thin flat plate has been placed longitudinally in a stream of air at
       20°C which flows with undisturbed velocity of 7.5 m/s. The surface of
       the plate is maintained at a uniform temperature of 120°C, i) Calculate
       the heat transfer coefficient 0.8m from the leading edge of the plate.
       ii) Also calculate the rate of heat transfer from one side of the plate to
       the air over the first 0.8m length. Assume unit width of the plate.   [7M]

(b)   Discuss the physical significance of dimensionless numbers Re, Nu, Pr, st, Gr.   [8M]

5(a)   Estimate the heat transfer coefficient for a laminar fully developed fluid (k=0.175W/mK) inside a 6mm inner diameter tube under uniform wall temperature boundary condition. Also compute heat transfer rate between the tube wall and the fluid for a length of 8m if the mean temp difference between the wall and the fluid is 500^0C.   [7M]

(b)   Derive the expression for thermal boundary layer thickness over flat plate.   [8M]

6(a)   What do you understand by nucleation in nucleate boiling? Explain subsequent growth and motion of bubbles.   [7M]

(b)   A black body having surface area $0.2m^2$ has an effective temperature 800K.Determine the following (i) total emission (ii) intensity of radiation (iii) wave length for maximum spectral emissive power.   [8M]

7(a)   A glass plate 30 cm square is used to view radiation from a furnace. The transmisivity of the glass is 0.5 from 0.2 to 3.5 μm. The emissivity may be assumed to be 0.3 up to 3.5 μm and 0.9 above that. The transmisivity of the glass is zero, except in the range from 0.2 to 3.5 μm. Assuming that the furnace is a blackbody at 2000^0c, calculate the energy absorbed in the glass and the energy transmitted.   [7M]

(b)   Derive an expression for logarithmic mean temperature difference (LMTD) in case of counter flow heat exchanger.   [8M]

8(a)   Write about classification of heat exchangers.   [7M]

(b)   A heat exchanger is required to cool 55,000 kg/hr of alcohol from 660° C to 400° C using 40,000 kg/hr of water entering at 50° C Calculate the surface area required for i) Parallel flow mode ii) Counter flow mode. Take U (over all heat transfer coefficient) = 580 W/m^{2}k, Cp for alcohol =3760J/kg.K, Cp for water = 4180 J/kg.K.   [8M]

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B.Tech. (VI Semester) Regular/Supplementary Examinations

S292-MACHINE DESIGN-II
(ME)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

Q.No	Questions	Marks	CO	BL
1(a)	Define the term bearing modulus.	1M	CO1	L1
(b)	Classify the crankshafts based on the position of crank.	1M	CO2	L1
(c)	Name the belt drive, which is used with shafts arranged at right angles?	1M	CO3	L1
(d)	What type of stress induced in helical torsion springs?	1M	CO4	L1
(e)	List out advantages of worm gears.	1M	CO5	L2
(f)	Two identical ball bearings P and Q are operating at loads of 30 kN and 50 kN. The ratio of the life of bearing P to the life of bearing Q	2M	CO1	L4
(g)	Enumerate the functions of Piston.	2M	CO2	L3
(h)	List out various stresses induced in wire ropes.	2M	CO3	L1
(i)	Discuss free length and solid length of spring.	2M	CO4	L2
(j)	Define the terms pressure angle and module of the gear.	2M	CO5	L1

PART-B
(Answer any FOUR questions. All questions carry equal marks)

2(a)	Design a Journal bearing for a centrifugal pump for the following specifications. Load on the journal =12kN, diameter of the journal = 75 mm and speed of the journal=1400 rpm. Atmospheric temperature= 25⁰C and operating temperature 70⁰C. Assume if any data required.	7M	CO1	L6
(b)	A shaft rotating at a constant speed subjected to an equivalent radial load of 1663 N. If the total life expected for the bearing is 20 mr at 95% reliability, calculate the dynamic load rating of the bearing.	8M	CO1	L3
3.	The connecting rod for a four stroke petrol engine to be designed for the following data. Bore = 80mm, Stroke =120mm, Weight of reciprocating parts=15N, Maximum speed = 2800rpm, Length of connecting rod from center to center = 240mm, Explosion pressure corresponding to 10⁰ of crank angle = 3 MPa, Compression ratio= 4:1, Factor of safety = 6.	15M	CO2	L6

