B.Tech.(IV Semester) (R14) Supplementary Examinations, August 2021

TIME TABLE

TIME :02.00 PM to 05.00 PM

A.Y. 2020-21

DATE	ASE	CE	CSE	ECE	EEE	EIE	IT	ME
16-08-2021 (Monday)	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
17-08-2021 (Tuesday)	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
18-08-2021 (Wednesday)	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
20-08-2021 (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
21-08-2021 (Saturday)	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
23-08-2021 (Monday)	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
24-08-2021 (Tuesday)	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: Any omissions or clashes in the time table may please be informed to the Controller of Examinations immediately.
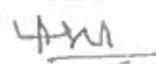
CONTROLLER OF EXAMINATIONS

PRINCIPAL

Date: 31-07-2021
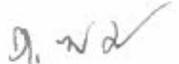
Copy to: 1. Vice-Principal, Deans & HoDs   2. Transport in-charge & Librarian
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B.Tech. (IV Semester) ~~Regular~~/Supplementary Examinations

S136-APPLIED THERMODYNAMICS
(ASE)

Time : 3 hours

Max.Marks : 75

PART-A
(Compulsory question)

Q.No	Questions	Marks
1(a)	Define saturation temperature.	1M
(b)	Draw the configurations of different steam nozzles.	1M
(c)	What is the shape of impulse turbine blade?	1M
(d)	What is the function of cam shaft in internal combustion engine?	1M
(e)	What is meant by cooling load?	1M
(f)	Enlist the limitations of chimney draught?	2M
(g)	What are the sources of air in the condensers?	2M
(h)	Draw the pressure and velocity variation diagram for a reaction turbine.	2M
(i)	What is the necessity of cooling engines?	2M
(j)	What are the sources of heat for an airplane?	2M

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

2(a)	Discuss the irreversibility's and losses in vapour power cycles.	7M
(b)	Derive the expression for condition for maximum discharge through a chimney.	8M
3(a)	Draw the line diagram of steam condensing plant and demonstrate the components of condensing plant.	7M
(b)	An impulse turbine having a set of 16 nozzles receives steam at 20bar, 400ºC The pressure of stem at exit is 12bar. If the total discharge is 260kg/min and nozzle efficiency is 90%, find the cross-sectional area of the exit of each nozzle. If the steam has a velocity of 80m/s at entry to the nozzles, find the percentage increase in discharge.	8M
4(a)	Prove that a Parson's reaction turbine is a 50 % reaction turbine with h-s diagram.	8M
(b)	Discuss the factors that influence the life of turbine blades.	7M
5(a)	Illustrate the working of four stroke CI engine.	8M
(b)	How the Williams line method does used to find the frictional power? Explain.	7M
6(a)	Illustrate the following terms (i) Humidity ratio (ii) Relative Humidity (iii) DPT iv)Enthalpy	7M
(b)	Air at 40ºC DBT and 25ºC WBT is cooled down in an air-conditioning plant to 25ºC DBT and 60% RH. Calculate the heat to be removed per kg of air if the COP of the unit is 3.5. Also, find the work required to cool 3 kg of air.	8M
7(a)	Enlist the factors to be considered while selecting a boiler.	7M
(b)	A steam power plant operates on ideal Rankine cycle. The steam enters the turbine at 3Mpa, 350ºC and is condensed in the condenser at pressure of 75kpa. Determine thermal efficiency, work ratio of the cycle.	8M
8(a)	Illustrate the working of forced circulation water cooling system.	7M
(b)	A single-cylinder, CI engine with a brake thermal efficiency of 29% uses diesel oil having a calorific value of 42000kj/kg. If it's mechanical efficiency is 88%, Calculate i) BSFC ii) ISFC iii)Indicated thermal efficiency	8M

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B.Tech. (IV Semester) Supplementary Examinations

S121-AIRCRAFT STRUCTURES-I
(AE)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

1(a)	Explain elasticity of materials.	[1M]
(b)	Define statically determinate structures.	[1M]
(c)	What is fixed beam?	[1M]
(d)	Define strain energy.	[1M]
(e)	Define buckling load on column.	[1M]
(f)	Write short note on principal planes, Principal stresses.	[2M]
(g)	With the help of neat sketch explain perfect frame.	[2M]
(h)	Explain the propped cantilever with neat sketch.	[2M]
(i)	Write brief notes on second theorem of castigliano's.	[2M]
(j)	Differentiate column and strut.	[2M]

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

2(a) The tensile stresses at a point across two mutually perpendicular planes are $100N/mm^2$ and $120N/mm^2$. Determine the normal, tangential and resultant stresses on a plane inclined at 30^0 to the axis. [7M]

(b) At a particular point in a structural member a two-dimensional stress system exists where σ_x =80 N/mm², σ_y=−60 N/mm² and τ_{xy} =50 N/mm². If Young's modulus E =200 000 N/mm² and Poisson's ratio ν=0.3 calculate the direct strain in the x and y directions and the shear strain at the point. Also calculate the principal strains at the point. [8M]

