A.Y. 2019-20

Regulations : R14

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)
B.Tech. (IV Semester)(R14) Supplementary Examinations, October 2020

TIME TABLE

TIME :2.00 PM to 5.00 PM

DATE	ASE	CE	CSE	ECE	EEE	EIE	IT	ME
20-10-2020 (Tuesday)	S403 - Theory of Machines	S112 - Advanced Surveying	S351 - Probability and Statistics	S125 - Analog Communications	S164 – Complex Variables and Statistical Methods	S410 - Transducers in Instrumentation	S351 - Probability and Statistics	S351 - Probability and Statistics
21-10-2020 (Wednesday)	S116 - Aerodynamics – I	S392- Strength of Materials - II	S180 - Database Management Systems	S174 - Control Systems	S174 - Control Systems	S174 - Control Systems	S180 - Database Management Systems	S252 - Fluid Mechanics and Hydraulic Machinery
22-10-2020 (Thursday)	S121 - Aircraft Structures - I	S264 - Hydraulics and Hydraulic Machinery	S381 - Software Engineering	S128 - Analog integrated Circuits	S342 - Power Generation and Utilization	S361 - Pulse and Switching Circuits	S381 - Software Engineering	S354 - Production Technology
23-10-2020 (Friday)	S136 - Applied Thermodynamics	S234 - Engineering Geology	S284 - JAVA Programming	S169 - Computer Organization	S217 - Electrical Machines – II	S169 – Computer Organization	S169 - Computer Organization	S286 - Kinematics of Machines
27-10-2020 (Tuesday)	S309 - Metallurgy and Material Science	S295 - Managerial Economics and Financial Analysis	S167 - Computer Graphics	S192 – Digital Signal Processing	S127 - Analog Electronics	S295 - Managerial Economics and Financial Analysis	S295 - Managerial Economics and Financial Analysis	S407 – Thermal Engineering
28-10-2020 (Wednesday)	S297 - Manufacturing Technology	S393 - Structural Analysis - I	S350 - Principles of Programming Languages	S223 - Electromagnetic Fields and Waves	S189 - Digital Electronic Circuits	S207 - Electrical and Electronic Measurements	S312 - Microprocessors and Interfacing	S245 - Estimation, Costing and Engineering Economics
29-10-2020 (Thursday)	S355 - Professional Ethics and Human Values	S355 - Professional Ethics and Human Values	S355 - Professional Ethics and Human Values	S243 - Environmental Studies	S243 - Environmental Studies	S243 - Environmental Studies	S355 - Professional Ethics and Human Values	S355 - Professional Ethics and Human Values

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: 06-10-2020

CONTROLLER OF EXAMINATIONS

PRINCIPAL

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

H.T.No ☐☐☐☐☐☐☐☐☐☐

R14

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

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

S403-THEORY OF MACHINES
(AE)

Time : 3 hours   Max.Marks:75

PART-A
(Answer all questions)

|		
1(a)	Define degree of freedom.	[1M]
(b)	What are the types of belts used for power transmission?	[1M]
(c)	Write about flat faced follower?	[1M]
(d)	How gyroscopic effects are nullified on an airplane while taking a right turn?	[1M]
(e)	What is static balancing?	[1M]
(f)	What is a four bar chain or quadric cycle chain?	[2M]
(g)	Write about screw friction?	[2M]
(h)	Draw spur gear with its nomenclature.	[2M]
(i)	In what way can the angular velocity be represented by a vector?	[2M]
(j)	How primary balancing can be done in reciprocating engines?	[2M]

PART-B
(Answer any FOUR questions)

2(a) Describe the various inversions of a four bar chain with neat diagrams. [7M]

(b) Explain different kinds of kinematic pairs giving example for each one of them. [8M]

3(a) Describe with a neat sketch the working of a single plate friction clutch. [7M]

(b) An open-belt drive is required to transmit 10 kW of power from a motor running at 600 rpm. Diameter of the driving pulley is 250 mm. The speed of the driven pulley is 220 rpm. The belt is 12 mm thick and has a mass density of $0.001 g/mm^3$.Safe stress in the belt is not to exceed $2.5 N/mm^2$.The two shafts are 1.25m apart. The coefficient of friction is 0.25. Determine the width of the belt. [8M]

4(a) What is meant by epicyclic gear train? How do we find velocity ratio of it? Explain with an example. [7M]

(b) A cam with a minimum radius of 25 mm is to be designed for a knife-edge follower with the following data: To raise the follower through 35 mm during 60^0 rotation of the cam, Dwell for next 40^0 of the cam rotation, descending of the follower during the next 90^0 of the cam rotation, Dwell during the rest of the cam rotation, Draw the profile of the cam if the ascending and descending of the cam is with simple harmonic motion. What is the maximum velocity and acceleration of the follower during the ascent and the descent if the cam rotates at 150 rpm? [8M]

5(a) Each road wheel of a motor cycle has a mass moment of inertia of 1.5 kg-m². The rotating parts of the engine of the motor cycle have a mass moment of inertia of 0.25 kg-m². The speed of the engine is 5 times the speed of the wheels and is in the same sense. The mass of the motor cycle with its rider is 250 kg and its centre of gravity is 0.6 m above the ground level. Find the angle of heel if the cycle is travelling at 50 km/h and is taking a turn of 30 m radius. The wheel diameter is 0.6 m. [7M]

(b) An aeroplane makes a complete half circle of 59 metres radius, towards left, when flying at 235 km per hr. The rotary engine and the propeller of the plane has a mass of 400 kg and a radius of gyration of 0.3 m. The engine rotates at 2400 r.p.m. clockwise when viewed from the rear. Find the gyroscopic couple on the aircraft and state its effect on it. [8M]

6(a) Explain why only a part of the unbalanced force due to reciprocating masses is balanced by revolving mass. [7M]

(b) Four masses A, B, C and D carried by a rotating shaft at radii 80 mm, 100 mm, 160 mm and 120 mm respectively are completely balanced. Masses B, C and D are 8 kg, 4 kg and 3 kg respectively. Determine the mass A and the relative angular positions of the four masses if the planes are spaced 500 mm apart. [8M]

7(a) How do you state that oscillating cylinder and rotary internal combustion engine are inversions of a single slider crank chain? Explain with neat sketches. [7M]

(b) Find the Kinematic linkages shown in figure (a) and (b) below, calculate the following; a) The number of binary links (N_b) b) The number of ternary links (N_t) c) The number of other (quaternary, etc) links (No) d) The number of total links (N) e) The number of loops (L) f) The number of joints or pairs (P) g) The number of degree of freedom (F)

(a)   (b)

[8M]
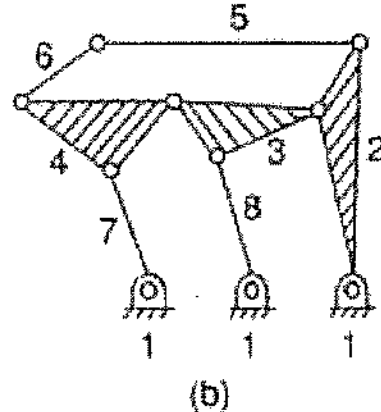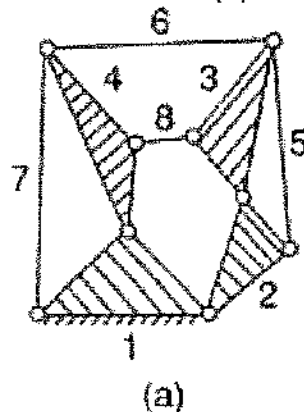
8(a) A V-belt drive with the following data transmits power from an electric motor to a compressor: power transmitted = 150 kW, speed of the electric motor = 850 rpm, Speed of the compressor=400 rpm, Diameter of the compressor pulley = 850 mm, Centre distance between pulleys =1.8 m, Maximum speed of the belt= 40 m/s, Mass density of the belt=800 kg/m³, cross-sectional area of the belt = 380 mm²,Allowable stress in the belt = 2.2 N/mm²,Groove angle of the pulley = 40⁰, coefficient of friction = 0.28. Determine the number of belts required and the length of each belt. [7M]

(b) A square-thread bolt with a core diameter of 25 mm and a pitch of 6 mm is tightened by screwing a nut. The mean diameter of the bearing surface of the nut is 60 mm. The coefficient of friction for the nut and the bolt is 0.12 and for the nut and the bearing surface, it is 0.15. Determine the force required at the end of a 400 mm long spanner if the load on the bolt is 12 kN. [8M]

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

S116-AERODYNAMICS-I
(AE)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

1(a) What is the value of stream function of streamline passing through stagnation point for semi-infinite body? [1M]

(b) What is the maximum thickness location for symmetrical airfoil in the transformed plane? [1M]

(c) What is the location of center of pressure for symmetrical airfoil by the theoretical result? [1M]

(d) What is the velocity induced at a given point 'P' by an semi-infinite, straight vortex filament of strength (Γ) at a perpendicular distance 'h' from P? [1M]

(e) For what bodies the skin friction drag accounts for the major portion of the total drag and the wake drag is very small? [1M]

(f) Draw the streamlines for source flow. [2M]

(g) How to transform circle of radius 'a' in to straight line using Kutta-Joukowski transformation function? [2M]

(h) Define vortex sheet. [2M]

(i) What is induced drag? [2M]

(j) Name any two examples for bluff body. [2M]

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

2(a) Consider uniform flow with velocity V_∞ moving from left to right over source and sink of strengths 'Λ' and '$-\Lambda$', respectively (equal and opposite). Consider polar coordinate system with source and sink placed a distance 'b' to the left and right of the origin, respectively. Prove that the superposition of a uniform flow and source-sink is a flow over Rankine oval. [7M]

(b) The superposition of a uniform flow and a doublet results in non-lifting flow over a circular cylinder. i) Find out the coordinates for location of stagnation point. ii) What is the equation of streamline passing though the stagnation point? [8M]

3(a) A symmetrical aerofoil is obtained by transforming a circle of radius 'a' with Kutta-Joukowski transformation function? The center of the circle in the physical plane is shifted from the origin 'o' and located downstream of the origin on the x- axis. Let 'e' be the eccentricity and actual distance of the center of circle from the origin is 'be'. The parameter 'b' is a constant in Kutta-Joukowski transformation function. Treat the radius of circle a = b+be. The coordinates of the transformed profile are $\xi = 2b \cos\theta$ and $\eta = 2be(1 + \cos\theta)\sin\theta$. Express the ratio of maximum thickness to chord as a function of eccentricity. [7M]

(b) A cambered aerofoil is obtained by transforming a circle of radius 'a' with Kutta-Joukowski transformation function? The center 'c' of the circle is displaced horizontally as well as vertically from the origin in the physical plane. The horizontal shift of the center is 'be' and the vertical shift is 'h'. Let 'e' be the eccentricity. The parameter 'b' is a constant in Kutta-Joukowski transformation function. Find out the coordinates of cambered airfoil profile in the transformed plane. [8M]

4(a) Derive the coefficient of lift expression for symmetrical airfoil using the thin airfoil theory.

Hint:

$$\frac{1}{2\pi} \int_0^c \frac{\gamma(\xi)\,d\xi}{x - \xi} = V_\infty \left(\alpha - \frac{dz}{dx} \right)$$

$$\gamma(\theta) = 2\alpha V_\infty \frac{(1 + \cos\theta)}{\sin\theta}$$ [7M]

(b) Prove that the center of pressure and the aerodynamics center are both at the quarter chord point in the case of symmetrical airfoil. [8M]

5(a) Derive the fundamental equation of Prandtl's lifting-line theory. [7M]

(b) Show that the downwash is constant over the span for an elliptical lift distribution. Consider the following total downwash expression as given below.

$$w(y_0) = -\frac{1}{4\pi} \int_{-b/2}^{b/2} \frac{(d\Gamma/dy)\,dy}{y_0 - y}$$ [8M]

6(a) Air moves over a flat plate with a uniform freestream velocity of 10 m/s. At a position 15 cm away from the leading edge of the plate, what is the boundary layer thickness? Use the parabolic velocity profile in the boundary layer $u/U = 2(y/\delta) - (y/\delta)^2$, where 'u' is the velocity at y and $u \to U$ (freestream velocity) as $y \to \delta$ (boundary layer thickness). For air kinematic viscosity is 1.5×10^{-5} m²/s and density is 1.23 kg/m³. [7M]

(b) A flat plate of length 0.8 m and width 1.9 m is kept in a sea level air stream flowing at a velocity of 5.3 m/s. Assuming a linear velocity profile for the boundary layer over the plate. Evaluate the boundary layer thickness at the end of the plate and total skin friction drag on the plate. [8M]

7(a) Consider the lifting flow over a circular cylinder with a diameter 0.5 m. The freestream velocity is 25 m/s, and the maximum velocity on the surface of the cylinder is 75 m/s. The freestream conditions are those for a standard altitude of 3 km (density is 0.9 kg/m³). Calculate the lift per unit span on the cylinder. [7M]

(b) The lift on spinning circular cylinder in a freestream with a velocity of 30 m/s and at standard sea level conditions is 6 N/m of span. Calculate the circulation around the cylinder. [8M]

8(a) Explain the mechanism of formation of trailing vortices at wing tips of finite wings. [7M]

(b) Derive the Equation for induced drag coefficient $C_{D,i} = C_L^2/AR$, for elliptical lift distribution. C_L is lift coefficient, AR is aspect ratio. [8M]

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

S121-AIRCRAFT STRUCTURES-I
(ASE)

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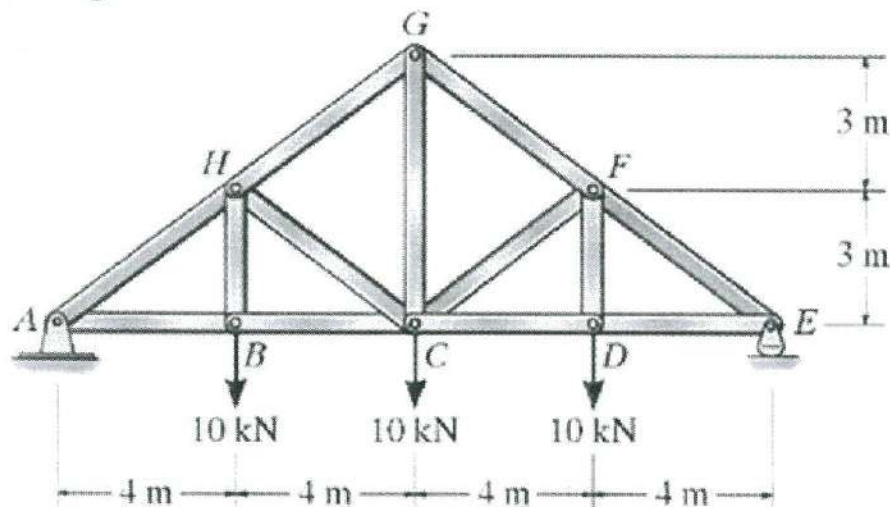
PART-A
(Compulsory question)