4.	The V-belt is to transmit 30 kW from a 250 mm pitch diameter sheave to a 900 mm diameter pulley. The centre distance between the two shafts is 1000 mm. The groove angle is 40° and the coefficient of friction for the belt and sheave is 0.3 and the coefficient of friction between the belt and flat pulley is 0.2. The cross-section of the belt is 40 mm wide at the top, 20 mm wide at the bottom and 25 mm deep. The density of the belt is 1000 kg/m³ and the allowable tension per belt is 1500 N. Find the number of belts required.	15M	CO3	L5
5(a)	Design a helical compression spring for a static load of 400 N at a deflection of 45mm with a factor of safety of 2.5. Use spring index C = 8. Specify all parameters necessary to manufacture the spring. State all assumptions.	7M	CO4	L6
(b)	Design a closed coil helical compression spring for a service load ranging from 2250N to 2750N. The axial deflection of the spring for the load range is 6mm. Assume a spring index of 5. The permissible shear stress intensity is 420MPa and modulus of rigidity= 84KN/mm². Neglect the effect of stress concentration.	8M	CO4	L5
6.	Design a spur gear drive to transmit 22 kW at 1000 rpm. Speed reduction is 2.5. The center distance between the gear shafts is approximately 350 mm. Use AGMA standards.	15M	CO5	L6
7(a)	A single-row deep groove ball bearing No. 6002 is subjected to an axial thrust of 1000 N and a radial load of 2200 N. Find the expected life that 50% of the bearings will complete under this condition.	8M	CO1	L5
(b)	Enumerate the steps involved in design of a center crank shaft.	7M	CO2	L6
8.	A semi elliptical laminated spring is to carry a load of 5000N and consists of 8 leaves 46 mm wide, two of the leaves being of full length. The spring is to be made 1000 mm between the eyes and is held at the center by a 60mm wide band. Assume that the spring is initially stressed so as to induce an equal stress of 500 MPa when fully loaded. Determine (i) thickness of leaves (ii) deflection of leaves (iii) lengths of all leaves.	15M	CO5	L5

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B.Tech.VI Semester ~~Regular~~/Supplementary Examinations

S372-ROBOTICS
(ME)

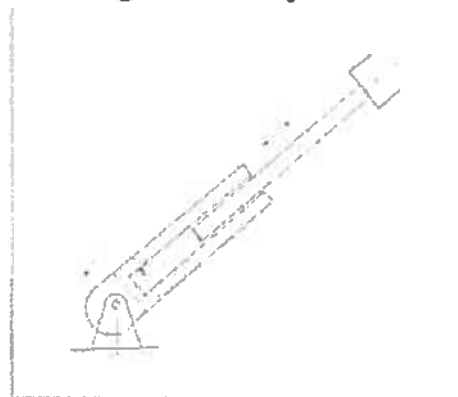Time : 3 hours   Max.Marks:75

PART-A
(Compulsory question)

1(a)	What is a spatial manipulator?	[1M]
(b)	Write the generalized homogenous transformation matrix.	[1M]
(c)	Write the rotation matrix for differential rotation of frame about y axis.	[1M]
(d)	What is a cubic spline?	[1M]
(e)	Listany two position sensors.	[1M]
(f)	List out the robot drive systems.	[2M]
(g)	Define forward kinematics.	[2M]
(h)	Express the relation between differential operators with respect to current frame $^T\Delta$ and fixed frame of reference Δ.	[2M]
(i)	Define Cartesian space trajectory.	[2M]
(j)	What are the types of actuators used in robot applications?	[2M]

PART-B
(Answer any FOUR questions all question carry equal marks)

2(a) Discuss in detail about the factors considered in selection and design of grippers. [7M]

(b) Write a short note on the different components of industrial robotics with a neat sketch. [8M]

3(a) For the vector v = 5i + 4j+ 6k, perform the following operations.
i) A translation of 6 units along y –axis and (ii) a rotation of 30° about x-axis. [7M]

(b) Determine the transformation of frame [1] with respect to frame [2] if transformation of frame [2] with respect to frame [1] is known. [8M]