3. Analyze the given frame and find the forces in the members of the Truss shown in Fig
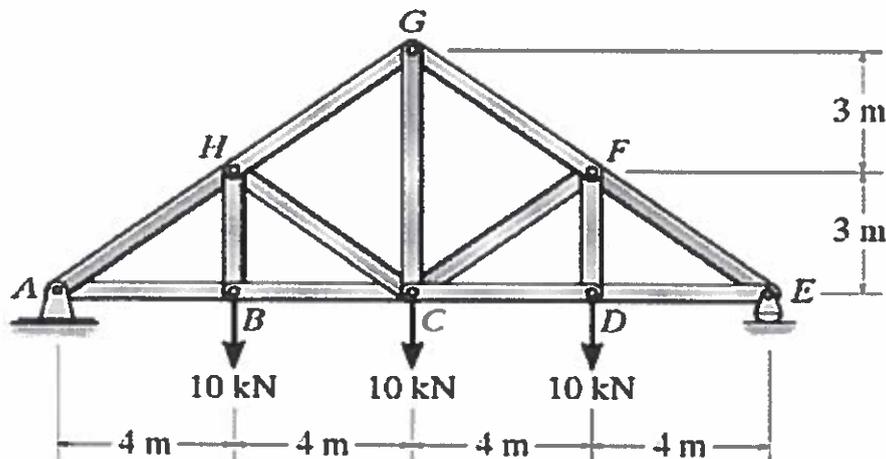
[15M]

4(a) Evaluate the support moments and reactions of a continuous beam ABC consists of two spans AB and BC of length 6 m and 8 m. The span AB carries a point load of 120 KN at 4 m from A while the span BC carries a point load of 160 KN at 5 m from C. [7M]

(b) A fixed beam 6 m span supports two point loads of 30 KN each at 2 m from each end. Find fixed moments also draw BMD. [8M]

5(a) Analyze the given beam of span 4m is fixed at one end and simply supported at the other end. It carries a UDL of 2.5KN/m per unit run over the whole span. Find the reaction at the simply supported end, by the principle of least work (using Castigliano's theorem). [8M]

(b) Evaluate the Strain energy stored in a member due to axial load. [7M]

6(a) Derive the expression for crippling load by Euler's formula for a column having both ends are fixed. [8M]

(b) A steel column is of length 6 m and diameter 400 mm with both ends fixed. Determine the crippling load by Euler's formula. Take E =2.1 x 10^5 N/mm². [7M]

7(a) Evaluate the safe compressive load on a hollow CI column with one end fixed and other end hinged of 150 mm external diameter and 100 mm internal diameter and 10 m in length take E= 95 KN/mm² and factor of safety is 5. [7M]

(b) A solid round bar 3m long and 5cm in diameter is used with following conditions. Determine crippling load. Take E=2.0 ×10^5 N/mm² When the given column is used following conditions.
i) Both ends hinged.   ii) One end is fixed and other is hinged. [8M]

8. A strained element has tensile stress of 500 N/mm² and a compressive stress of 300 N/mm² acting on two mutually perpendicular planes X and Y and two equal shear stresses of 75 stress of N/mm² on these planes. Find The stresses on an inclined plane at 45⁰ and check the results by using graphical methods. [15M]

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

S116-AERODYNAMICS-I
(ASE)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

Q.No	Questions	Marks
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 symmetric airfoil in the transformed plane?	1M
(c)	What does the first digit in NACA 2412 airfoil represent?	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 pressure drag due to separation accounts for the major portion of the total drag.	1M
(f)	What is the stream function of incompressible uniform flow oriented in the positive x-direction?	2M
(g)	How to represent a point 'P' in the (x, iy) plane?	2M
(h)	Define mean camber line of an airfoil.	2M
(i)	What is meant by induced drag?	2M
(j)	What is meant by bluff body?	2M

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

2(a)	Define uniform flow, source, sink and vortex flow.	7M
(b)	Draw the streamlines for the combination of (i) uniform flow with source (ii) uniform flow with source and sink (iii) source and sink (limiting condition) (iv) uniform flow and doublet (v) uniform flow, doublet and vortex.	8M
3(a)	Transform the uniform flow parallel to x-axis of the physical plane, with the transformation function $\zeta = z^2$.	7M
(b)	Find the transformation of the uniform flow parallel to the y-axis, in the z plane using transformation function $\zeta = z^2$.	8M
4(a)	Write short notes on vortex sheet.	7M
(b)	Explain the Kelvin Circulation Theorem and define starting vortex.	8M
5(a)	Write a short notes on (i) Downwash (ii) Induced drag (iii) Induced angle of attack.	7M
(b)	Write a short notes on (i) Trailing vortices (ii) Horse shoe vortex (iii) Bound vortex.	8M
6(a)	Write short notes on (i) Boundary layer thickness (ii) Displacement thickness.	7M
(b)	Explain the concept of Boundary layer with a neat sketch.	8M
7(a)	Show that the shape of the trailing edge of Joukowski airfoil is cusped.	7M
(b)	A symmetrical airfoil is obtained by transforming a circle of unit radius, with Kutta-Joukowski transformation function. If the eccentricity is 0.1, find the maximum value of the thickness to chord ratio.	8M
8.	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, Develop an expression for boundary layer thickness.	15M

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

S403-THEORY OF MACHINES
(ASE)

Time : 3 hours   Max.Marks : 75

PART-A
(Compulsory question)

Q.No	Questions	Marks
1(a)	Explain the term higher pair.	1M
(b)	What is meant by velocity ratio of belt drive?	1M
(c)	What is meant by train value?	1M
(d)	What is plane of precession?	1M
(e)	Why balancing is necessary for rotors?	1M
(f)	What are the different types of joints?	2M
(g)	Write about screw friction.	2M
(h)	State the law of gearing.	2M
(i)	Write about gyroscopic plan.	2M
(j)	Write about balancing of reciprocating mass.	2M