Q.No	Questions	Marks
1(a)	Define obliquity.	1M
(b)	Write the relation between number of joints and members for imperfect frame.	1M
(c)	What is fixed beam?	1M
(d)	Define modulus of resilience.	1M
(e)	What are the important end conditions of columns?	1M
(f)	Determine minimum principal stress for $s_x=100$ N/mm², $s_y=70$ N/mm², $G_{xy}=50$ N/mm².	2M
(g)	Explain statically determinate structures with example.	2M
(h)	What is the fixed end moment of a fixed beam when it is subjected to point load at middle?	2M
(i)	State in which cases, Castigliano's theorem can be used.	2M
(j)	Explain limitations of Euler's formula.	2M

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

2(a)	Explain principal planes, principal stress and principal strains.	7M
(b)	The stresses at a point in a bar are 300 N/mm² (tensile) and 150 N/mm² (compressive). Determine the resultant stress in magnitude and direction on a plane inclined at 45⁰ to the axis of the major stress.	8M
3.	Analyze the given frame and find the forces in the members of the Truss shown in Fig.	15M

4(a)	A fixed beam AB 5 m long carries a point load of 48 KN at its centre. The Moment of Inertia of the beam is 5×10^7 mm^4 and value of E for the beam material is 2×10^5 N/mm^2 Determine Fixed end moments at A and B.	8M
(b)	Evaluate the prop reaction of a cantilever of length 6 m carries a point load of 48 KN at its centre. The cantilever is propped rigidly at the free end.	7M

5(a)	Write short note on Castigliano's first theorem.	7M
(b)	Find the deflection at the centre of a SSB of span L carrying a UDL of w per unit run over the whole span, Assume uniform flexural rigidity.	8M

6(a)	A mild steel column of 50 mm diameter is hinged at both ends. Find the crippling load for the column, its length is 2.5 m take E= 200Gpa.	7M
(b)	Calculate the safe compressive load on a hollow cast iron column one end rigidly fixed and the other hinged of 150 mm external diameter and internal diameter 100 mm and 10 m in length. Use Euler's formula with a factor of safety of 5, and E= 95 KN/mm^2.	8M

7(a)	Derive the normal strain on the inclined plane.	7M
(b)	At a point in a elastic material the normal stresses on two mutually perpendicular planes are 80 N/mm^2 tensile and 60 N/mm^2 compressive. These planes also carry shear stresses of 65 N/mm^2.Determine the principal planes and principal stresses.	8M

8(a)	A continuous beam ABC as shown in Fig. Determine the reactions and moments at the supports.	7M
(b)	Analyze the beam ABC of length 16 m consists of spans AB and BC each 8 m long and simply supported at A, B and C. the beam carries a UDL of 40 KN/m on the whole length. Find the reactions at the support and the support moments.	8M

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B.Tech. IV Semester ~~Regular~~/Supplementary Examinations
S136-APPLIED THERMODYNAMICS
(AE)

Time: 3 hours   Max. Marks: 75

PART-A
(Compulsory question)

1(a)	Sketch Carnot's cycle.	[1M]
(b)	Define nozzle efficiency.	[1M]
(c)	Define reheat factor.	[1M]
(d)	State the purpose of providing piston in an IC engine.	[1M]
(e)	Define humidity ratio.	[1M]
(f)	Analyze the effect of increasing the average temperature at which heat is supplied on a Rankine cycle.	[2M]
(g)	Write a short note on convergent-divergent nozzle.	[2M]
(h)	State the difference between impulse and reaction turbine.	[2M]
(i)	Classify IC engines based on Cooling system.	[2M]
(j)	Name the different components of summer air conditioning system.	[2M]

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

2(a) In a Rankine cycle, the steam at inlet to turbine is saturated at a pressure of 35 bar and the exhaust pressure is 0.2 bar. Determine: (i) The pump work, (ii) The turbine work, (iii) The Rankine efficiency, (iv) The condenser heat flow, (v) The dryness at the end of expansion. Assume flow rate of 9.5 kg/s.   [8M]

(b) With a neat sketch explain the working of La-Mont boiler.   [7M]

3(a) Discuss the effects of irreversibility on nozzle efficiency with the help of T-S diagram.   [7M]

(b) Explain with a neat sketch the working of parallel flow jet condenser.   [8M]

4(a) The steam leaves the nozzles of a single row impulse turbine at 900m/s. The nozzle angle is 20^0 and blade angles are 30^0 at inlet and outlet. Calculate the blade velocity and work done per kg of steam. Assume the flow over the blade is friction less.   [8M]

(b) Derive an expression for optimum stage efficiency of a reaction turbine.   [7M]

5(a) Explain the working principle of 4-stroke SI engine with the help of P-V diagram.   [8M]

(b) A four cylinder, four stroke petrol engine has a 10cm bore, 15cm stroke and uses a compression ratio of 6. The engine develops 25kW indicated power at 2000rpm. Find the mean indicated pressure and air standard efficiency. Also, calculate the fuel consumption per hour, if the indicated thermal efficiency is 30%. Take the calorific value of fuel as 42MJ/kg.   [7M]

6(a) An air refrigeration open system operating between 1 MPa and 100 kPa is required to produce a cooling effect of 2000 kJ/min. Temperature of the air leaving the cold chamber is – 5°C and at leaving the cooler is 30°C. Neglect losses and clearance in the compressor and expander.
Determine :
(i) Mass of air circulated per min.
(ii) Compressor work, expander work, cycle work
(iii) COP and power in kW required. [8M]

(b) What are the psychometric processes encountered in air conditioning practice? [7M]

7(a) A boiler is equipped with a chimney of 30m height. The ambient temperature is 25°C. The temperature of flue gases passing through the chimney is 300°C. If the air flow is 20kg/kg of fuel burnt, find: (i)draught produced; (ii) the velocity of flue gases passing through chimney if 50% of the theoretical draught is lost in friction. [8M]

(b) Explain the working of Evaporative condenser with a neat sketch. [7M]

8(a) The following results refer to a test on a petrol engine
          Indicated power = 30 kW,
          Brake power = 26 kW,
          Engine speed = 1000 rpm
          Fuel brake power/ hour = 0.35 kg
          Calorific value of fuel = 43900kJ/kg
Calculate the indicated Thermal efficiency, the brake Thermal efficiency and Mechanical efficiency. [8M]

(b) With a neat sketch explain the working of a summer sir-conditioning system. [7M]

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

S297-MANUFACTURING TECHNOLOGY
(AE)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

1(a)	How much is the tolerance value produced by Investment casting.	[1M]
(b)	Define briefly about friction welding.	[1M]
(c)	Write about the different types of rolling?	[1M]
(d)	Which type of surfaces is machined on lathe?	[1M]
(e)	Define grinding operation.	[1M]
(f)	What is shrinkage allowance?	[2M]
(g)	Give two differences between TIG and MIG welding.	[2M]
(h)	What is meant by closed die forging?	[2M]
(i)	Write about the process of knurling.	[2M]
(j)	What is the working principle of UCM?	[2M]

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

2(a)	Explain the steps involved in making a casting with neat sketch.	[7M]
(b)	State the application of semi-centrifugal and centrifugal casting methods.	[8M]
3(a)	Discuss the types of welding joints with their standard symbols.	[7M]
(b)	Differentiate between arc and gas welding with respect to the principle, operation, application and limitations.	[8M]
4(a)	Describe the process of hot extrusions of tubes.	[7M]
(b)	What is hot extrusion? Discuss the hydro static extrusion with the help of neat sketches?	[8M]
5(a)	What is meant by Single point cutting tool? What are the requirements for cutting tool materials?	[7M]
(b)	Briefly explain the various parts of lath with neat sketches.	[8M]
6(a)	With the help of sketch, how many types of drilling machines and their applications?	[7M]
(b)	What is Electron Discharge Machining? When will you use reverse polarity in EDM? Justify answer with example.	[8M]
7(a)	What are the different elements in a typical gating system?	[7M]
(b)	Describe with neat sketch the MIG welding process and give its specific applications.	[8M]
8(a)	What is flash desirable is impression die forging?	[7M]
(b)	What is the difference between peripheral milling and face milling with the help of neat sketches?	[8M]

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B.Tech. IV Semester) Supplementary Examinations

S355-PROFESSIONAL ETHICS AND HUMAN VALUES

Time : 3 hours   (ASE, CE, CSE, IT, ME)   JC11   Max. Marks : 75

PART-A
(Compulsory question)

Q.No	Questions	Marks
1(a)	Define 'self-respect'.	1M
(b)	Define values.	1M
(c)	Mention any two limitations for 'codes of ethics'.	1M
(d)	What is meant by 'Authority'?	1M
(e)	Define 'moral leadership'.	1M
(f)	Explain the terms, 'profession',' professional',' professionalism'.	2M
(g)	Give few examples for values.	2M
(h)	State the importance of industrial standards.	2M
(i)	Define institutional authority with an example.	2M
(j)	State the definition for 'appropriate technology'.	2M

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

Q.No	Questions	Marks
2(a)	Discuss on the theory pertaining to moral autonomy with specific reference to; consensus 'and 'controversy'.	7M
(b)	State the definitions of profession, professional, professionalism and the criteria for achieving professional status.	8M
3(a)	What is empathy? State how it can be practiced by a leader?	8M
(b)	Creativity in one's own capabilities, values, and goals, is self confidence. Justify your answer.	7M
4(a)	Laws are needed to provide a minimum level of compliance, justify your answer.	7M
(b)	What is meant by moral commitment? Justify your answer.	8M
5(a)	Discuss in detail the concept of 'Assessment of safety and risk.	8M
(b)	What is meant by personal risk? Discuss in detail.	7M
6(a)	Discuss in detail the concept of multinational companies.	8M
(b)	Engineers as experimenters have certain duties towards environment, state them in detail.	7M
7(a)	State how loyalty can be exhibited in different senses.	8M
(b)	Define confidentiality and state various moral principles of confidentiality.	7M
8(a)	Discuss the concept of global warming.	7M
(b)	Explain the concept"Human-centered Environmental Ethics".	8M

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B.Tech. IV Semester Regular/Supplementary Examinations

S309– METALLURGY AND MATERIAL SCIENCE

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

PART-A
(Compulsory question)

1(a)	What is a grain Boundary?	[1M]
(b)	Discuss lever rule with an example.	[1M]
(c)	Give the composition of mild Steel.	[1M]
(d)	Write about Nitriding.	[1M]
(e)	Mention few applications of A356 alloy.	[1M]
(f)	Define Solid solution.	[2M]
(g)	Explain Gibbs Phase Rule.	[2M]
(h)	What is the necessity of heat treatment?	[2M]
(i)	Write the potential differences between Steel and Cast Iron.	[2M]
(j)	Mention few differences between alloys and composites.	[2M]

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

2.	Make use of neat sketches to discuss about Crystal Imperfections in detail with neat sketches.	[15M]
3(a)	Explain the construction of Equilibrium Diagrams.	[7M]
(b)	Elaborate Cu- Ni phase diagram.	[8M]
4.	Staring from Iron allotropy, Explain Iron – Iron Carbide Equilibrium diagram with a neat sketch.	[15M]
5(a)	Enumerate the differences between Annealing and Normalizing.	[7M]
(b)	Explain the construction TTT diagram of eutectoid steel and mention the formation of various phases.	[8M]
6(a)	Classify the composites and mention the advantages, applications of Metal Matrix composites over Ceramic Matrix Composites.	[7M]
(b)	Distinguish brasses and Bronzes.	[8M]
7(a)	Explain the phenomena of Age Hardening.	[7M]
(b)	What is Hardenability and Explain Jominy End Quench test of Hardenability?	[8M]
8.	What is Coordination Number and Atomic Packing factor? Deduce APF for BCC, FCC and HCP Structures.	[15M]

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

S112-ADVANCED SURVEYING
(CE)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

1(a)	Define swinging.	[1M]
(b)	What is stadia hair?	[1M]
(c)	What is the degree of curve?	[1M]
(d)	What is base line in triangulation?	[1M]
(e)	What are the methods of locating soundings?	[1M]
(f)	Discuss primary adjustment of vernier theodolie.	[2M]
(g)	Why the substance bar used?	[2M]
(h)	Draw the neat sketch of compound curve with components.	[2M]
(i)	What is the principle of triangulation survey?	[2M]
(j)	What is total station?	[2M]

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

2(a) Discuss the various methods of locating details in a theodolite traverse. [7M]

(b) In running a theodolite traverse in an anticlockwise direction, the following data were obtained. The lengths CD and DE could not be measured owing the obstacles. Calculate the length of CD and DE.

Line	length (m)	Bearing
AB	98.0	0°
BC	67.5	N 25°12'W
CD	-	S 75°06'W
DE	-	S 56°24'E
EA	70.0	N35°36'E

[8M]

3(a) Describe the procedure for determination of constants of a tachometer. [7M]

(b) In tachometry surveying the readings of 3 diaphragm webs on a staff held at a distant point were recorded as 0.650, 0.990 and 1.320m, the telescope held horizontally. If the multiplying and additive constants were 100 and 0.5 respectively, calculate the distance of the staff from the instrument station. If the RL of the instrument station was 25.250m and height of sight was 1.45m, determine the R.L of staff station. [8M]

4(a) Describe the different methods of setting out simple circular curves. [7M]

(b) Trigonometric leveling was carried out to determine the difference in elevation of two station P and Q 2500 m apart. If the angle of elevation at P was 1°45' and the angle of depression at Q was 1°35', find the height of Q above P, and the refraction correction. The height of instrument above its station was 1.1m and that of the signal was 4. [8M]

5(a) What is satellite station? How would you reduce the horizontal angles? [7M]

(b) How is the base line measurement carried out in triangulation? Describe the different tape corrections to be applied for the length of the base line. [8M]

6(a) What is GIS? Explain its various components in detail? [7M]

(b) Explain with reference to aerial photographs, What is meant by end over lap and side over lap and why they are provided? [8M]

7(a) Explain the permanent adjustments of theodolite? [7M]

(b) What is gales traverse table? What are the steps adopted for complete traverse computations in Gales traverse table. [8M]

8(a) What are reciprocal observations in Trigonometric leveling? How is it superior to single observation? [7M]

(b) Define curve. How are circular curves classified? Explain the elements of simple circular curve? [8M]

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LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.:: A.P.