4. Obtain the Jacobian for the given manipulator below.

Link	a_i	α_i	d_i	θ_i
1	0	90°	0	θ_1
2	0	0	d_2	0

[15M]

5(a) Explain the three basic modes of operations of a robot language operating system. [7M]

(b) The joint of a robot manipulator has to move from 30° to 150° in 4seconds.Find the cubic polynomial to generate a smooth trajectory and the velocity at 3rd second. [8M]

6(a) Discuss the applications of robots used in the field of Assembly and Inspection. [7M]

(b) What is a potentiometer? Explain with a neat sketch. [8M]

7(a) Describe an end effector and sensor commands in second generation robot languages. [7M]

(b) Explainin detail about the steps involved in trajectory planning. [8M]

8(a) Write short notes on various velocity sensors. [7M]

(b) Explain the working of a pneumatic actuating system with neat sketch. [8M]

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B.Tech. (VI Semester) ~~Regular~~/Supplementary Examinations

S302-MECHANICAL VIBRATIONS
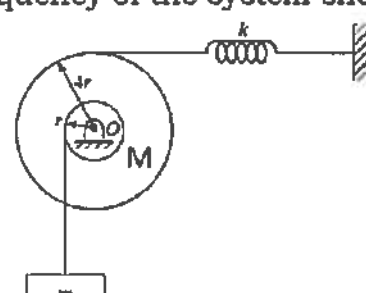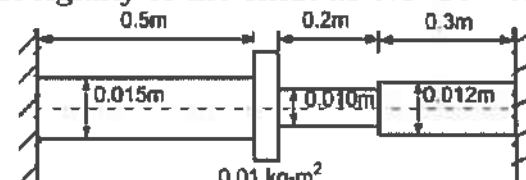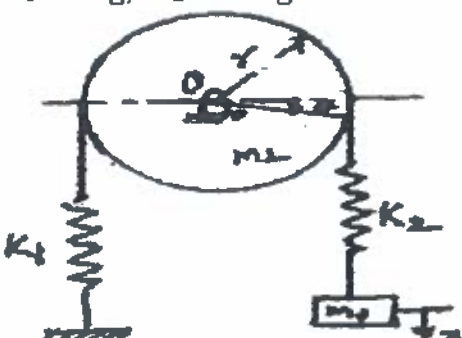(ME)

Time : 3 hours

Max. Marks : 75

PART-A
(Compulsory question)

Q.No	Questions	Marks	CO	BL
1(a)	What do you mean by Free Vibrations?	1M	CO1	L1
(b)	What are Different types of Damping?	1M	CO2	L1
(c)	Write the differential equation for a mass is vibrating due to unbalanced reciprocating mass.	1M	CO3	L1
(d)	How many number of degrees of freedom for a double pendulum?	1M	CO4	L1
(e)	What is continuous system?	1M	CO5	L1
(f)	A 0.453 kg mass attached to light spring elongates it by 7.87 mm. Determine the natural frequency of the system.	2M	CO1	L2
(g)	The natural frequency of a spring mass system is 40Hz. What is damped natural frequency if damping ratio is 0.02?	2M	CO2	L2
(h)	An automobile travelling a road approximated as a sine wave. What do you mean by critical speed of the automobile?	2M	CO3	L2
(i)	What is condition for Dynamic vibration absorber?	2M	CO4	L1
(j)	What is Maxwell reciprocal Theory?	2M	CO5	L1

PART-B
(Answer any FOUR questions. All questions carry equal marks)

2(a)	Find the natural frequency of the system shown in Fig.	8M	CO1	L4
(b)	Consider a stepped shaft with two discs as shown in Fig. Take the modulus of rigidity of the shaft as 0.8×10^{11} N/m.	7M	CO1	L4
3(a)	The following data is given for a vibrating system with viscous damping. Mass = 2.5 kg, Spring constant = 3 N/mm. Amplitude reduces to 0.25 of the initial value after five consecutive cycles. Determine the damping coefficient of the system.	7M	CO2	L3
(b)	A mass of 2 kg is supported on an isolator having a spring scale of 2940 N/m and viscous damping. If the amplitude of free vibration of the mass falls to one half of its original value in 1.5 seconds, determine the damping coefficient of the isolator.	8M	CO2	L3