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

2(a)	Write notes on complete and incomplete constraints in lower and higher pairs, illustrating your answer with neat sketches.	8M
(b)	Sketch and describe the quadric cycle chain. Why it is considered to be the basic chain? Explain.	7M
3(a)	A belt runs over a pulley of 700 mm diameter at a speed of 190 rpm. The angle of lap is 175^0 and the maximum tension in the belt is 3 kN. Determine the power transmitted if the coefficient of friction between the belt and the pulley is 0.3.	8M
(b)	A block weighs 8 kN and is freely suspended from a rope which makes 3.5 turns round a drum of 190 mm diameter. If the drum rotates at 50 rpm, determine the force required by a man to pull the rope from the other end of the rope. Also, find the power to rise the block. The coefficient of friction is 0.25.	7M
4(a)	Each of two gears in a mesh has 48 teeth and a module of 8 mm. The teeth are of 20^0 involute profile. The arc of contact is 2.25 times the circular pitch. Determine the addendum.	7M
(b)	Draw the displacement, velocity and acceleration diagrams for a follower when it moves with uniform acceleration and retardation. Derive the expression for velocity and acceleration during outstroke and return stroke of the follower.	8M

5(a)	A disc with radius of gyration of 60 mm and amass of 4 kg is mounted centrally on a horizontal axle of 80 mm length between the bearings. It spins about the axle at 800 rpm counterclockwise when viewed from the right-hand side bearing. The axel processes about a ver axis at 50 rpm in the clockwise direction when viewed from above. Determine the resultant reaction at each bearing due to the mass and the gyroscopic effect.	7M
(b)	The wheels of a motorcycle have a moment on inertia 68 kg m² and engine parts a moment of inertia of 3.4 kgm². The axis of rotation of the engine crankshaft is parallel to that of the road wheels. If the gear ratio is 5 to 1, the diameter of the road wheels is 65 cm and the motor cycle rounds a curve of 30.5 m radius at 60 km/hour, find the magnitude and direction of the gyroscopic couple.	8M
6(a)	Four masses A, B, C and D are attached to a shaft and revolve in the same plane. The masses are 12 kg, 10 kg, 18 kg and 15 kg respectively and their radii of rotations are 40 mm, 50 mm, 60 mm and 30 mm. The angular position of the masses B, C and D are 60°, 135° and 270° from the mass A. Find the magnitude and position of the balancing mass at a radius of 100 mm.	7M
(b)	The cylinders of a twin V-engine are set at 60⁰ angle with both pistons connected to a single crank through their respective connecting rods. Each connecting rod is 600 mm long and the crank radius is 120 mm. the total rotating mass is equivalent to 2 kg at the crank radius and the reciprocating mass is 1.2 kg per piston. A balance mass is also fitted opposite to the crank equivalent to 2.2 kg at a radius of 150 mm. Determine the maximum and minimum values of the primary and secondary forces due to inertia of the reciprocating and the rotating masses if the engine speed is 800 rpm.	8M
7(a)	The cylinder axes of a V-engine are at right angles to each other. The weight of each piston is 3 kg and of each connecting rod is 3.9 kg. The weight of the rotating parts like crank webs and the crank pin is 2.8 kg. The connecting rod is 500 mm long and its centre of mass is 200 mm from the crank-pin centre. The stroke of the piston is 170 mm. Show that the engine can be balanced for the revolving and the primary force by a revolving counter mass. Also, find the magnitude and the position if its centre of mass from the crankshaft is 90 mm.	7M
(b)	Four masses A, B, C and D revolve at equal radii and are equally spaced along a shaft. The mass B is 9 kg and the radii of C and D make angles of 80° and 230° respectively with the radius of B. Find the magnitude of the masses A, C and D and the angular position of A so that the system may be completely balanced.	8M
8(a)	Explain about completely, successfully and incompletely constrained motions of kinematics pairs with examples.	8M
(b)	Sketch and explain any two inversions of a double slider crank chain.	7M

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B.Tech. (IV Semester) Supplementary Examinations

S264-HYDRAULICS AND HYDRAULIC MACHINERY
(CE)

Time : 3 hours   Max.Marks : 75

PART-A
(Compulsory question)

Q.No	Questions	Marks	CO	BL
1(a)	What are the classifications of open channel flow?	1M	CO1	L1
(b)	Define hydraulic jump.	1M	CO2	L1
(c)	Explain about Hydraulic efficiency and mechanical efficiency.	1M	CO3	L2
(d)	Explain about different characteristic curves of turbine.	1M	CO4	L2
(e)	What are various components of reciprocating pump?	1M	CO5	L1
(f)	Distinguish between uniform and non-uniform flow.	2M	CO1	L4
(g)	What is the difference between rapidly varied flow and gradually varied flow?	2M	CO2	L1
(h)	Define the term impact of jets.	2M	CO3	L1
(i)	Explain about various parts of pelton wheel.	2M	CO4	L2
(j)	Define the following : (i) suction head (ii) delivery head (iii) static head.	2M	CO5	L1