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

S392–STRENGTH OF MATERIALS-II
(CE)

Time : 3 hours

Max. Marks : 75

PART-A
(Compulsory question)

1(a)	Define principal strain.	[1M]
(b)	Write the expression for 'J' in case of a hollow shaft.	[1M]
(c)	A long column of length L with both ends hinged is acted upon by an axial compressive load P. Write the differential equation for the bending of column.	[1M]
(d)	List out the conditions for stability of a masonry structure.	[1M]
(e)	Write the formula to find the stresses in unsymmetrical bending.	[1M]
(f)	A tie bar is subjected to a uniform tensile stress of 100 N/mm^2. Determine the intensity of normal stress and shear stress on a plane the normal to which is inclined 30^0 to the axis of the bar.	[2M]
(g)	For a hollow shaft of D = 300mm and d = 200mm, determine the polar section modulus.	[2M]
(h)	A solid round bar 3 m long and 5 cm diameter is used as a strut with both ends fixed. Determine the crippling load. Take E = 2 × 10^5 N/mm^2.	[2M]
(i)	If the base width of the dam is b = 8m, determine the eccentricity e to avoid tension in the dam section.	[2M]
(j)	If Ixx =142.35mm^4 and Iyy = 400mm^4 and Ixy = -385mm^4, then determine the principal moment of inertia Ivv.	[2M]

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

2(a)	Develop the formulae for the normal and tangential stresses on an inclined plane in case of bi-axial stress system.	[7M]
(b)	At a point in an elastic material under strain, there are normal stresses of 50N/mm^2 and 30N/mm^2 (both tensile) respectively at right angles to each other with a shearing stress of 25N/mm^2. Determine the principal stresses and the position of the principal planes.	[8M]
3(a)	Determine the power transmitted by a solid steel shaft of 50mm diameter at 120 rpm, if the permissible shear stress is not to exceed 62.5 N/mm^2.	[7M]
(b)	Deduce the expression for the close coiled helical spring under axial pull.	[8M]
4(a)	Develop the Euler's crippling load for the column with one end fixed and the other end free.	[7M]
(b)	Determine the section of a cast iron hollow cylindrical column 5m long with ends firmly built-in if it carries an axial load of 300kN.The ratio of internal to external diameter is 3/4. Use factor of safety 8. f_c = 567N/mm^2 and Rankine's constant = 1/1600.	[8M]

5(a) Determine the maximum and minimum stress intensities induced on the base of a masonry wall 6m high, 4 m wide and 1.5 m thick, subjected to a horizontal wind pressure of 1.5 kN/m² acting on the 4m side. The unit weight of masonry may be taken as 22.4 kN/m³. [7M]

(b) A beam of rectangular section of 80mm to 120mm carries a uniformly distributed load of 40kN/m over a span of 1m and an axial compressive force of 5kN. Determine (i) maximum fibre stress, (ii) fibre stress at a point 0.25m from the left end of the beam and 40mm below the neutral axis. [8M]

6(a) The truss in Fig. is pinned to the wall at point F, and supported by a roller at point C. Calculate the force (tension or compression) in members BC, BE, and DE.

[7M]
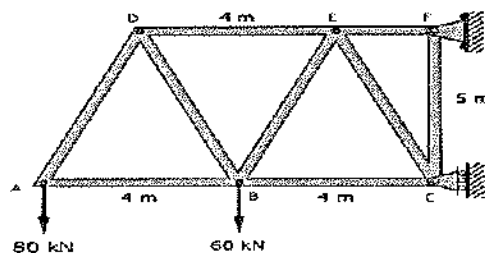
(b) Determine the centroidal principal moment of inertia of the equal angle section 30mm x 30mm x 10mm as shown in fig. Use analytical method.

[8M]
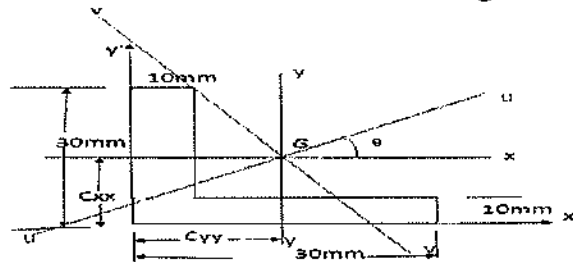
7(a) A close-coiled helical compression spring is made of 10 mm steel wire closely coiled to a mean diameter of 100 mm with 20 coils. A weight of 100 N is dropped on to the spring. If the maximum instantaneous compression is 60 mm, determine the height of the drop. Take N = 0.84x10⁵ N/mm². [7M]

(b) Determine the Euler's crippling load for a hollow cylindrical steel column of 38 mm external diameter and 2.5 mm thick. Take length of the column as 2.3 m and hinged at its both ends. Take E = 205 kN/mm². [8M]

8(a) Determine the core of a hollow circular section. [7M]

(b) The stresses on two perpendicular planes through a point are 60 N/mm² tension, 40 N/mm² compression and 30 N/mm² shear. Find the stress components and the resultant stress on a plane at 60⁰ to that of the tensile stress. [8M]

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B.Tech. IV Semester Regular/Supplementary Examinations

S264-HYDRAULICS AND HYDRAULIC MACHINERY
(CE)

Time: 3 hours   Max. Marks: 75

PART-A
(Compulsory question)

1(a)	Define Gradually Varied Flow.	[1M]
(b)	Define Impact of Jet.	[1M]
(c)	Define Jet Ratio.	[1M]
(d)	Write the main parts of the reciprocating pump.	[1M]
(e)	Define negative slip of reciprocating pump.	[1M]
(f)	Define subcritical flow using Froude Number.	[2M]
(g)	Find the force exerted by a jet water of diameter 75 mm on stationery flat plate, when the jet strikes the plate normally with velocity of 20 m/s.	[2M]
(h)	Draw the general layout of hydroelectric power plant.	[2M]
(i)	Define suction head and delivery head.	[2M]
(j)	Write an expression for work done by reciprocating pump.	[2M]

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

2(a) Derive an expression for discharge through an open channel by Chezy's Formula. [8M]

(b) Find the bed slope of a trapezoidal channel of bed width 4 m, depth of water 3 m and side slope of 2 horizontal to 3 vertical, when the discharge through the channel is $20 m^3/sec$. Take Manning's N = 0.03 in Manning's formula. [7M]

3(a) Derive an expression for the depth of hydraulic jump in terms of the upstream Froude number. [8M]

(b) Find the slope of the free water surface in a rectangular channel of width 20 m, having depth of flow 5 m. The discharge through channel is $50 m^3/s$. The bed of the channel is having a slope of 1 in 4000. Take the value of Chezy's constant C = 60. [7M]

4(a) Derive an expression for the force on the inclined plate moving in the direction of the Jet. [8M]

(b) A jet of water from a nozzle is deflected through 60^0 from its original direction by a curved plate which it enters tangentially without shock with a velocity of 30 m/s and leaves with a mean velocity of 25 m/s. If the discharge from the nozzle is 0.8 kg/s, calculate the magnitude and direction of the resultant force on the vane, if the vane is stationary. [7M]

5(a) Obtain an expression for the work done per second by water on the runner of a Pelton wheel. Hence derive an expression for maximum efficiency of the Pelton wheel giving the relationship between the jet speed and bucket speed. [7M]

(b) A Francis turbine with an overall efficiency of 75% is required to produce 148.25 kW power. It is working under a head of 7.62 m. The peripheral velocity = 0.26 √2gH and the radial velocity of flow at inlet is 0.96√2gH. The wheel runs at 150 r.p.m and the hydraulic losses in the turbine are 22% of the available energy. Assuming radial discharge, determine (i) The guide blade angle (ii) The wheel vane angle at inlet (iii) Diameter of the wheel at inlet (iv) Width of the wheel at inlet. [8M]

6(a) Explain main parts of the Centrifugal pump. [7M]

(b) The cylinder bore diameter of a single-acting reciprocation pump is 150 mm and its stroke is 300 mm. The pump runs at 50 r.p.m. and lifts water through a height of 25 m. The delivery pipe is 22 m long and 100 mm in diameter. Find the theoretical discharge and the power required to run the pump. If the actual discharge is 4.2 liters/s, find the percentage slip. Also determine the acceleration head at the beginning and middle of the delivery stroke. [8M]

7(a) Write the comparison between centrifugal pumps and reciprocating pumps. [7M]

(b) List four important efficiencies of a turbine and explain in detail. [8M]

8(a) Derive an expression for force exerted by a jet on stationery inclined plate. [7M]

(b) The penstock supplies water from a reservoir to the Pelton wheel with a gross head of 500 m. One third of the gross head is lost in friction in the penstock. The rate of flow if water through the nozzle fitted at the end of the penstock is 2.0 m³/s. The angle of deflection of the jet is 165⁰. Determine the power given to the runner and also hydraulic efficiency of the Pelton Wheel. Take speed ratio = 0.45 and C_v= 1.0. [8M]

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B.Tech. IV Semester Regular/Supplementary Examinations

S234-ENGINEERING GEOLOGY
(CE)

Time : 3 hours   Max. Marks : 75

PART-A
(Answer all questions)

1(a)	Recognize the name of the feature in which the oceanic crust merges below the continental crust.	[1M]
(b)	Recognize the mineralogical name of white mica.	[1M]
(c)	Identify the shape of Phacolith in country rock.	[1M]
(d)	How much is the angle that exists between strike and dip always?	[1M]
(e)	Between gneiss and slate, which one requires lining at the tunnel site?	[1M]
(f)	Briefly explain the function of Jetties in a harbor.	[2M]
(g)	When do you get bigger crystals? During slow cooling or rapid cooling? Justify.	[2M]
(h)	Illustrate 'graded bedding' with the help of a diagram.	[2M]
(i)	Recognize the name and draw the diagram of the fold in which axis of the fold is horizontal.	[2M]
(j)	In which formation would you expect more overbreak; in quartzite or slate? Explain the reason.	[2M]

PART-B
(Answer any FOUR questions)

2(a)	Demonstrate and explain the process of formation of deltas with figures.	[7M]
(b)	Discuss different chemical weathering processes with description.	[8M]
3(a)	Feldspar group is one of the most important mineral groups in rock forming minerals. Report its physical properties, general chemistry, occurrence and uses.	[7M]
(b)	Recognize how cleavage of a mineral is identified, explain its importance in identifying a mineral, and demonstrate some important types with figures and examples.	[8M]
4(a)	Interpret sedimentary structures with figures.	[7M]
(b)	Recognize different forms of extrusive igneous rocks and describe each with figures wherever necessary.	[8M]
5(a)	Depict various types of joints and illustrate each of them with field examples.	[7M]
(b)	Differentiate between Horst and Graben with figures and describe the features of each.	[8M]
6(a)	Evaluate the geological considerations at the tunnel site in a folded area.	[7M]
(b)	Evaluate competency of igneous, sedimentary and metamorphic rocks for dam foundation.	[8M]
7(a)	What are the objects that are used to recognize the hardness of mineral without using Moh's scale of hardness? Explain how hardness is measured with them.	[7M]
(b)	Interpret the atomic structure of Nesosilcates with figures.	[8M]
8.	Classify faults based on MUTUAL RELATIONSHIP OF ATTITUDES OF FAULTS PLANE AND ADJACENT BEDS, depict various faults in this class and illustrate each of them.	[15M]

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

S393-STRUCTURAL ANALYSIS-I
(CE)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

1(a)	Define theorem of clapeyron's three moments.	[1M]
(b)	State the effects of sinking of supports of continuous beam.	[1M]
(c)	List the basic assumption made in slope deflection method.	[1M]
(d)	State castigliano's first theorem.	[1M]
(e)	Name the different types of indeterminacies.	[1M]
(f)	Calculate the value of prop reaction in a propped cantilever of span 'L', when it is subjected to a point load of 'W' at the centre?	[2M]
(g)	A two span continuous beam with each span of length of 6 m carries concentrated loads each of magnitude 50kN at the centre of each span. Determine the end reactions in the beam.	[2M]
(h)	Differentiate stiffness factor and member stiffness.	[2M]
(i)	Write the expression for Flexural loading in strain energy.	[2M]
(j)	Distinguish between pin jointed and rigidly jointed structure.	[2M]

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

2(a) A cantilever of length 4m carries a UDL of 1kN/m over the entire length. The cantilever is propped rigidly at the free end. If the young's modulus $E = 2 \times 10^5$ N/mm² and $I = 10^8$ mm⁴ then determine the following :
(i) Reaction at rigid prop.
(ii) The deflection at the centre of the cantilever.
(iii) Magnitude and position of maximum deflection.   [8M]

(b) A propped cantilever beam AB, 6m long is carrying a point load of 30kN at its centre. EI is constant. Determine the reaction components in the propped cantilever.   [7M]

3. Evaluate support reactions and moments shown in figure. Also draw the BMD and SFD by clapeyron's three moment equation method.
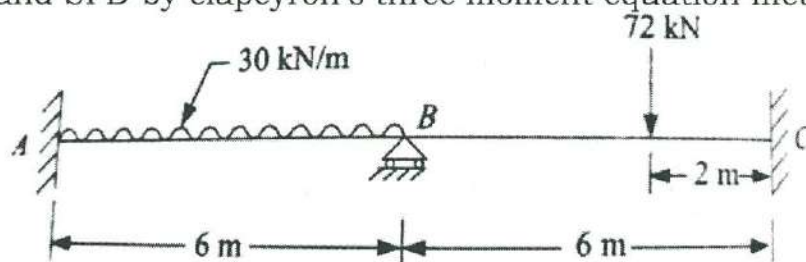
[15M]

4. Analyze the continuous beam shown in figure by slope deflection method, if joint B sinks by 10 mm. Given EI = 4000 kN m². Draw bending moment and shear force diagram.
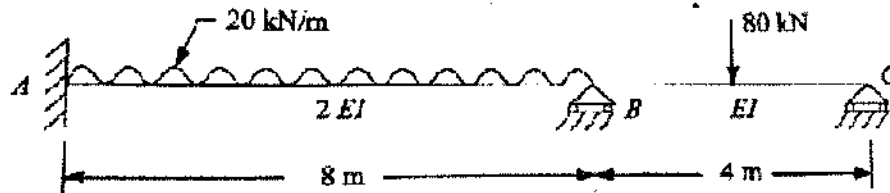
[15M]

5. A beam of uniform section and of length '2L' is freely supported by rigid supports at its ends & by an elastic prop at its centre. The prop deflects by an amount 'λ' times the load it carries and if the beam carries a total distributed load of W, show that the load carried by the prop is $5W/8[1+6EI\lambda/L^3]$.