4(a)	The disc of a torsional pendulum has a moment of Inertia of 600 kg – cm² and is immersed in a viscous fluid. The brass shaft attached to it is of 10 cm diameter and 40 cm long. When the pendulum is vibrating, the observed amplitudes on the same side of the rest position for successive cycles are 9º, 6⁰ and 4⁰. Determine (i) Logarithmic decrement (ii) The time period of vibration (iii) The damping torque (iv) If the disc is removed from viscous fluid, what is the frequency?	8M	CO2	L4
(b)	A mass of 1 kg is to be supported on a spring stiffness of 9800 N/m. The damping coefficient is 5.9 NS/m. Determine the natural frequency of the system. Find also logarithmic decrement and the amplitude after 3 cycles, if the initial displacement is 0.3 cm.	7M	CO2	L4
5(a)	A body of mass 20 kg is suspended from a spring which deflects 15 mm under the weight of the body. The damper provides 28% of the critical damping. If a harmonic force of 200 N at a frequency of 10 Hz is made to act on the body, find the amplitude of motion and phase of the body with respect to the impressed force.	7M	CO3	L2
(b)	The springs of an automobile trailer are compressed 0.1m under its own weight. Find the critical speed when the trailer is traveling over a road with a profile approximated by a sine wave of amplitude 0.08m and wave length of 14 meters. What will be the amplitude of vibration at 60 km/hour?	8M	CO3	L3
6(a)	A machine of mass 75 kg is mounted on springs of stiffness 1200 KN/m and a damping factor of 0.2. A piston within the machine of mass 2 kg with a stroke of 80mm and a speed of 3000 cpm. Find (i) The amplitude of mass (ii) The phase angle of mass with respect to exciting force (iii) The force transmitted to the foundation. The phase angle of transmitted force with respect to exciting force.	7M	CO3	L3
(b)	Discuss in detail about Vibration measuring Instruments.	8M	CO3	L2
7.	Find the natural frequencies of the system shown in the figure and draw the mode shapes. Assume that there is no slip between the cord and cylinder. K_1= 40N/m, K_2= 60N/m, m_1 = 2kg, m_2 = 10kg .	15M	CO4	L4
8.	For the three-degrees-of-freedom system shown in fig (i) Write the differential equations of motions in matrix form (ii) Obtain the natural frequencies for K_1 = K, $3K_2$ = $2K_3$ = 6K, m_1 = m ; $3m_2$ = $2m_3$ = 6m	15M	CO5	L4

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B.Tech. (VI Semester) ~~Regular~~/Supplementary Examinations
S414-TRIBOLOGY
(ME)

Time : 3 hours

Max. Marks : 75

PART-A
(Compulsory question)

Q.No	Questions	Marks	CO	BL
1(a)	Define the word friction.	1M	CO1	L1
(b)	Name the time dependant non Newtonian fluids.	1M	CO2	L1
(c)	Mention the type of lubrication in which metal to metal contact exists.	1M	CO3	L1
(d)	In which state the hydrostatic bearing enters, when the journal is rotating?	1M	CO4	L1
(e)	Specify the value of race rotation factor for a bearing with outer ring rotates.	1M	CO5	L2
(f)	List out the components of ball bearings.	2M	CO1	L2
(g)	Zero wear is preferable. Justify the statement.	2M	CO2	L2
(h)	Differentiate Pseudo Plastics and dilatants fluids.	2M	CO3	L2
(i)	Specify any two disadvantages of Hydrostatic bearing.	2M	CO4	L2
(j)	If a bearing has SKF number of 6203. Identify the diameter of shaft and type of bearing.	2M	CO5	L1

PART-B
(Answer any FOUR questions. All questions carry equal marks)

2(a)	Elucidate the Abrasive wear mechanism with a neat sketch.	7M	CO1	L2
(b)	Enumerate the various Friction measurement techniques with neat sketch.	8M	CO1	L2
3(a)	Illustrate the working of Say bolt Viscometer for measuring kinematic viscosity.	8M	CO2	L2
(b)	Elaborate various properties of Lubricants.	7M	CO2	L2
4(a)	Specify the significance of various dimensionless parameters used in design of journal bearings.	8M	CO3	L3