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

Q.No	Questions	Marks	CO	BL
2(a)	Write Bazin's formula for uniform flow by explaining the terms and Derive the relation betweenchezy's and Bazin's formula.	7M	CO1	L1
(b)	A rectangular channel 2 m deep and 8 m wide is running full of water. The slope of the channel bed is 1 in 950. Take Chezy's constant(C) as 50. Calculate the discharge through the channel.	8M	CO1	L3
3(a)	Explain the different types of similarities that must exist between a prototype and its model.	7M	CO2	L2
(b)	In a 1 in 20 model of stilling basin, the height of the hydraulic jump in the model is observed tobe 0.2m. What is the height of the hydraulic jump in the prototype? If the energy dissipated inthe model is 1/10 kW, what is the corresponding value in prototype?	8M	CO2	L4
4(a)	Explain in detail the force exerted by a jet on a moving plate with a neat sketch.	7M	CO3	L2
(b)	A nozzle has an exit diameter of 15 mm and discharges water into the atmosphere. The gauge pressure behind the nozzle is 400kPa. The coefficient of velocity is 0.98 and there is no contraction of the jet. The jet hits a stationary flat plate normal its direction. Determine the forces on the plate. The density of water is 1000 kg/m^3. Assume the velocity of approach into the nozzle is negligible.	8M	CO3	L4

5(a)	Write a brief note on classification of turbines.	7M	CO4	L1
(b)	A pelton wheel has to be designed for the following data: power to be developed =6000 kW, Net head available = 400 m, speed = 550 rpm, Ratio of jet diameter to the wheel diameter =1/10 and overall efficiency = 85%. Find the number of jets, diameter of jet, diameter of the wheel and quantity of water required.	8M	CO4	L3
6(a)	Explain the working principle of a cetrifugal pump with a neat sketch.	7M	CO5	L2
(b)	A centrifugal pump is to discharge 0.118 m³/s at a speed of 1450 rpm against head of 25 m The impeller diameter is 250 mm, its width at outlet is 50 mm and manometer efficiency is75%. Determine the vane angle at the outer periphery of the impeller.	8M	CO5	L3
7(a)	Explain the working of single acting reciprocating pump with a neat sketch.	7M	CO5	L2
(b)	A double acting reciprocating pump has piston of diameter 250 mm and piston rod of diameter 50mm which is on one side only. Length of piston stroke is 350 mm and speed of crack moving the piston is 60 rpm. The suction and delivery heads are 4.5 m and 18m respectively. Determine the discharge capacity of the pump and the power required to operate the pump.	8M	CO5	L3
8(a)	What do you understand about the Heads and efficiencies and explain very clearly?	7M	CO5	L1
(b)	A centrifugal pump works against a head of 30 m and discharges 0.25 m³/s while running at 1000rpm. The velocity of flow at the outlet is 3 m/s and the vane angle at outlet is 30⁰. Determine the diameter and width of the impeller at outlet if the hydraulic efficiency is 80%.	8M	CO5	L3

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

S392-STRENGTH OF MATERIALS-II
(CE)

Time : 3 hours   Max.Marks:75

PART-A
(Answer all questions)

1(a)	Name the planes on which no shear stress acts.	[1M]
(b)	When a member is subjected to torque, what kind of stress is induced in it?	[1M]
(c)	The load at which a column just buckles is known as what?	[1M]
(d)	What is the kern area ((core) of a hollow circular section?	[1M]
(e)	What is the value of the product moment of inertia about the principal axes?	[1M]
(f)	If two principal stresses acting at point are σ_1 = +40N/mm^2 and σ_2 = + 20N/mm^2, find the maximum shear stress.	[2M]
(g)	If the mean radius of spring coil is 50mm and angle of twist is 2.01 radians, find the defection (δ).	[2M]
(h)	Two steel columns P (length L and yield strength fy = 250MPa) and Q (length 2L and yield strength fy = 500MPa) have the same cross-sections and end conditions. Find the ratio of buckling load of column P to that of column Q?	[2M]
(i)	If the base width of the dam is b = 8m, find the eccentricity e to avoid tension in the dam section.	[2M]
(j)	If I_{xx} = 20.34x10^4 mm^4 and I_{yy} =7.33x10^{4}mm^4 and I_{xy} = 7.04x10^{4}mm^4, then find the direction of principal moment of inertia w.r.t x-axis.	[2M]

PART-B
(Answer any FOUR questions)

2(a)	Define the terms (i) principal stresses (ii) principal planes (iii) major principal plane (iv) minor principal plane (v) major principal stress and (vi) minor principal stress.	[7M]
(b)	Direct stresses 120N/mm^2 tension and 90N/mm^2 compression are applied to an elastic material at a certain point, on planes at right angles. The greater principal stress is limited to 150N/mm^2, what shearing stress may be applied to the given planes and what will be the maximum shearing stress at the point?	[8M]
3(a)	List out the assumptions made in the theory of torsion.	[7M]
(b)	Calculate the maximum shear stress induced and the angle of twist in degrees for a length of 10m for a shaft of 100mm diameter transmitting 112.5kW power at 150 rpm. N = 0.82x10^5 N/mm^2 for material of the shaft.	[8M]

4(a) List out the assumptions made in the Euler's theory for long columns. [7M]

(b) Using Euler's formula, calculate the critical stresses for a series of struts having slenderness ratio of 40, 80, 120, 160 and 200 under the following conditions: (i) Bothe ends hinged, (ii) Both ends fixed. E= 2.05 x 10^5 N/mm². [8M]

5. A masonry retaining wall, trapezoidal in section, with one face vertical is 1m wide at top and 3m at the base and 8m high. The material retained on the vertical face exerts a lateral pressure varying from zero at top to 25 kN/m² at the base. If the unit weight of masonry is 21 kN/m³, calculate the maximum and minimum stress intensities induced in the base. [15M]