[15M]

6. Evaluate the forces in all the members of a frame work that consists of six bars of uniform cross sectional area, and hinged together to form a square with two diagonals, is suspended from one end as shown in figure.
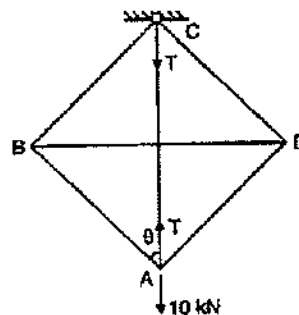
[15M]

7. A continuous beam ABCD consists of three span, and is loaded as shown in figure. Ends A and D are fixed. Determine the bending moments at the supports and plot the bending moment diagram by moment distribution method.
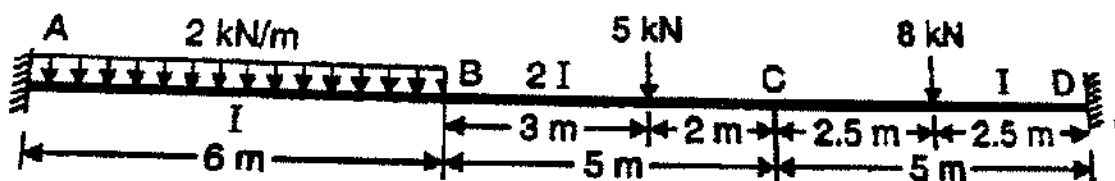
[15M]

8. Analyse support reactions and moments shown in figure. Also draw BMD and SFD by clapeyron's three moment equation method.
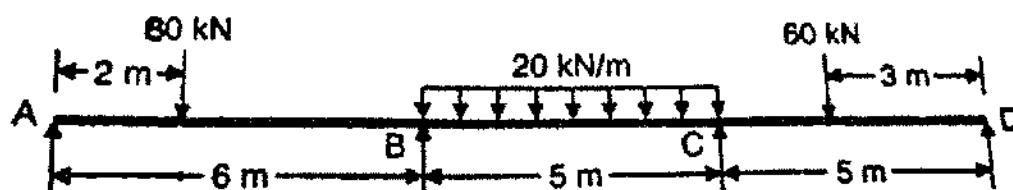
[15M]

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

S295-MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS
(CE, EIE & IT)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

1(a)	Assess the meaning of managerial economics.	[1M]
(b)	Name the two branches of economics.	[1M]
(c)	Formulate the concept total revenue.	[1M]
(d)	Rewrite the definition of accounting.	[1M]
(e)	What is ratio?	[1M]
(f)	Define Demand Forecasting.	[2M]
(g)	List various types of cost concept.	[2M]
(h)	Explain the term equilibrium point.	[2M]
(i)	State the features of fixed assets.	[2M]
(j)	Outline business entity concept.	[2M]

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

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2(a)	Elaborate types of Elasticity of demand.	[7M]
(b)	State how the price elasticity can be measured.	[8M]
3(a)	Describe the laws of returns to scale with appropriate examples.	[8M]
(b)	Briefly explain different types of External Economies.	[7M]
4(a)	List out the features of perfect market under perfect competition.	[8M]
(b)	Define market. And explain different types of Market.	[7M]
5(a)	Make use of capital budgeting. State various methods of capital budgeting.	[8M]
(b)	Summarize the factors determining requirements of working capital.	[7M]
6(a)	Mention various users of accounting with suitable examples.	[8M]
(b)	Give rules of Personal accounts, Real accounts, and Nominal accounts with suitable examples.	[7M]
7.	Inference Demand Forecasting. Illustrate different methods of Demand Forecasting.	[15M]
8.	Firms has a fixed cost of Rs.10, 000 selling price per unit Rs.5/- variable cost per unit is Rs.3/- determine breakeven point in terms of volume and calculate sales value. Calculate margin of safety considering that the actual production is 8000 units.	[15M]

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

S351-PROBABILITY AND STATISTICS
(CSE,IT&ME)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

1(a)	If E(x) = 3 then find the value of E(2x+3).	[1M]
(b)	Mention the mean and variance of Binomial distribution.	[1M]
(c)	When do we consider a sample is a large sample?	[1M]
(d)	What is the degrees of freedom for a chi-square (χ^2) test while dealing with a contingency table of order 3x2?	[1M]
(e)	Define correlation.	[1M]
(f)	State Baye's theorem of Probability.	[2M]
(g)	If the mean of a Poisson distribution is 2, then find P(X=1).	[2M]
(h)	The observations of a population are 2,4,6,8,10. Samples of size 2 are taken with replacement. Then find the mean of the sampling distribution of means ($\mu_{\bar{x}}$).	[2M]
(i)	If $\bar{x} = 20, \mu = 16, \sigma = 4 \ and \ n = 36$, then calculate the test statistic Z.	[2M]
(j)	Write the normal equations to estimate the constants in fitting of a second degree parabola by the method of least squares.	[2M]

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

2(a)   In a certain town 40% have brown hair, 25% have blue eyes, and 15% have both brown hair and blue eyes. A person is selected at random from the town   (i) If he has brown hair, what is the probability that he has blue eyes?   (ii) If he has blue eyes, determine the probability that he has brown hair.   [7M]

(b)   Calculate the mean and variance of X, if the probability distribution of the discrete random variable X is given by

X	-1	0	1	2	3
P(x)	0.3	0.1	0.1	0.3	0.2

[8M]

3(a)   Prove that for Poisson distribution, the mean and variance are equal.   [7M]

(b)   In an intelligence test administered to 1,000 children, the average score is 42 and standard deviation is 24. Then find (i) the no. of children exceeding the score 60. (ii) The no. of children with score lying between 20 and 40. (iii) The no. of children below the score 50.   [8M]

4(a)   The mean height of students in a college is 155 cms and standard deviation is 15 cms. What is the probability that the mean height of 36 students is less than 157 cms?   [7M]

(b)   Measurements of the weights of a random sample of 200 ball bearings made by a certain machine during one week showed a mean of 0.824 and a standard deviation of 0.042. find 95% and 98% confidence limits for the mean weight of all the ball bearing.   [8M]

5(a) The mean yields of rice from two places in a district were 210 Kgs and 220 Kgs per acre from 100 acres and 150 acres respectively. Can it be regarded that the samples were drawn from the same district which the s.d of 11 Kgs per acre? (at 5% level of significance) [7M]

(b) 200 digits were chosen at random from a set of tables. The frequencies of the digits are shown below.

Digit	0	1	2	3	4	5	6	7	8	9
Frequency	18	19	23	21	16	25	22	20	21	15

use the chi-square test to assess the correctness of the hypothesis that the digits were distributed in equal number in the tables from which these were chosen at 5% level of significance. [8M]

6(a) Find the rank correlation coefficient for the following data which represent the marks of ten students in two subjects.

X	68	64	75	50	64	80	75	40	55	64
Y	62	58	68	45	81	60	68	48	50	70

[7M]

(b) The regression equations of two variables X and Y are as follows.
$3X +2Y-26=0$ and $6X+Y-31=0$ then find (i) the means of X and Y (ii) the regression coefficients (iii) coefficient of correlation between X and Y. [8M]

7(a) If A and B are independent events then prove that i)$\bar{A}$ and B ii)A and $\bar{B}$ iii) $\bar{A}$ and $\bar{B}$,are also independent events [7M]

(b) Fit a binomial distribution and calculate the expected (theoretical) frequencies from the following data.

x	0	1	2	3	4	5
f(x)	10	20	30	15	15	10

[8M]

8 Find the coefficient of correlation and two regression lines from the following data.

Age of Husband	25	22	28	26	35	20	22	40	20	18
Age of wife	18	15	20	17	22	14	16	21	15	14

Hence (i)Estimate the age of husband when the age of wife is 19.
and (ii)Estimate the age of wife when the age of husband is 30. [15M]

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

S180-DATABASE MANAGEMENT SYSTEMS
(CSE & IT)

Time :·3 hours   Max. Marks : 75

PART-A
(Compulsory question)

1(a)	Define Cardinality.	[1M]
(b)	Give the syntax for creating table in SQL.	[1M]
(c)	What are the properties of decomposition?	[1M]
(d)	What is a transaction?	[1M]
(e)	Write any two differences between sequential and heap file organization.	[1M]
(f)	List out the applications of DBMS.	[2M]
(g)	Label the disadvantages of relational database system.	[2M]
(h)	When a relation is said to be in 3NF?	[2M]
(i)	How to achieve View Serializability?	[2M]
(j)	Categorize the levels of RAID.	[2M]

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

2. Design a database for Banking System using ER model.   [15M]

3. Consider the following schema to write queries in SQL.
   Sailor(sid, sname, age, rating)
   Boats(bid, bname, bcolor)
   Reserves(sid,bid,day)

   (i) Find the sailors who reserved at least two boats.   (ii)Identify the names of the sailors who have reserved red boat but not a green boat. (iii)Label the youngest sailor name for each rating level.   (iv)List the boats reserved by 'Prabhu' and 'Ramu'   [15M]

4(a)	Discuss first and second normal forms with suitable examples.	[8M]
(b)	Compare BCNF and Third normal form.	[7M]
5(a)	What is a transaction? Explain ACID properties of transaction.	[7M]
(b)	Describe two phase locking protocol with an example schedule. What are the variants of 2PL?	[8M]
6(a)	Compare B Tree and B+ Tree.	[7M]
(b)	Define RAID. What are the principles of various RAID levels?	[8M]

7(a) Define the following terms with example
   i) Super key ii) Candidate key iii) Primary key.   [7M]
 (b) Give in detail about generalization and aggregation with ER diagrams.   [8M]

8(a) Given a relation with attributes R=(A,B,C,D,E,F,G,H) and following functional dependencies:
   $CH \rightarrow G$
   $A \rightarrow BC$
   $B \rightarrow CFG$
   $E \rightarrow A$
   $F \rightarrow EG$
   .Find the number of candidate keys for R.   [8M]

 (b) Given a relation with attributes R=(A,B,C,D,E,F) and following functional dependencies.
   $A \rightarrow C$
   $C \rightarrow D$
   $D \rightarrow B$
   $E \rightarrow F$
   Identify the candidate key for R.   [7M]

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B.Tech. IV Semester ~~Regular~~/Supplementary Examinations
S381-SOFTWARE ENGINEERING
(CSE&IT)

Time : 3 hours   Max. Marks: 75

PART-A
(Compulsory question)

1(a)	List the generic process framework activities applicable to the majority of software projects.	[1M]
(b)	When a detailed requirement for a software product is not identified, which software process model is best suited in this situation?	[1M]
(c)	List the requirement engineering tasks.	[1M]
(d)	Define the term pattern.	[1M]
(e)	What do you mean by driver and stub programs?	[1M]
(f)	Why has SCAMPI been developed as a standard for software process assessment?	[2M]
(g)	What is the use of perspective process models?	[2M]
(h)	What is the purpose of domain analysis?	[2M]
(i)	List the software quality attributes developed by Hewlett-Packard.	[2M]
(j)	Show the classes of loops in loop testing with a neat sketch.	[2M]

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

2(a)	Define software engineering. Explain the software engineering layers.	[7M]
(b)	Define software process. Explain the umbrella activities occur throughout the software process.	[8M]
3(a)	Explain how incremental process models are better than waterfall model.	[8M]
(b)	Illustrate the seven core principles that focus on software engineering practice proposed by David Hooker.	[7M]
4(a)	Explain the process by which requirements are elicited and negotiated.	[7M]
(b)	Classify the primary differences between structured analysis and object-oriented analysis.	[8M]
5(a)	Explain design concepts of: i) Information hiding ii) Refactoring iii) Refinement.	[7M]
(b)	Why is architecture important? Explain the steps involved in data design at the component level.	[8M]
6(a)	What is Boundary Value Analysis (BVA)? Explain the technique specifying rules and its usage with the help of an example.	[7M]
(b)	What are the two main types of errors not covered by the Fault-based testing? Explain the use of Scenario-based testing with a simple use case.	[8M]
7(a)	Explain how spiral model is used for software development	[8M]
(b)	Illustrate how the CMMI represents a process meta-model as a continuous CMMI meta-model.	[7M]
8(a)	Explain the attributes of a 'good' test.	[7M]
(b)	Perform the path testing for the following program flow graph by computing Cyclomtic complexity	[8M]
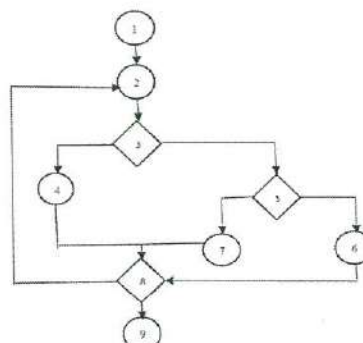
Fig. Q8 (b)

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B.Tech. IV Semester Regular/Supplementary Examinations

S284-JAVA PROGRAMMING
(CSE)

Time: 3 hours   Max. Marks: 75

PART-A
(Compulsory question)