(b)	A full journal bearing has the following specifications
	       Journal diameter=75mm
	       Radial clearance=0.02mm
	       Journal speed=800rpm
	       Mean viscosity=0.025 Pa s
	       Eccentricity ratio= 0.8
	Neglecting side leakage determines (i) load carrying capacity (ii) attitude angle (iii) power loss due to viscous friction.
		7M	CO3	L3

5(a)	What are the different types of oil rings used in bearings? Explain their utility and advantages.	7M	CO4	L2
(b)	The following data is given for hydrostatic bearing consists of thrust load= 500 KN, shaft speed=1000rpm, supply pressure=6N/mm², film thickness=0.15mm, Ratio of recess dia to shaft dia=0.6 viscosity of lubrication=31cp, specific gravity of lubricant=0.86 and specific heat of lubricant =2.09kj/kg°c. Calculate (i) shaft and recess diameter (ii) Flow requirement in liters/min (iii) Viscous power losses (iv) Pumping power losses.	8M	CO4	L4
6(a)	What are the important properties of bearing materials? Discuss in detail.	7M	CO5	L2
(b)	Give the complete classification of Nonmetallic bearing materials.	8M	CO5	L2
7(a)	Describe the working of Direct Reading Ferro graph in detail with a neat sketch.	7M	CO1	L2
(b)	State and explain all the laws of friction and explain the working of cross- cylinder arrangement for measurement of friction with sketches.	8M	CO1	L2
8(a)	Categorize the Various flows of Fluid.	7M	CO2	L2
(b)	Enumerate the design procedure for sliding contact bearings.	8M	CO5	L3

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LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)
L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.:: A.P.

B.Tech. (VI Semester) ~~Regular~~/Supplementary Examinations

S141-AUTOMOBILE ENGINEERING
(ME)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

Q.No	Questions	Marks	CO	BL
1(a)	Why are T-slots provided in a piston?	1M	CO1	L1
(b)	How is fuel injection maintained evenly in all cylinders?	1M	CO2	L1
(c)	Give the difference between the magneto and thecoil ignition system.	1M	CO3	L1
(d)	State the principle of starting motor.	1M	CO4	L1
(e)	Define steering ratio.	1M	CO5	L1
(f)	State the function of piston rings.	2M	CO1	L2
(g)	Explain solid or airless injection.	2M	CO2	L2
(h)	Mention the different foulings that occur in a spark plug.	2M	CO3	L2
(i)	Enumerate the merits and demerits of automatic transmission.	2M	CO4	L2
(j)	Define caster. Explain the effect of excessive caster.	2M	CO5	L5

PART-B
(Answer any FOUR questions. All questions carry equal marks)

Q.No	Questions	Marks	CO	BL
2(a)	Draw the complete layout of an automobile and discuss briefly how the power transmission System takes place from engine to rear wheel.	7M	CO1	L1
(b)	Point out the necessity of using a cylinder liner. Draw neat sketches of dry and wet liners and make a comparison between them.	8M	CO1	L4
3(a)	State the function of a carburetor in a petrol engine. Describe a simple carburettor with a neat sketch and also state its limitations.	7M	CO2	L1
(b)	Mention the functions of a nozzle. With sketches explain the various types of nozzles.	8M	CO2	L2
4(a)	Explain the working of a Battery ignition system with a suitable sketch.	7M	CO3	L2
(b)	Explain the sensors used for temperature measurements.	8M	CO3	L2
5(a)	What is the function of a clutch? Explain the working of a centrifugal clutch.	7M	CO4	L1
(b)	Briefly explain the construction and working of a differential with the help of neat sketch.	8M	CO4	L2
6(a)	Explain in detail the necessity and principle of working of an antilock brake system.	7M	CO5	L2
(b)	Explain briefly the action of air springs. Draw the schematic diagram showing the layout of an air suspension system and describe the same.	8M	CO5	L5
7(a)	Discuss the merits and demerits of front engine front wheel drive and rear engine rear wheel drive.	7M	CO1	L1
(b)	With the help of neat sketch explain the working of S.U Electric pump.	8M	CO2	L2
8(a)	Describe the construction of a sliding mesh gear box. Show how the power flows in various speeds.	7M	CO4	L2
(b)	Describe, with a neat sketch, the working of a typical power steering system.	8M	CO5	L2

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