6. Analyse the truss shown in fig using method of joints.

[15M]
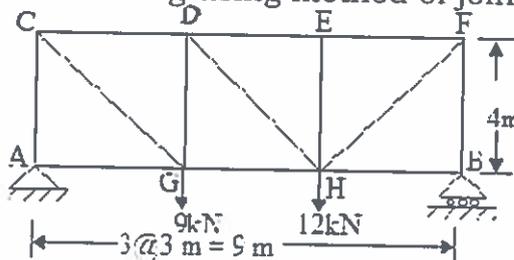
7. At a point in an elastic material under strain, there are normal stresses of 50N/mm² and 30N/mm² (both tensile) respectively at right angles to each other with a shearing stress of 25N/mm². Calculate the principal stresses and the position of the principal planes and the maximum shear stress analytically. Verify the result by graphical method [15M]

8 Fig. shows a hollow square chimney having uniform inside dimension of 1.6m x 1.6m and varying outside dimension at different heights. Check the stability of the chimney by taking uniform wind pressure of 1.5kN/m² throughout the height when blowing at right angles to the face. Shape factor =1.15
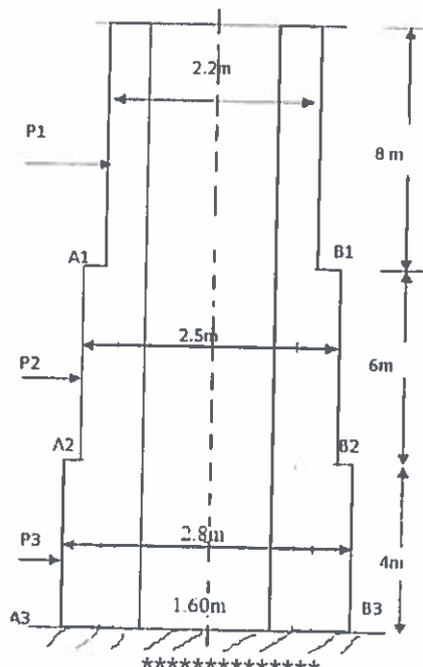
[15M]

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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)

Q.No	Questions	Marks
1(a)	What are different programming environments?	1M
(b)	What do you mean by static binding?	1M
(c)	Explain about float type.	1M
(d)	What are selection statements?	1M
(e)	What is scope of a variable?	1M
(f)	Write about layered architecture for compilation.	2M
(g)	What are lexical units?	2M
(h)	Give an example of Strongly typing.	2M
(i)	What are unary operators?	2M
(j)	What are signals of semaphores?	2M

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

2(a)	Give a brief note on the reasons for studying programming languages.	8M
(b)	Explain the features ofd different programming paradigms.	7M
3(a)	What are synthesized and inherited attributes in attribute grammars?	7M
(b)	Define intrinsic attributes explain using suitable examples.	8M
4(a)	What are slicing and dicing of an array using suitable examples?	7M
(b)	Explain the features associative arrays.	8M
5(a)	Give a brief note on relational expressions.	8M
(b)	How mixed mode expressions are evaluated in c,c++? Explain.	7M
6(a)	How can you explain about scoping of a variable in subprograms?	7M
(b)	What is a semaphore and discuss the operations performed on semaphores?	8M
7(a)	List the criteria for evaluating for a programming language.	8M
(b)	What are fundamental principles of language design?	7M
8(a)	Compare OOP features of C++ and Java.	7M
(b)	Compare OOP features of C++ and smalltalk.	8M

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B.Tech. (IV Semester) Supplementary Examinations

S167-COMPUTER GRAPHICS

(CSE)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

Q.No	Questions	Marks	CO	BL
1(a)	What is use of computer graphics?	1M	CO1	L1
(b)	Write a short note on points.	1M	CO2	L1
(c)	Explain translation.	1M	CO3	L2
(d)	State various viewing function.	1M	CO4	L1
(e)	Explain quadratic surfaces.	1M	CO5	L2
(f)	What is Raster scan system?	2M	CO1	L1
(g)	What is output primitives?	2M	CO2	L1
(h)	Discuss shearing.	2M	CO3	L2
(i)	What is point clipping?	2M	CO4	L1
(j)	Discuss cordinate transformation.	2M	CO5	L2

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

Q.No	Questions	Marks	CO	BL
2.	Discuss application graphics related CAD, Entertainment and education.	15M	CO1	L2
3(a)	Explain ellipse generating algorithm.	7M	CO2	L2
(b)	Discuss pixel and dressing with example.	8M	CO2	L2
4(a)	Discuss raster methods for transformation.	7M	CO3	L2
(b)	Explain composite transformation.	8M	CO3	L2
5(a)	Discuss window to view point coordinate transformation.	7M	CO4	L2
(b)	Explain point clipping.	8M	CO4	L2
6(a)	Discuss 3D display methods.	7M	CO5	L2
(b)	Explain translation, rotation, transformations.	8M	CO5	L2
7(a)	What are random scan systems?	7M	CO1	L1
(b)	Discuss filled area primitives.	8M	CO2	L2
8(a)	What is line clipping?	7M	CO4	L1
(b)	Discuss about 3D graphics.	8M	CO5	L2

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B.Tech. (IV Semester) Supplementary Examinations

S381-SOFTWARE ENGINEERING
(CSE)

Time : 3 hours

Max. Marks : 75

PART-A
(Compulsory question)