1(a)	Describe about Inheritance.	[1M]
(b)	Write short notes on class path.	[1M]
(c)	Differentiate between running() and runnable() in a thread life cycle.	[1M]
(d)	Demonstrate event source.	{1M}
(e)	Write short notes on JDBC.	[1M]
(f)	Describe about garbage collection.	[2M]
(g)	Describe about java.util package.	[2M]
(h)	Describe about throw and throws.	[2M]
(i)	What are the characteristics of a border layout.	[2M]
(j)	Describe about result set types.	[2M]

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

2(a)	Demonstrate about different Buzzwords of a java language.	[7M]
(b)	Write a program to delete the duplicate elements in a given array.	[8M]
3(a)	Write the procedure to create a user defined package with an example.	[7M]
(b)	Differentiate between classes and interfaces.	[8M]
4(a)	Describe about thread synchronization with an example.	[7M]
(b)	Explain about applet life cycle.	[8M]
5(a)	Write a program for handling mouse events.	[7M]
(b)	Describe about grid layout with an example.	[8M]
6(a)	Explain about different types of JDBC drivers.	[7M]
(b)	Describe about basics of networking.	[8M]
7(a)	Write a program to count the sum of given numbers by using command line arguments.	[7M]
(b)	Describe about the built in exceptions in java.	[8M]
8(a)	Describe about thread priorities.	[7M]
(b)	Compare different types of type conversions.	[8M]

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

S350-PRINCIPLES OF PROGRAMMING LANGUAGES
(CSE)

Time : 3 hours   Max. Marks:75

PART-A
(Compulsory question)

1(a)	List the three fundamental features of any object oriented programming language.	[1M]
(b)	Differentiate between BNF and EBNF notations used for expressing syntax of a programming language.	[1M]
(c)	What is "type checking"?	[1M]
(d)	Define the method of mixed mode assignment.	[1M]
(e)	What are "in", "out", "in out" specifications of parameters in Ada?	[1M]
(f)	What is the role of symbol table in compilation?	[2M]
(g)	Define the terms "Syntax" and "Semantics".	[2M]
(h)	Give an example declaration of user defined data type in two different programming languages.	[2M]
(i)	Give examples for (i) simple statement, (ii) compound statements, (iii) conditional statement, (iv) iterative statement in any programming language.	[2M]
(j)	Give an example of overloaded subprogram.	[2M]

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

|		
2(a)	Compare and contrast between language translation methods of pure compilation and pure interpretation.	[7M]
(b)	With the help of suitable examples illustrate the properties of programming languages that influence readability.	[8M]
3(a)	Define the terms (i)static semantics (ii) attribute grammar. Illustrate with suitable example how attribute grammar is used to handle static semantic issues at compile time.	[7M]
(b)	Give 2 examples of ambiguous grammar and illustrate the ambiguity with the examples of parse tree for the different sentential forms.	[8M]
4(a)	Based on the binding times of (i)storage allocation and (ii)subscript binding classify the array types and briefly give their features.	[7M]
(b)	With the help of a parameterized abstract data type declaration of stack in C++ programming language, substantiate the features.	[8M]
5(a)	What are assignment statements? Illustrate using suitable examples and discuss the implementation aspects.	[7M]
(b)	Give example declarations of iterative statements in three different programming languages for the same task and compare their syntactic and semantic differences.	[8M]
6(a)	Depicting the activation records of calling and called units, compare the activities at the time of entry as well as exit in the process of subroutine call with different types of parameter passing methods.	[7M]
(b)	Explain the scope of variables in sub programs with suitable examples.	[8M]
7(a)	Compare and contrast OOP features in C++ and Java.	[7M]
(b)	What is the use of JVM (Java Virtual Machine)?	[8M]
8(a)	Substantiate the syntactic differences of selective statements for same task in two different programming languages.	[7M]
(b)	Explain the features of associative arrays.	[8M]

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

S167–COMPUTER GRAPHICS

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

PART-A
(Answer all questions)

1(a)	What is persistence?	[1M]
(b)	Write the equation of circle when its center position is (x_c, y_c).	[1M]
(c)	What is Reflection?	[1M]
(d)	Define Window and Viewport.	[1M]
(e)	How a Polygon can be represented using vertex table?	[1M]
(f)	What is difference between impact and non-impact printers?	[2M]
(g)	What is the symmetry property of an ellipse?	[2M]
(h)	Distinguish between uniform scaling and differential Scaling.	[2M]
(i)	List out the various Text Clipping Techniques.	[2M]
(j)	What are the different types of parallel projections?	[2M]

PART-B
(Answer any FOUR questions)

2(a)	Draw and explain working of Direct-View Storage Tubes(DVST).	[8M]
(b)	Discuss various applications of computer graphics in detail.	[7M]
3(a)	Write Bresenham's midpoint ellipse drawing algorithm.	[8M]
(b)	Plot an ellipse with $r_x=8$ and $r_y=6$ using midpoint ellipse algorithm.	[7M]
4(a)	How the rotation of an object about the pivot point is performed?	[7M]
(b)	How the scaling of an object about the fixed point is performed?	[8M]
5(a)	Explain Cohen-Sutherland line clipping algorithm in detail.	[8M]
(b)	Use Liang-Barsky Line Clipping algorithm to find the clipping coordinates of a line P1,P2 where P1(10,10) and P2(60,30), against window with (XWmin,YWmin)=(15,15) and XWmax,YWmax=(25,25).	[7M]
6(a)	Write about Quadric Surfaces.	[7M]
(b)	Explain the following 3D transformations: a) Translation b) Scaling c) Reflection d) Shear	[8M]
7(a)	How a polygon is clipped? Explain it with the help of Sutherland – Hodgeman Polygon clipping.	[8M]
(b)	Digitize a line from (20, 10) to (30, 18) on a raster screen using Bresenham's straight line algorithm.	[7M]
8(a)	Prove that the composition of two rotations is additive by concatenating the matrix representation for $R(\emptyset_1)$ and $R(\emptyset_2)$ to obtain $R(\emptyset_1) * R(\emptyset_2) = R(\emptyset_1 + \emptyset_2)$	[7M]
(b)	What are the steps involved in Cyrus Beck line clipping Algorithm?	[8M]

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

S125-ANALOG COMMUNICATIONS
(ECE)

Time : 3 hours   JCX   Max. Marks : 75

PART-A
(Compulsory question)

1(a) Draw the spectrum of AM wave. [1M]
 (b) Define angle modulation. [1M]
 (c) Define figure of merit. [1M]
 (d) Classify AM transmitters. [1M]
 (e) What is aliasing effect? [1M]
 (f) Why we need modulation explain? [2M]
 (g) Mention the significance of carson's rule. [2M]
 (h) When does threshold effect occurs in AM and FM? [2M]
 (i) Compare TRF and Superhetrodyne reciver. [2M]
 (j) State sampling theorem. [2M]

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

2(a) Explain the demodulation of DSB-SC using costas receiver. [7M]
 (b) Explain how we can save bandwidth using QAM. [8M]

3(a) An NBFM signal under tone Modulation is similar to an AM signal under Tone Modulation, except a 180 degrees phase with respect to LSB-Justify. [7M]
 (b) Explain generation of FM using Armstrong method. [8M]

4(a) Derive the expression for Figure Of merit of DSB-SC. [8M]
 (b) Derive the expression for Figure Of merit of AM using coherent detection. [7M]

5(a) Explain why we have to consider $f_{lo}=f_c+f_{IF}$ [7M]
 (b) Classify and explain FM transmitters. [8M]

6(a) Explain FDM in detail. [8M]
 (b) Explain the generation of PAM. [7M]

7(a) Explain the generation of AM wave using square law modulator. [7M]
 (b) Why we have to choose VSB modulation technique for picture transmission? Explain the need for detection of VSB modulated signal using envelope detector and show that m(t) is recovered by envelope detector. [8M]

8(a) An AM modulator has an output of X(t)=A. Cos 400πt+B. Cos380πt+4. Cos420πt. The un-modulated carrier power is 100watts and the modulation efficiency is 40%. Find A and B. [7M]
 (b) An angle modulated signal with carrier frequency $\omega_c=2\pi*10^5$ is described by the equation $(t) = 10\cos(\omega_c t + 5\sin(3000t) + 10\sin(2000\pi t))$. Find i) the power of the modulated signal. ii) frequency deviation Δf iii) deviation ratio β iv) Bandwidth using Carson's rule. vi) carrier swing. [8M]

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

S174-CONTROL SYSTEMS

Time : 3 hours   (ECE, EEE & EIE)   Max. Marks : 75
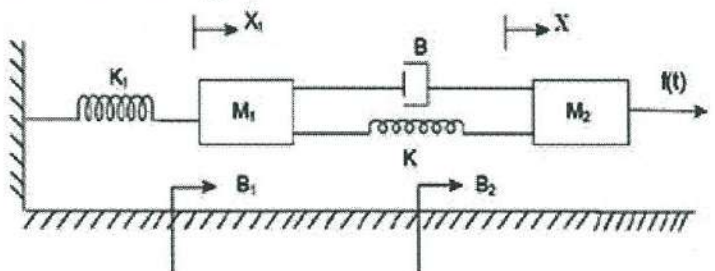
PART-A
(Compulsory question)

Q.No	Questions	Marks	CO	BL
1(a)	Three blocks with gains of 5,8 and 4 are connected in cascade. What is total gain of arrangement?	1M	CO1	L2
(b)	What does the term 'type' of a system indicate?	1M	CO2	L2
(c)	Define Gain cross over frequency.	1M	CO3	L1
(d)	What are the conditions to be satisfied for the root locus to exist at any point in the s-plane?	1M	CO3	L2
(e)	Mention one advantage of state variable approach.	1M	CO3	L1
(f)	Mention the characteristics of negative feedback.	2M	CO2	L2
(g)	What is effect of PI controller on system performance?	2M	CO4	L2
(h)	Mention advantage of polar plot.	2M	CO3	L1
(i)	State Nyquist stability criterion.	2M	CO3	L2
(j)	What is necessary and sufficient condition for Observability of a system?	2M	CO3	L1

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

2(a)	List out the block diagram reduction rules.	7M	CO1	L2
(b)	Determine the transfer function for the mechanical system shown in figure. 	8M	CO1	L3
3(a)	Derive the expressions for rise time, peak overshoot of a second order under damped system with unit step input.	7M	CO2	L2
(b)	A unity feedback system has the forward path transfer function $G(S) = \frac{K_1(2S+1)}{S(5S+1)(S+1)^2}$ The input r(t)=1+6t is applied to the system. Determine the minimum value of K_1 if the steady state error to be less than 0.1.	8M	CO3	L3

4.	Sketch the complete Nyquist plot for the system whose open loop transfer function is $G(S)H(S) = \frac{K(S-4)}{(S+1)^2}$	15M	CO3	L3
5.	Draw the complete root locus for the system with $G(S)H(S) = \frac{K(S+5)}{S(S+1)(S+2)}$ Determine the value of K for $\xi = 0.5$.	15M	CO3	L3
6(a)	Diagonalize the system matrix given below: $$A = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -6 & -11 & -6 \end{bmatrix}$$	7M	CO3	L3
(b)	Test the controllability and observability of the system described by $$\begin{bmatrix} \dot{x_1} \\ \dot{x_2} \end{bmatrix} = \begin{bmatrix} 1 & 1 \\ -3 & -2 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u, \qquad y = \begin{bmatrix} 1 & 0 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$	8M	CO3	L3
7(a)	Describe the procedure for drawing Bode plot.	7M	CO3	L2
(b)	The open loop transfer function of a closed loop system with unity feedback is $G(S) = \frac{K}{(S+2)(S+4)(S^2+6S+25)}$ By applying RH criterion, discuss the stability of closed loop system as a function of K. Determine the value of K. Which will cause sustained oscillations in the closed loop system?	8M	CO3	L3
8(a)	Describe the following: (i) State (ii) state equation (iii) state variable (iv) state model.	7M	CO3	L1
(b)	Derive the expression for transfer function of a lag compensator.	8M	CO4	L3

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

S128-ANALOG INTEGRATED CIRCUITS
(ECE)

Time: 3 hours   Max. Marks: 75

PART-A
(Compulsory question)

1(a)	What is the need of level translator?	[1M]
(b)	Why open-loop op-amp configuration is not used in linear applications?	[1M]
(c)	What is notch filter?	[1M]
(d)	Explain the function of 'reset' pin in 555 Timer.	[1M]
(e)	Explain conversion time related to DAC.	[1M]
(f)	Draw Wilson current source.	[2M]
(g)	What are the specifications of an ideal op-amp?	[2M]
(h)	Draw the circuit and output waveform of zero crossing detector.	[2M]
(i)	Draw the circuit of 555 timer IC as Missing pulse detector.	[2M]
(j)	What is Resolution? Calculate the value of resolution for a 10 bit DAC.	[2M]

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

2(a)	Calculate the Q-point, Gain, Input Resistance, Output Resistance of Dual Input Balanced Output Differential Amplifier.	[8M]
(b)	Compare Wilson current source and cascade current source.	[7M]
3(a)	Draw the block diagram of op-amp and mention the characteristics of ideal op-amp.	[8M]
(b)	A square wave of peak to peak amplitude of 500 mV has to be amplified to peak-to-peak amplitude of 3 V, with a rise time of 4 µs or less. Can a 741 be used? Justify.	[7M]
4(a)	Explain the operation of Wein bridge oscillator with a neat schematic and derive the Expression for frequency of oscillation.	[8M]
(b)	For RC phase shift oscillator circuit three identical phase shifting networks of $R = 10K\Omega$ and $C = 0.001\mu F$ are used. Determine the frequency of oscillations.	[7M]
5(a)	Explain the operation of Monostable multivibrator using 555 timer and also derive the expression for time period of output.	[8M]
(b)	What is frequency translation and explain FSK demodulation using 565 PLL.	[7M]
6(a)	Draw the circuit diagram of 3-bit R-2R ladder type D/A converter and explain its operation. Derive the expression for output voltage.	[8M]
(b)	Explain the operation of successive approximation type ADC with neat diagram.	[7M]
7(a)	Draw the fundamental log amplifier circuit and derive the output voltage expression.	[8M]
(b)	Draw the schematic diagram of all pass filter and determine the phase shift ϕ between input and output at f=2KHz.	[7M]
8(a)	Draw the circuit diagram of a Schmitt trigger using 555 timer and explain its operation.	[8M]
(b)	Explain the working of VCO.	[7M]

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B.Tech. (IV Semester) Supplementary Examinations

S169-COMPUTER ORGANIZATION
(ECE,EIE & IT)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

Q.No	Questions	Marks
1(a)	What are the registers generally contained in CPU?	1M
(b)	Define routine.	1M
(c)	Expand the terms MISD and MIMD.	1M
(d)	What is Hit ratio?	1M
(e)	What is an interface?	1M
(f)	What is insert operation?	2M
(g)	What is Indirect addressing mode?	2M
(h)	What is Divide overflow?	2M
(i)	What is associative memory?	2M
(j)	What is cycle stealing?	2M

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

2(a)	Explain the basic computer instruction formats.	7M
(b)	How are interrupts handled by the basic computer? Explain the interrupt cycle with a flowchart.	8M
3(a)	What are micro-subroutines? Explain.	7M
(b)	Differentiate between RISC and CISC.	8M
4(a)	What are the pipeline conflicts? Discuss briefly with example.	8M
(b)	Write a short note on vector processing.	7M
5(a)	Differentiate between RAM and ROM.	7M
(b)	What is ROM? List out types of ROM and explain in detail.	8M
6(a)	Differentiate between Source Initiated and Destination Initiated transfer using handshaking.	7M
(b)	With neat diagram, explain the strobe control data transfer method and state its disadvantages.	8M
7(a)	Write a short notes on cache memory.	7M
(b)	Differentiate between main memory and cache memory.	8M
8(a)	What is Input Output Processor? Discuss briefly about CPU-IOP communication.	8M
(b)	Write a short note on Serial communication.	7M

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B.Tech. Ⅳ Semester ~~Regular~~/Supplementary Examinations
S223-ELECTROMAGNETIC FIELDS AND WAVES
(ECE)

Time: 3 hours   Max. Marks: 75

PART-A
(Compulsory question)

1(a)	Define coulombs law.	[1M]
(b)	Define Biotsevert law and give the expression.	[1M]
(c)	Define faraday law.	[1M]
(d)	Define skin depth.	[1M]
(e)	Define poynting theorem.	[1M]
(f)	Define divergence and divergence theorem of a vector A and write the equations.	[2M]
(g)	List any two differences between electrostatic fields and magneto static fields.	[2M]
(h)	Write integral form of all Maxwell's equations.	[2M]
(i)	What is polarization? What are the different types of polarization?	[2M]
(j)	Define Brewster angle. Obtain the expression for it.	[2M]

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

2(a) Derive an expression for electric field intensity due to infinite line charge located along z-axis from -∞ to ∞. [7M]

(b) Point charges Q_1 and Q_2 are respectively located at (4,0,-3) and (2,0,1).if Q_1=4nc find another point charge when (i) Electric field intensity on a charge at a point (5,0,6) has no z-component. (ii) Force on a charge at a point (5,0,6) has no x-component. [8M]

3(a) State and explain boundary conditions between two dielectric media. [7M]

(b) A circular loop conductor having radius of 0.2 m is placed in XY plane. The loop consists of a resistance of 10 ohms. If the Magnetic field is B = Sin10⁴ t Tesla, find the current flowing in the loop. [8M]

4(a) Derive the Boundary conditions for Magnetic field at the boundary of two Media. [8M]

(b) Copper wire carries a conduction current of 1.0 Amp at 60Hz. Determine the displacement current in the wire? Assume $\varepsilon_{cu=}\ \varepsilon_0$; $\mu_{cu=}\ \mu_0$; σ=5.8×10⁷ mhos/m. [7M]

5(a) Define a Uniform plane wave and establish the wave equations for a conducting medium. [7M]

(b) A lossy dielectric has intrinsic impedance of 250 ⌊30⁰ ohms, and $\vec{E} = 2\,e^{-ax}\cos(\omega t - 0.5x)\,\hat{Z}$ V/m. Find the loss tangent, propagation constant, skin depth, polarization and direction of propagation. [8M]

6(a) Derive the reflection coefficient for a parallel polarized wave at an angle of incidence θ_i between two media (lossless and $\mu_1 = \mu_2 = \mu_0$). [7M]

(b) Define Brewster's angle and obtain an expression for the same in terms of medium parameters. [8M]

7(a) Explain the relations between E and H in Uniform plane wave. [7M]

(b) The magnetic field component of a wave is given by $H = 30\cos(10^8 t - 6x)a_y$ mA/m. Determine (i) The direction of wave propagation (ii) wavelength (iii) wave velocity. [8M]

8(a) Explain the concept of power loss in a plane conductor? [7M]

(b) State Poynting theorem? A plane travelling wave has a peak electric field of 15V/m. If the medium is lossless with μ_r=1 and ε_r=12.Find velocity of the wave, impedance of the medium and peak pointing vector. [8M]

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

S243-ENVIRONEMNTAL STUDIES
(ECE,EEE&EIE)

Time : 3 hours   Max. Marks : 75

PART-A
(Answer all questions)

1(a)	Classify the natural resources.	[1M]
(b)	Define ecosystem.	[1M]
(c)	What the three 'R's indicate in solid waste management?	[1M]
(d)	How does ozone layer protect us?	[1M]
(e)	Identify any two reasons for population explosion.	[1M]
(f)	Identify any three functions of a forest resource.	[2M]
(g)	List out the Hotspots of biodiversity in India.	[2M]
(h)	Name any two primary air pollutants.	[2M]
(i)	Briefly list out any two methods for water conservation.	[2M]
(j)	What is the full form of AIDS and HIV?	[2M]

PART-B
(Answer any FOUR questions)

2(a)	Give some environmental impacts of mining in detail.	[7M]
(b)	Elaborately discuss the impacts of fertilizers and pesticides.	[8M]
3(a)	How can you differentiate between a food chain and a food web?	[7M]
(b)	Discuss in detail the structure and functions of ecosystem.	[8M]
4(a)	What do you think about the sources, effects and control for noise pollution?	[7M]
(b)	List out the sources and effects of air pollution and suggest some methods for control of air pollution.	[8M]
5(a)	Define greenhouse effect. Explain about greenhouse gases.	[7M]
(b)	Write a case study of nuclear holocaust.	[8M]
6(a)	Describe the role of information and technology in protection of environment.	[7M]
(b)	Briefly discuss HIV/AIDS, mode of its spread and its effects. Also discuss the control measures.	[8M]
7(a)	What are the changes you can make in your life style to help implement the shift to a more sustainable society?	[7M]
(b)	What are the main problems of energy in urban areas? Explain.	[8M]
8(a)	Briefly discuss the salient features of Environmental Protection Act.	[7M]
(b)	Describe the role of information and technology in protection of environment.	[8M]

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B.Tech.**IV** Semester ~~Regular~~/Supplementary Examinations

S192-DIGITAL SIGNAL PROCESSING

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

PART-A
(Compulsory question)

1.(a) State whether the sequence u(n-1) is left or right or both sided. [1M]

(b) For what value of magnitude of z, DTFT & ZT are equal. [1M]

(c) What is the duration of linear convoluted sequence $x(n) = x_1(n) * x_2(n)$, if N_1 is the duration of $x_1(n)$ and N_2 is the duration of $x_2(n)$. [1M]

(d) How analog and digital frequencies are related in bilinear transformation? [1M]

(e) If w(n) is hamming window with 11 samples, which are extending from 0 to 10, then the value of w(0). [1M]

(f) If x(n) = {1, 2, 3, 4, 5, 6, 7, 8, 9} and DTFT[x(n)] = $X(e^{j\omega})$,then find $X(e^{j\omega})$ at $\omega = 0$. [2M]

(g) Find the z-transform of x(n)=u(n). [2M]

(h) What are the phase factors involved in the last stage computation of 8-Point DFT of a sequence in radix-2 DIT FFT algorithm? [2M]

(i) Draw the magnitude response of type-I Chebyshev filter. [2M]

(j) What are advantages of FIR filter? [2M]

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

2. Apply DTFT on a sequence and obtain its frequency Spectrum, hence draw the magnitude and phase Spectrum
   (a) $x_1(n)=)=3(1/2)^n u(n)$ (b) $x_2(n)=)=2^n u(-n-1)$. [15M]

3(a) State and prove time differentiation property of Z-Transform. [7M]

(b) Evaluate the z transform of a sequence $x(n)=n(n+1)a^n Cos(n\pi/2)u(n)$. [8M]

4. Develop the algorithm to compute 8-Point DFT of a sequence x(n) using radix-2 DIF FFT. [15M]

5.(a) Compare impulse invariant and bilinear transformations. [7M]

(b) List out various properties of Butterworth and Chebyshev approximation filters. [8M]

6. Design a digital FIR high pass filter with a cutoff frequency of 1.2 rad/sec by taking 11 samples of hanning window. [15M]

7.(a) When the sequence is said to be even or odd? How to separate even and odd parts of a sequence? Explain. [7M]

(b) Compute the 4-point DFT of a sequence x(n)={1,2,3}. [8M]

8.(a) What is the importance of long division method of inverse z-transform? Explain. [7M]

(b) What are cosine windows? Explain. [8M]

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B.Tech. (IV Semester) Supplementary Examinations

S164-COMPLEX VARIABLES AND STATISTICAL METHODS
(EEE)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

Q.No	Questions	Marks
1(a)	How can you write Cauchy-Reimann equations by using Polar coordinates?	1M
(b)	Give the Taylor's series expansion of $\frac{1}{z+1}$ about the point $z=0$	1M
(c)	Give formula to calculate mean of the Poisson distribution.	1M
(d)	Define population.	1M
(e)	Write formula to calculate test statistic for F-test.	1M
(f)	Check that the function $u = \sin x.\sinh y$ is harmonic or not.	2M
(g)	Find the poles of the function $\frac{1}{z^2(1-z)}$	2M
(h)	A fair die is tossed twice. Find the probability of getting a 4, 5 or 6 on the first toss and 1, 2 ,3 or 4 on the second toss.	2M
(i)	Find the mean and variance for the population 1. 5, 6, 8.	2M
(j)	Define Type I error and Type II error.	2M

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

2(a)	Find the imaginary part of an analytic function whose real part is $u = y + e^x \cos y$	8M
(b)	Apply generalized Cauchy's Integral formula to evaluate $\int_c \frac{\log z}{(z-1)^3} dz$ where C is $|z-1| = \frac{1}{2}$	7M
3(a)	Expand as Laurent's series the function $f(z) = \frac{1}{z^2 - 4z + 3}$ in the region $1 < |z| < 3$	7M
(b)	Find the residues of $\frac{ze^z}{(z-1)^3}$ at its poles.	8M
4(a)	In a factory, machine A produce 40% of the output and machine B produce 60%. On the average, 9 items in 1000 produced by A are defective and 1 item in 250 produced by B is defective. An item drawn at random from a day's output is defective. What is the probability that it was produced by A or B?	8M
(b)	For a normally distributed variate with mean 70 and standard deviation 16, find the probabilities that (i) 38 ≤ x ≤ 46 (ii) 82 ≤ x ≤ 94	7M

| 5(a) | A normal population has a mean of 0.1 and the standard deviation of 2.1. Find the probability that mean of a sample of size 900 will be negative. | 8M |
| (b) | What is the maximum error one can expect to make with probability 0.90 when using the mean of a random sample of size n = 64 to estimate the mean of population with $\sigma^2 = 2.56$ | 7M |

| 6(a) | Calculate the correlation coefficient for the following data and discuss how the variable X is related to Y. | 8M |

X	6	5	3	10	2	4	9	7	8	1
Y	5	8	4	7	10	2	1	6	9	3

| (b) | A sample of 26 bulbs gives a mean life of 990 hours with a S.D of 20 hrs. The manufacturer claims that the mean life of bulbs is 1000 hrs. Is the sample not up to the standard. | 7M |

| 7(a) | A manufacturer firm produces steel pipes in 3 plants with daily production volume of 500, 1000 and 2000 units respectively. According to past experience, it is known that the fraction of defective outputs produced by these plants are respectively 0.005, 0.008 and 0.010. If a pipe is selected from a day's total production and found to be defective, find out From which plant the pipe came? What is the probability that it came from the first plant? | 8M |
| (b) | If the variance of a Poisson variate is 3, then find the probability that (i) x= 0 (ii) 0 < x < 3 (iii) $1 \leq x \leq 4$ | 7M |

| 8(a) | Two machines A, B, C produce 70%, 20% and 10% of the total number of a factory. The percentage of defective output of these machines are respectively 4%, 3% and 2%. An item is selected at random and found defective. Find the probability that this is from (i) Machine A, (ii) Machine B, (iii) Machine C. | 8M |
| (b) | If a random variable has a Poisson distribution such that P(X=1)=P(X=2). Find (i) mean of the distribution (ii) P(X=4) (iii) P(1<X<4). | 7M |

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

S342-POWER GENERATION AND UTILIZATION
(EEE)

Time: 3 hours   Max. Marks: 75

PART-A
(Compulsory question)

1(a)	What is the function of surge tank?	[1M]
(b)	Describe the function of moderator.	[1M]
(c)	Define polar curve.	[1M]
(d)	Define Plant Capacity factor.	[1M]
(e)	What is the advantage of per unit method over percent method?	[1M]
(f)	Compare Hydro and thermal power stations.	[2M]
(g)	Explain about coolant used in nuclear reactor.	[2M]
(h)	Give some applications of induction heating.	[2M]
(i)	Explain block rate tariff.	[2M]
(j)	Define base impedance and base kilovoltamperes.	[2M]

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

2(a) Draw the schematic arrangement of a Thermal Power Station and explain the function of each part. [7M]

(b) Explain the function of the following components in a Hydro electric Power plant. (i) Dam (ii) Spill ways (iii) Penstock (iv) Surge Tank. [8M]

3(a) Explain with neat sketch, the principle of operation of Nuclear reactor. [8M]

(b) Describe with a neat diagram the construction and principle of operation of FBR reactor. [7M]

4(a) Explain in brief how heating is done in the following cases:
i) Resistance heating ii) Induction heating iii) Dielectric heating. [8M]