Q.No	Questions	Marks	CO	BL
1(a)	List the three types of process patterns, with suitable examples.	1M	CO1	L1
(b)	What is Ethnography? Write its importance.	1M	CO2	L1
(c)	Describe about software quality guidelines.	1M	CO3	L1
(d)	Write short notes on internal and external views of testing.	1M	CO4	L1
(e)	Write short notes on estimation.	1M	CO5	L1
(f)	Illustrate the advantages of software metrics.	2M	CO1	L1
(g)	What is interviewing? Explain different types of interviews.	2M	CO2	L1
(h)	Discuss the importance of refactoring in software design.	2M	CO3	L1
(i)	Demonstrate about boundary value analysis in black box testing.	2M	CO4	L2
(j)	Write a short note on risk identification.	2M	CO5	L2

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

2(a)	Explain "Software myth". Discuss on various types of software myths and the true aspects of these myths.	7M	CO1	L2
(b)	Describe are the advantages of iterative development. Compare iterative development with Incremental delivery approach.	8M	CO1	L1
3(a)	Discuss about Requirements classification and organization.	7M	CO2	L3
(b)	Discuss various types of validation techniques that can be used individually or in conjunction with one another.	8M	CO2	L2
4(a)	Discuss briefly the following fundamental concepts of software design: (i) Abstraction (ii) Modularity (iii) Information hiding.	7M	CO3	L2
(b)	What is software architecture? Why it is important explain with an example?	8M	CO3	L2
5(a)	Demonstrate about boundary value analysis in black box testing.	7M	CO4	L3
(b)	Discuss in detail about the art of debugging.	8M	CO4	L2
6(a)	What is scheduling? Explain the importance of scheduling in the project management.	7M	CO5	L2
(b)	Explain in detail about Reactive versus Proactive Risk Strategies.	8M	CO5	L3
7(a)	Describe are the advantages of iterative development? Compare iterative development with Incremental delivery approach.	7M	CO4	L2
(b)	Discuss various types of validation techniques that can be used individually or in conjunction with one another.	8M	Co4	L3
8(a)	Identify various functional and non functional requirements that may be defined for library based system.	7M	CO1	L3
(b)	Describe five software application areas in which software safety and hazard analysis would be a major concern.	8M	CO5	L2

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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
(Answer all questions)

1(a) Give the expression for electrostatic energy stored with in a capacitor. [1M]
 (b) Memorize the units of Magnetic scalar potential. [1M]
 (c) What is the inconsistency of Ampere's law? [1M]
 (d) Write the scalar form of wave equations. [1M]
 (e) State the poynting theorem. [1M]
 (f) What are the limitations of Gauss's law? [2M]
 (g) Define Biot-Savart's law and give the expression for magnetic field intensity due to line current. [2M]
 (h) Write down the formula and units for J_d. [2M]
 (i) Mention the characteristics of EM wave propagation in lossless dielectric medium. [2M]
 (j) Write the formula for average power density vector of a EM wave. [2M]

PART-B
(Answer any FOUR questions)

2(a) State the applications of Gauss law with respect to (i)infinite line charge (ii)infinite surface charge [8M]
 (b) A spherical capacitor with a = 1.5cm and b = 5cm has inhomogeneous dielectric of $\varepsilon=(10\varepsilon_0/r)$. Calculate the capacitance of the capacitor. [7M]

3(a) State Ampere's circuit law. What are its applications? [7M]
 (b) State and explain Biot-Savart's law. Give the expressions of Biot-Savart's law for line, surface and volume currents. [8M]

4(a) What are the transformer and motional electromotive forces(emfs) in the context of Faraday's law? [8M]
 (b) A parallel plate capacitor with plate area of 5cm² and plate separation of 2mm has voltage 25sin10³t V applied to its plates. calculate displacement current assuming $\varepsilon=\varepsilon_0$. Derive the related expression. [7M]

5(a) Derive the relation between E and H in uniform plane wave propagation [7M]
 (b) The electric field intensity associated with a plane wave travelling in a perfect dielectric medium is given by $E_x(z,t)=10\cos(2\pi\times10^7t-0.1\pi z)\,V/m$
(i)What is the velocity of propagation? (ii) Write down an expression for the magnetic field intensity associated with the wave if $\mu=\mu_0$. [8M]

6(a) Write short notes on (i) Surface impedance (ii) Brewster angle. [7M]
 (b) A uniform plane wave is normally incident from air on a perfect conductor. Determine the resulting E and H fields. Sketch their variations. [8M]

7(a) Explain how the concept of displacement current density resolves the inconsistency in Ampere's law. [8M]
 (b) State all Maxwell's equations in differential and integral form for time varying fields. [7M]

8(a) The electric field in free space is given by $E=50\cos(10^8t+\beta x)a_y$
(i)Find the direction of wave propagation (ii)Calculate β and the time it takes to travel a distance of λ (iii)Sketch the wave at t=0. [7M]
 (b) Given $E=E_m\sin(\omega t-\beta z)a_y$ in free space. Find D, B, H. [8M]

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B.Tech. (IV Semester) ~~Regular~~/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 for are the registers generally used in any CPU?	1M
(b)	What are the drawbacks of hardwired control design?	1M
(c)	What are the four major groups of computers based on Flynn's classification?	1M
(d)	What is the purpose of random access memory in a computer?	1M
(e)	What is memory-mapped I/O?	1M
(f)	What is a stored program Concept?	2M
(g)	What is the main difference between internal and external interrupts?	2M
(h)	What are the stages of RISC instruction pipeline?	2M
(i)	Distinguish between Static and Dynamic random access memories.	2M
(j)	What is the major difference between programmed I/O and Interrupt initiated I/O?	2M