(b) A lamp of 500 candle power is placed at the centre of a room, 20m×10m×5m. Calculate the illumination in each corner of the floor and a point in the middle of a 10m wall at a height of 2m from floor. [7M]

5(a) What are the desirable characteristics of a tariff? [8M]

(b) Differentiate between fixed, semi fixed and running costs. [7M]

6(a) List the advantages of per unit computations. [7M]

(b) Define the per unit value of a quantity. How will you change the base impedance from one set of base values to another set? [8M]

7(a) What is meant by renewable energy sources? Give the advantages and limitations of these sources of energy. [7M]

(b) The maximum demand of a consumer is 20A at 220V and his total energy consumption is 8760 Kwh. If the energy is charged at the rate of 20 paise per unit for 500 hours use of the maximum per annum plus 10 paise per additional units. Calculate (i) Annual bill (ii) Equivalent flat rate. [8M]

8(a) What do you mean by electrostatic precipitator? What are its advantages? [8M]

(b) What are the different factors influencing the economics of power generation? [7M]

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

S217-ELECTRICAL MACHINES-II
(EEE)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

Q.No	Questions	Marks	CO	BL
1(a)	What is the condition for maximum torque for 3-Φ induction motor?	1M	CO1	L1
(b)	State the applications of an induction generator.	1M	CO2	L3
(c)	Mention in which direction a shaded pole motor runs.	1M	CO2	L2
(d)	Define voltage regulation of an alternator.	1M	CO3	L2
(e)	Why the synchronous motor got its name?	1M	CO4	L2
(f)	List out the methods of speed control of cage type 3-Φ induction motor.	2M	CO1	L1
(g)	What is starting torque of 3-Φ induction motor?	2M	CO1	L2
(h)	List the drawbacks of the presence of backward rotating field in a 1-Φ induction motor.	2M	CO2	L1
(i)	Which type of synchronous generator is used in hydro-electric plants?	2M	CO3	L3
(j)	What is the effect of RMF in a synchronous motor?	2M	CO4	L2

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

Q.No	Questions	Marks	CO	BL
2(a)	With neat diagram illustrate the working principle and operation 3-Φ Induction motor.	7M	CO1	L2
(b)	Illustrate about the squirrel cage type and slip ring type rotors related to 3-Φ induction motor.	8M	CO1	L1
3(a)	Discuss the torque slip characteristics of 3-Φ induction motor in detail.	7M	CO2	L2
(b)	Illustrate the circle diagram of 3-Φ induction motor with all power losses. Estimate the following using circle diagram. (i) Line current (ii) Motor efficiency (iii) Slip (iv) Power factor.	8M	CO2	L1
4.	A 230V, 50Hz, 380W, 4-pole 1-Φ Induction Motor gave the following test results: No-load test: 230V 84W 2.8A Blocked rotor test: 110V 460W 6.2A The stator winding resistance is 4.6Ω and during the blocked rotor test, the auxiliary winding is open. Determine the equivalent circuit parameters.	[15M]	CO2	L3
5(a)	Discuss about the parallel operation of synchronous generators.	7M	CO3	L2
(b)	A 415V, 40KVA, 1-Φ Alternator has an effective resistance of 0.2Ω. A field current of 10A produces an armature current of 210A on short-circuit and an EMF of 480V on open-circuit. Calculate: (i)Synchronous impedance and reactance. (ii)Full-load regulation with 0.8p.f lagging.	8M	CO3	L3
6(a)	Discuss the construction details of a 3-Φ synchronous motor with a neat sketch.	7M	CO4	L1
(b)	Justify Why synchronous motors are not self-starting.	8M	CO4	L2
7(a)	Deduce the toque equation of a 3-Φ Induction motor with all necessary equations.	7M	CO2	L3
(b)	Enumerate on the following with respect to 3-Φ induction motor: (i)losses (ii) efficiency	8M	CO2	L2
8(a)	What is regulation of ac generator? Discuss about the MMF method in detail.	7M	CO4	L2
(b)	Illustrate EMF method in detail with all necessary equations.	8M	CO4	L2

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B.Tech. (IV Semester) ~~Regular~~/Supplementary Examinations
S189- DIGITAL ELECTRONIC CIRCUITS
(EEE)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

Q.No	Questions	Marks	CO	BL
1(a)	Find the hexadecimal equivalent of $(1234)_8$.	1M	CO1	L1
(b)	Draw the logic diagram of function $F = AB + \overline{B}(B+D)$ without simplifying.	1M	CO2	L3
(c)	Define combinational logic circuit.	1M	CO3	L1
(d)	State various types of triggering techniques.	1M	CO4	L1
(e)	Denote the meaning of equivalent states.	1M	CO4	L1
(f)	Express the function $F = A + \overline{B}C$ as a sum of minterms.	2M	CO2	L3
(g)	Implement the function $F = XY + \overline{X}\cdot\overline{Y} + \overline{Y}\cdot Z$ with OR and inverter gates.	2M	CO2	L3
(h)	Design 16x1 multiplexer using 8x1 multiplexers.	2M	CO3	L3
(i)	Derive the excitation table for T flip-flop.	2M	CO4	L4
(j)	Differentiate between Mealy machine and Moore machine.	2M	CO4	L4

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

Q.No	Questions	Marks	CO	BL
2(a)	Obtain the 7-bit hamming code word for the 4-bit data word 1011 using even parity.	7M	CO1	L3
(b)	Simplify the given Boolean function using K-map $F=\sum m(1,3,4,5,9,10,11)+\sum d(6,8)$	8M	CO2	L4
3(a)	Reduce the function $F=\Pi M(0,1,2,3,4,7)$ using k-map and implement it in NOR logic.	7M	CO2	L4
(b)	Represent Ex-OR gate using NOR gates.	8M	CO2	L3
4(a)	Design a combinational logic circuit for 4-bit Adder-Subtractor circuit using parallel adder.	7M	CO3	L3
(b)	Design 16x1 Multiplexer using two 4x1 Multiplexers.	8M	CO3	L3
5(a)	Design a 4-bit synchronous counter.	7M	CO4	L3
(b)	Design a Mod-16 ripple down-counter using J-K flip flops.	8M	CO4	L3
6(a)	What are the salient features of an ASM charts? A clocked sequential circuit is provided with a single input x and single output Z. It should produce an output Z = 1 at the end of sequence 000 or 111. Overlapping is allowed. Obtain (i) State – Diagram (ii) State – Table Design the circuit using D flip-flops.	7M	CO4	L2
(b)	Illustrate with an example about Mealy Machine.	8M	CO4	L2
7(a)	Express the given function $F(A,B,C,D) = \overline{B}D + \overline{A}D + BD$ as a sum of minterms and as s product of maxterms.	7M	CO2	L4
(b)	Convert the following to Decimal and then to Octal i) $(4234)_{16}$ ii) $(125F)_{16}$ iii) $(10010011)_2$ iv) $(10111111)_2$	8M	CO1	L3
8(a)	Minimize the logic function $F(w,x,y,z)=\sum m(0,1,2,3,7,8,10,11,15)$ using K-map, and realize using NAND gates.	7M	CO2	L4
(b)	Describe the fundamental steps for NOR-NOR implementation	8M	CO2	L2

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

S127-ANALOG ELECTRONICS
(EEE)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

1(a)	Name the parameter f_T in short circuit common emitter amplifier.	[1M]
(b)	Define the term conduction angle related to power amplifiers.	[1M]
(c)	Tell the type of feedback used in oscillators.	[1M]
(d)	List the signals which are commonly used in pulse circuits.	[1M]
(e)	Find the devices that are required for clipping purpose.	[1M]
(f)	Calculate f_T, if h_{fe} is 50 and f_β is 1MHz.	[2M]
(g)	Explain cross over distortion in power amplifiers.	[2M]
(h)	Demonstrate feedback concept block diagram.	[2M]
(i)	Memorize the relation between the rise time and bandwidth of low pass RC circuit.	[2M]
(j)	Construct a circuit to transmit that part of a sine wave which lies between -3V and +6V.	[2M]

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

2.	Make use of the circuit diagram of hybrid-π CE model with resistive load, derive its current gain and plot its frequency response.	[15M]
3(a)	Explain about types of distortions present in power amplifiers.	[7M]
(b)	Build the circuit diagram of class B push pull power amplifierand obtain its efficiency.	[8M]
4(a)	Summarize the concept of voltage-shunt feedback amplifier with neat sketches and derive input impedance and output impedance.	[7M]
(b)	Examine how the noise, distortion, gain and bandwidth parameters of an amplifier are affected due to negative feedback.	[8M]
5(a)	Show how a high pass RC circuit acts as a differentiator.	[7M]
(b)	Solve the expression for output of high pass RC circuit excited by step input.	[8M]
6(a)	Design a two way parallel clipper circuit that allows input in the voltage range of -2V and 5V. Draw transfer characteristics.	[7M]
(b)	Experiment with a parallel positive clipper circuit with reference voltage V_R and explain its operation and transfer characteristics.	[8M]
7(a)	Explain how frequency response is affected with negative feedback.	[7M]
(b)	Calculate the voltage gain with feedback A_f, input resistance R_{if} and output resistance R_{of} of the amplifier with feedback, if a current-series negative feedback amplifier has a voltage gain without feedback A=600, input resistance R_i=2kΩ, output resistance R_o=18kΩ and feedback ratio β=0.01.	[8M]
8(a)	Draw the hybrid-π model representation of transistor in CE configuration and mention the names of each parameter.	[7M]
(b)	Demonstrate the operation of negative clamper with neat sketches.	[8M]

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

S410-TRANSDUCERS IN INSTRUMENTATION
(EIE)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

1(a)	What is transducer?	[1M]
(b)	List two examples for active transducers.	[1M]
(c)	Which mechanical transducer is suitable for measuring low pressure?	[1M]
(d)	List two advantages of capacitive transducer.	[1M]
(e)	Name a transducer that converts light into an electrical current.	[1M]
(f)	Write two nonlinear conditions possible in the instrumentation systems.	[2M]
(g)	Write the two main differences between transducers and sensors.	[2M]
(h)	Write two examples for resistive transducers and mechanical transducers.	[2M]
(i)	Write any two applications of capacitive transducers.	[2M]
(j)	How phototransistor is working?	[2M]

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

2(a)	Explain the following characteristics of measurement systems. (i) Accuracy (ii) Precision (iii) Resolution (iv)Sensitivity.	[8M]
(b)	Explain the following terms in the instrumentation & measurement systems with suitable examples (i) Systematic errors (ii) Random errors.	[7M]
3(a)	Explain working of a thermocouple with suitable diagrams.	[7M]
(b)	Explain the operation of piezoelectric sensor and list out its advantages.	[8M]
4(a)	List out some important resistive transducers and explain working of RTD (Resistive Temperature Detector).	[7M]
(b)	Write the advantage of bimetallic transduces and explain its operation.	[8M]
5(a)	Explain the operation of hall effect electromagnetic transducer with necessary equations.	[8M]
(b)	Write principle and operation of LVDT with necessary diagrams.	[7M]
6(a)	Explain the operation of photo diode and photo transistor.	[8M]
(b)	Write the advantages of magneto transistor and magneto diode.	[7M]
7(a)	List the types of strain gauges and explain briefly.	[7M]
(b)	Explain the operation of Light Dependent Resistor and applications.	[8M]
8(a)	Write the advantages of resolver and explain its working with necessary diagrams.	[8M]
(b)	Explain the operation of capacitive transducer with neat diagrams.	[7M]

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B.Tech. IV Semester Regular/Supplementary Examinations

S361-PULSE AND SWITCHING CIRCUITS
(EIE)

Time : 3 hours   Max. Marks : 75

PART-A
(Answer all questions)

1(a) What is the unique characteristic of sinusoidal waveform with respect to linear wave shaping? [1M]

(b) Which devices are required for clipping purposes? [1M]

(c) Write the values of V_{BE} (cut-off) and V_{BE} (sat) of a NPN silicon transistor. [1M]

(d) What are the other names for Monostable multivibrator? [1M]

(e) Write the relation between e_s, e_d and e_t. [1M]

(f) When does low-pass circuit act as an Integrator? [2M]

(g) State clamping circuit theorem. [2M]

(h) Draw the circuit of fixed biased binary. [2M]

(i) When does Schmitt trigger exhibit hysteresis? [2M]

(j) Draw the circuit of UJT relaxation oscillator. [2M]

PART-B
(Answer any FOUR questions)

2(a) Derive relationship between rise time and bandwidth of RC Low pass circuit. [8M]

(b) Define the types of Non-sinusoidal signals and express them mathematically and graphically. [7M]

3(a) Draw the basic circuit diagram of Positive peak clamper and explain its operation. [7M]

(b) Describe with the help of a neat circuit diagram and transfer characteristics of a two level clipper. [8M]

4(a) Design a fixed bias Bistable multivibrator to meet the following specifications. Vcc=Vbb=12V, Ic(sat)=4mA,h_{FE}(min)=20. [8M]

(b) Explain the switching times of the transistor. [7M]

5(a) Compare Astable, Monostable multivibrators. [7M]

(b) Show that Monostable multi vibrator can be used as a voltage to time converter. [8M]

6. Derive the relation between slope error, displacement error and transmission error. [15M]

7(a) A Pulse is applied to a low pass RC circuit. Prove by direct integration that the area under the pulse is the same as the area under the output waveform across the capacitor. Explain the result physically. [8M]

(b) Appraise the necessity of triggering and explain various methods of triggering of binary (Bistable). [7M]

8(a) Define intrinsic stand of ratio in UJT. Derive the relation in terms of resistances. [7M]

(b) Derive the expression for frequency of oscillations of UJT. [8M]

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

S312-MICROPROCESSORS AND INTERFACING

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

PART-A
(Answer all questions)

1(a)	What is the purpose of AX register in 8086?	[1M]
(b)	Define assembly language program.	[1M]
(c)	What is meant by Isolated I/O?	[1M]
(d)	What are the contents of CWR of 8255 when port C lower is used as O/P port?	[1M]
(e)	List the various serial data transfer schemes.	[1M]
(f)	Explain any two flag manipulation instructions of 8086.	[2M]
(g)	Write an ALP to compare two strings.	[2M]
(h)	Draw the pin diagram of 74LS373.	[2M]
(i)	Write the salient features of mode0 in 8255.	[2M]
(j)	What is the use of priority resolver in 8259A?	[2M]

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

2(a)	Mention the salient features of 8086.	[7M]
(b)	Explain the flag register of 8086.	[8M]
3.	Explain the maximum mode of operation of 8086 briefly and draw the timing diagrams for read and write operations.	[15M]
4(a)	Explain the general bus operation of 8086 with a timing diagram.	[7M]
(b)	Show the Interface details of 128KB EPROM to 8086 in even and odd banks from the address 80000H.	[8M]
5(a)	List out the Salient features of 8255 in different modes.	[7M]
(b)	Interface a 4-pole, Stepper Motor to 8255 and write a Program for 5 rotations in anticlockwise direction	[8M]
6(a)	Describe the function of the following pins of 8259A (i) D_7-D_0 (ii) $\overline{INTA}$ (iii) $\overline{WR}$ (iv) CS	[8M]
(b)	Interface 8251 with 8086 with an address 80H.	[7M]
7(a)	Write an ALP to find the total no-of 1's in a given byte.	[7M]
(b)	Write an ALP to display the message "I Love My India" on the CRT screen of a microcomputer.	[8M]
8(a)	Write short notes on DOS and BIOS Interrupts.	[7M]
(b)	Explain the interrupt vector table of 8086.	[8M]

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LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
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B.Tech. (IV Semester) ~~Regular~~/Supplementary Examinations

S252-FLUID MECHANICS AND HYDRAULIC MAHCINERY
(ME)

Time : 3 hours   JC Y   Max.Marks : 75

PART-A
(Compulsory question)

Q.No	Questions	Marks
1(a)	Define Kinematic viscosity.	1M
(b)	What is Eulerian method?	1M
(c)	How can you define boundary layer thickness?	1M
(d)	What do you mean by efficiency of a turbine?	1M
(e)	What is meant by priming?	1M
(f)	What do you mean by fluid mechanics?	2M
(g)	What is an orifice meter?	2M
(h)	How can you define turbulent boundary layer?	2M
(i)	What is the basis selection of a turbine at a particular place?	2M
(j)	What is meant by double acting reciprocating pump?	2M
	PART-B (Answer any FOUR questions. All questions carry equal marks)	
2(a)	Develop the expression for the relation between gauge pressure P inside a droplet of liquid and the surface tension.	7M
(b)	Illustrate about single column manometers. How they are used for the measurementof pressure?	8M
3(a)	The head of water over an orifice of diameter 40mm is 10m. Find the actual discharge and actual velocity of the jet at vena-contracta. Take C_d=0.6 and C_v=0.98.	7M
(b)	Formulate Darcy-Weisbach equation.	8M
4(a)	Discuss about laminar boundary layer.	7M
(b)	Explain about turbulent boundary layer.	8M
5(a)	A turbine is operated under a head at 200 rpm. The discharge is 9 cumec. If efficiency is 90%. Determine, (i) specific speed of the machine (ii) power generated.	7M
(b)	A turbine develops 9000 KW when running at 10 rpm. The head on the turbine is 30m. if the head on the turbine is reduced to 18m, determine the speed and power developed by the turbine.	8M
6(a)	Centrifugal pump delivers water against a net head of 14.5 m and a design speed of 1000 rpm.The vanes are curved back to an angle of 30⁰ with the periphery. The impeller diameter is 300 mm and outlet width is 50 mm.Determine the discharge of the pump if manometric efficiency is 95%.	7M
(b)	Formulate the expression for specific speed of centrifugal pump.	8M
7(a)	Deduce the expression for capillary Fall.	7M
(b)	The capillary rise in the glass tube is not to exceed 0.2mm of water. determine its minimum size, given that tension for water in contact with air=0.0725N/m.	8M
8(a)	What is Pitot-tube? How you will determine the velocity at any point with the help of pitot-tube?	7M
(b)	An orifice meter with orifice diameter 15cm is inserted in a pipe of 30cm diameter. The pressure gauges fitted upstream and downstream of the orifice meter give readings of 14.715 N/cm² and 9.81 N/cm² respectively. Find the rate of flow of water through the pipe in lit/s. Take C_d=0.6.	8M

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

S354-PRODUCTION TECHNOLOGY
(ME)

Time : 3 hours   Max. Marks : 75

PART-A
(Answer all questions)

1(a)	List the advantages of MIG welding.	[1M]
(b)	List the types of rolling mills.	[1M]
(c)	List the components in oxy-acetylene welding equipment.	[1M]
(d)	Write the equation used to calculate the amount of heat generated in resistance welding.	[1M]
(e)	List the advantages of TIG welding.	[1M]
(f)	Define gating ratio.	[2M]
(g)	Enumerate the types of gates used in casting processes.	[2M]
(h)	Define coining.	[2M]
(i)	Define piercing.	[2M]
(j)	What is bending?	[2M]

PART-B
(Answer any FOUR questions)

2(a)	With the help of neat sketches explain the types of patterns used in foundries.	[8M]
(b)	State and explain the essential ingredients of moulding sand.	[7M]
3(a)	Describe the types of flames obtained in oxy acetylene welding process and mention their advantages and applications.	[8M]
(b)	How is gas cutting torch different from the gas welding torch? Explain.	[7M]
4(a)	The voltage –length characteristic of a D.C. arc is given by V=20+30L, where 'V' is the voltage and 'L' is the length of arc in cm. The power source characteristic is approximated by a straight line with an open circuit voltage is 60V and short circuit current is 200Amp. Determine the optimum arc length and the corresponding arc power.	[8M]
(b)	Elaborate the causes and remedies of welding defects.	[7M]
5(a)	Enumerate the advantages and disadvantages of hot working process.	[8M]
(b)	Describe the forging process.	[7M]
6(a)	What is extrusion? How it is classified? Explain.	[8M]
(b)	Describe the processes of making seamless tubes by extrusion processes.	[7M]
7(a)	Sketch and explain the steps in casting process.	[8M]
(b)	With neat sketches, explain the tandem rolling mill and planetary rolling mill.	[7M]
8(a)	Differentiate A.C welding and D.C welding.	[8M]
(b)	Classify the types of electrodes used in arc welding.	[7M]

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

S286-KINEMATICS OF MACHINES
(ME)

Time : 3 hours   Max.Marks : 75

PART-A
(Compulsory question)

Q.No	Questions	Marks
1(a)	Define resistant body.	1M
(b)	Give the direction of velocity of rotating link.	1M
(c)	List out trace point of a cam.	1M
(d)	What is initial tension in belt drives?	1M
(e)	Define gear ratio.	1M
(f)	Differentiate the two quick return motion mechanisms.	2M
(g)	State the condition for a link to experience coriolis acceleration.	2M
(h)	State the reasons for providing offset in cam-follower pair.	2M
(i)	Discuss the initial tension in belts.	2M
(j)	Derive the train value of a reverted gear train.	2M

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

Q.No	Questions	Marks
2(a)	Derive the condition to be satisfied by a mechanism required to produce an exact straight line motion.	7M
(b)	Describe with a neat sketch the elliptical trammel mechanism as an inversion of the double slider crank chain.	8M
3(a)	State and explain Kennedy's theorem as applicable to instantaneous center of rotation of three bodies.	7M
(b)	Estimate the number of instantaneous centers a four bar chain. Locate all the instantaneous centers of a four bar mechanism with an example.	8M
4(a)	Derive the equation for the ratio of angular velocities of the driven and driving shafts for a Hook's joint.	7M
(b)	Determine the maximum permissible angle between the shaft axes of a universal joint if the driving shaft rotates at 800 rpm and the total fluctuation of speed does not exceed 60 rpm. Also, find the maximum and the minimum speeds of the driven shaft.	8M
5(a)	What is meant by cross-belt drive? Deduce expression for the length of the belt in a cross belt drive.	8M
(b)	A leather belt 120 mm wide and 6mm thick transmits power from a pulley 800mm diameter which rotates at 450 rpm. The angle of lap is 160⁰ and coefficient of friction is 0.3. The mass of the belt is 1000 kg/m³ and the stress is not to exceed 2.5 MPa. Find the maximum power that can be transmitted.	7M
6(a)	Derive an expression for minimum number of teeth (T) on the wheel if interference is to be avoided between two mating gears.	7M
(b)	Two 20⁰ involute spur gears mesh externally and give a velocity ratio of 3. Module is 3 mm and the addendum is equal to 1.1 module. If the pinion rotates at 120 rpm, determine (i) the minimum number of teeth on each wheel to avoid interference.(ii) The number of pairs of teeth in contact.	8M
7(a)	Illustrate the Grasshopper mechanism clearly.	7M
(b)	Discuss the Skotch yoke mechanism with an illustration.	8M
8(a)	Discuss the double Hooke's joint with a neat sketch.	7M
(b)	Classify with neat sketches the cam follower according to their shape, location and motion. State also their advantages, if any, with respect to other followers.	8M

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

S245-ESTIMATION,COSTING AND ENGINEERING ECONOMICS
(ME)

Time : 3 hours   Max.Marks:75

PART-A
(Answer all questions)

1(a)	Define estimation.	[1M]
(b)	List out the reasons for scrap.	[1M]
(c)	Define foundry.	[1M]
(d)	What are sunk costs?	[1M]
(e)	What is group replacement?	[1M]
(f)	How Weldon defined costing?	[2M]
(g)	Define direct labor.	[2M]
(h)	Define Up Setting operation in forging.	[2M]
(i)	What is standard costing?	[2M]
(j)	What is break-even point?	[2M]

PART-B
(Answer any FOUR questions)

2(a)	Classify and explain various time allowances.	[7M]
(b)	What are various constituents of estimation? Explain.	[8M]
3(a)	Explain various components of cost with block diagram.	[7M]
(b)	How the material costs are classified? How material cost is calculated in an industry?	[8M]
4(a)	Explain different types of forging.	[7M]
(b)	Estimate the cost of the metal sheet for preparing a funnel with two fulcrums of onewith 8 cm, 4 cm diameters and 6 cm height and another with 4 cm, 1 cm diametersand 8 cm height. Assume the wastage of metal as 10% and cost of the sheet as Rs.20/m².	[8M]
5(a)	In what way cost accounting is helpful to manufacturer?	[7M]
(b)	How labor cost can be controlled? Explain.	[8M]

6. A firm is using a machine whose purchase price is Rs 13,000. The installation charges amount to Rs 3,600 and the machine has a scrap value of only Rs 1,600 because the firm has a monopoly if this type of work.The maintenance cost in various years is given in the following table:

Year	1	2	3	4	5	6	7
Cost (Rs)	250	750	1000	1500	2100	2900	4000

The firm wants to determine after how many years the machine should be replaced on economic considerations, assuming that the machine replacement can be done only at the year ends. [15M]

7(a)	Describe various marketing considerations for pricing.	[7M]
(b)	What is the importance of book-keeping? Explain the systems of book Keeping.	[8M]
8(a)	List out and describe the various pattern allowances.	[7M]
(b)	Estimate the time required for making an open tank of size 40 x 40 x 40 cm by gaswelding. Size of the sheets used is 50 x 40x 0.3 cm. Welding is to be done on innersides only. Assume fatigue allowance to be 5%. Welding speed from table is 12min/m of welding for 3 mm thick plates.	[8M]

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

S407-THERMAL ENGINEERING
(ME)

Time : 3 hours   Max.Marks : 75

PART-A
(Compulsory question)

Q.No	Questions	Marks
1(a)	Why regeneration process is used in Rankine cycle?	1M
(b)	What is the function of a boiler chimney?	1M
(c)	What do you understand by supersaturated flow in nozzles?	1M
(d)	How the blades are shaped in a reaction turbine?	1M
(e)	What do you mean by compressor isothermal efficiency?	1M
(f)	Draw the T-S and P-V diagram for Carnot vapour power cycle.	2M
(g)	Why Reheating and regenerating methods are used in Rankine cycle?	2M
(h)	What is the purpose of cooling tower in a steam power plant?	2M
(i)	Why compounding is necessary for steam turbine? Give reasons.	2M
(j)	Why clearance volume is provided in reciprocating compressors?	2M

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

2(a)	Compare and contrast Carnot vapour cycle and Rankine vapour cycle.	8M
(b)	In a steam power cycle, the steam supply is at 15bar, dry and saturated. The condenser pressure is 0.4bar. Calculate the Carnot and Rankine efficiencies of the cycle. Neglect pump work.	7M
3(a)	Sketch a boiler used in thermal power plant and locate all the parts in it.	7M
(b)	Calculate the height of chimney required to produce a draught equivalent to 1.7cm of water if the flue gas temperature is 270^0C and ambient temperature is22^0C and minimum amount of air per kg of fuel is 17kg.	8M
4(a)	Classify condensers and justify the role of a condenser in a thermal power plant.	7M
(b)	The nozzles of a De-Laval steam turbine are supplied with dry saturated steam at a pressure of 9bar. The pressure at the outlet is 1 bar. The turbine has two nozzles with a throat diameter of 2.5mm. Assuming nozzle efficiency as 90% and that of turbine rotor 35%, find the quality of steam used per hour and the power developed.	8M
5(a)	Illustrate the working principle of a reaction turbine with neat sketch.	7M
(b)	Explain the concept of super saturation with h-s diagram.	8M

6(a)	Compare and contrast reciprocating and centrifugal compressors.	7M
(b)	Compare the work inputs and compressor efficiency required for a roots blower and a Vane's compressor having the same induced volume of 0.06m³/rev. The inlet pressure being 1.013 bar and the pressure ratio 2.0. For the Vane type assume that internal compression takes place through half the pressure range.	8M

7(a)	Formulate the expression for theoretical mass of air required for one kg combustion of a solid fuel which contains various constituents.	7M
(b)	A fuel has the following composition by mass:Carbon 86%, Hydrogen 11.75%, Oxygen 2.25%. Calculate the theoretical air supply per kg of fuel, and the mass of products of combustion per kg of fuel.	8M

8(a)	What do you understand by the significant role of chimney in a thermal power plant?	7M
(b)	Find the minimum height of the chimney required to produce a draught of 15mm of H_2O, if 18 kg of air is required/kg of fuel burnt on the grate. The mean temperature of flue gases inside the chimney is 329°C and the atmospheric temperature is 29°C.	8M

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