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

2(a)	What is a micro-operation? Give the micro-operations for memory transfer and their corresponding symbolic statements.	7M
(b)	Give the circuit diagram for 4 bit Adder-Subtractor using logic gates.	8M
3(a)	What are the methods for designing a control unit? Give the general configuration of a micro-programmed control unit.	7M
(b)	How controls signals are generated using micro-programmed control unit and explain with the help of a neat diagram?	8M
4(a)	Explain the features of Booth's algorithm for multiplication of signed 2's complement numbers.	7M
(b)	Show the block diagram of the hardware for implementing the Booth's multiplication algorithm.	8M
5(a)	Write short notes on the following (i) Magnetic disk (ii) Magnetic tapes.	7M
(b)	Distinguish between static RAM and dynamic RAM.	8M
6(a)	How asynchronous communication and synchronous communication differ?	7M
(b)	With suitable diagrams explain strobe control method of asynchronous data transfer.	8M
7(a)	What are data transfer and data manipulation instructions? Give some examples.	7M
(b)	What is the purpose of program control instructions? Give some examples.	8M
8(a)	Write short notes on following (i)Hit ratio (ii) Writing into cache (iii) Cache initialization.	7M
(b)	Compare and contrast direct and associative mapping techniques.	8M

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B.Tech. (IV Semester) Supplementary Examinations

S174-CONTROL SYSTEMS
(ECE, EEE & EIE)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

1(a) Mention the Mason's gain formula.   [1M]
 (b) How the system is classified depending on the value of damping?   [1M]
 (c) What is phase cross over frequency?   [1M]
 (d) How do you identify a system is marginally stable syatem?   [1M]
 (e) What is the necessity condition for controllability?   [1M]
 (f) Calculate the transfer function of given block diagram.


[2M]
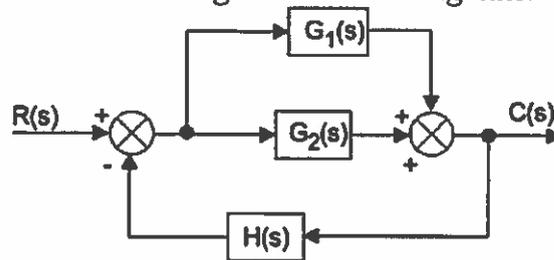
 (g) Estimate the rise time for a system with damping ratio 0.6 and the
     natural frequency of oscillations 8 rad/sec.   [2M]

 (h) Sketch the polar plot of $G(S)=\dfrac{1}{(1+ST_1)(1+ST_2)}$

[2M]

 (i) Draw the pole-zero diagram of lead compensator.   [2M]
 (j) Write any two properties of Eigen values.   [2M]

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

2(a) Obtain the transfer function X(s)/F(s) for the mechanical system.

[7M]
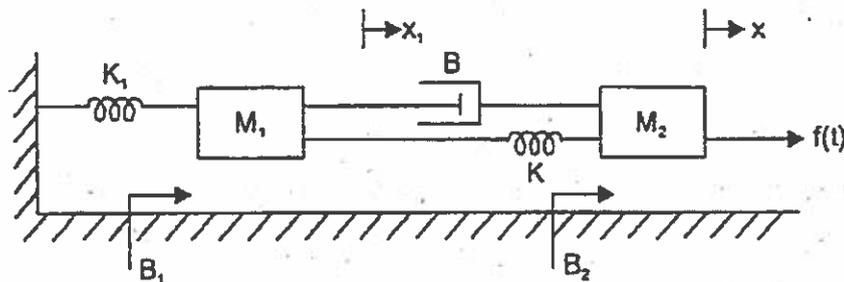
 (b) Discuss open loop and closed loop control system with examples.   [8M]

3(a) Obtain the response of unity feedback system with open loop transfer
     function is $G(S)=\dfrac{4}{S(S+5)}$, when the input is unit step.

[7M]

(b) Calculate the static error constants and steady state errors to the given unity feedback loop transfer function. $G(S) = \dfrac{20(S+2)}{S\,(S+1)(S+3)}$ [8M]

4. Sketch Bode plot for the following transfer function and determine the system Gain K for the gain crossover frequency to be 5 rad/sec.

$$G(S) = \dfrac{KS^2}{(1+0.2S)(1+0.02S)}$$

[15M]

5. Sketch the root locus for unity feedback system with open loop

$$G(S) = \dfrac{K}{S(S^2+4S+13)}$$

and discuss the stability of a system based on gain K. [15M]

6(a) Construct the state model for the system characterized by the differential equation $\dddot{y} + 6\ddot{y} + 11\dot{y} + 2y = 2u$. [7M]

(b) A linear time invariant system is given as

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} -1 & 0 \\ 0 & -2 \end{bmatrix}\begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix}u \quad ; \quad y(t) = \begin{bmatrix} 1 & 2 \end{bmatrix}\begin{bmatrix} x_1 \\ x_2 \end{bmatrix} \quad \text{find its}$$

controllability and Observability. [8M]

7(a) Find the trafer function for the signal flow graph.

[7M]
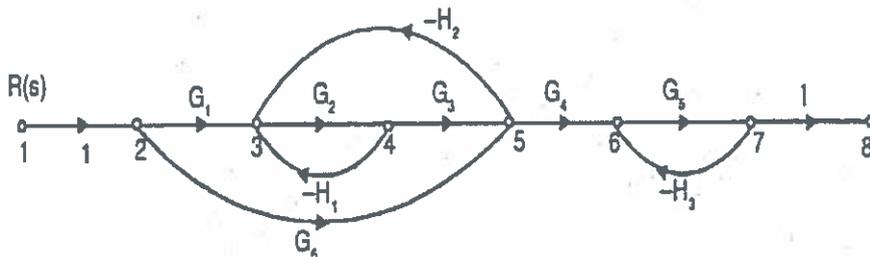
(b) Derive the expressions for peak time and settling time. [8M]

8(a) Construct the state space model for the following transfer function using Gullemine's form. $G(S) = \dfrac{(S+2)(S+4)}{S\,(S+1)(S+3)}$

[7M]

(b) The unity feedback system is characterized by an open loop transfer function $G(S) = \dfrac{K}{S\,(S+10)}$ Determine gain K, so that the system will have

a damping ratio of 0.5. For this value of K, Determine the settling time at peak overshoot for a unit step input. [8M]

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2 of 2

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

S125-ANALOG COMMUNICATIONS
(ECE)

Time : 3 hours   Max.Marks : 75

PART-A
(Answer all questions)

1(a)	Write the expression for Total current in an AM wave.	[1M]
(b)	Write the expression for time domain representation of an FM signal.	[1M]
(c)	State the meaning of SNR.	[1M]
(d)	How much is the intermediate frequency for FM?	[1M]
(e)	Write the expression for Nyquist interval.	[1M]
(f)	Define quadrature null effect.	[2M]
(g)	If frequency sensitivity is 10 KHz/Volt and deviation is 40 KHz. how much is message Amplitude?	[2M]
(h)	Define noise.	[2M]
(i)	Obtain image frequency rejection ratio if an FM receiver with Q value 100, is receiving 90MHz input signal.	[2M]
(j)	Sketch the waveforms of pulse width modulation technique.	[2M]

PART-B
(Answer any FOUR questions)

2(a)	Elaborate the need for modulation.	[7M]
(b)	Calculate power in side bands as well asthe transmission efficiency of an AM signal $S(t)=5 \cos 2\pi x 10^6 t (1+ \cos 2\pi x 10^3 t)$.	[8M]
3.	Derive the expression for wide band FM with necessary expressions.	[15M]
4(a)	Summarize the concepts of AM receiver model with a neat block schematic.	[8M]
(b)	Derive the expression for output noise power in DSBSC system.	[7M]
5(a)	With a neat circuit diagram, show how AGC bias can be delayed using a diode.	[7M]
(b)	Find the tuning range of ganged capacitor in AM receiver designed to tune 550KHz to 1650KHz. Also obtain the image frequency rejection ratio if the loaded Q is 5.2 and the incoming signal frequency is 1000 KHz.	[8M]
6(a)	Discuss about the generation of PAM using Sample and Hold circuit.	[8M]
(b)	Compare all sampling techniques.	[7M]
7(a)	With a neat block diagram, elaborate the filter method of SSB generation.	[7M]
(b)	A DSBFC signal is given as $s(t)= 4\cos(2\pi x 10^6 t)(1+0.7\cos(2000\pi t))$.Determine the (i) Power of individual sidebands (ii) Total power (iii) Transmission efficiency (iv) Bandwidth.	[8M]
8(a)	Sketch the block diagram of a TRF receiver and discuss about each block.	[8M]
(b)	In an AM receiver the image frequency rejection ratio is 100. Calculate the loaded Q at (i) 900 KHz. (ii)1000KHz	[7M]

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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
1(a)	Convert $(1101011110)_2$ into its equivalent gray code.	1M
(b)	Realize NAND gate using NOR gate.	1M
(c)	Differentiate PAL and PLA.	1M
(d)	Denote a 2-bit down counter with state diagram.	1M
(e)	Define a state box.	1M
(f)	Represent given function $f = AB + A\overline{C} + \overline{B}C$ into standard SOP form.	2M
(g)	Sketch the logic diagram to implement the function $Y = \left(\overline{A + B}\right) \cdot \overline{(C + D)}$.	2M
(h)	Realize the function F=$\sum$m (0,4,6,7,9,13,15) using 8x1 multiplexer.	2M
(i)	Distinguish between latch and flip-flop.	2M
(j)	Compare state equality and state compatibility.	2M

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

2(a)	Obtain the 13-bit hamming code word for the 8-bit data word 01011011 using even parity.	8M
(b)	Simplify the given Boolean function using K-map F=$\sum$m(1,3,4,5,9,10,11)+$\sum$d(6,8).	7M
3(a)	Simplify the following functions and implement with NAND gate circuits (i) $F = \left(X + \overline{Y} + \overline{Z}\right) \cdot \left(\overline{X} + \overline{Z}\right)$ (ii) $F = AB + AB\overline{C}D + ABD\overline{E} + \overline{A}B\overline{C}E + \overline{A} \cdot \overline{B} \cdot \overline{C} \cdot E$	8M
(b)	Draw the logic diagram using only two input NAND gates to implement the function $F = \left(A \cdot B + \overline{A} \cdot \overline{B}\right) \cdot \left(C \cdot \overline{D} + \overline{C} \cdot D\right)$	7M
4(a)	Implement the following functions using PLA $F_1 = A\overline{B} + AC + \overline{A}B\overline{C}$ $F_2 = \overline{(AC + BC)}$	7M
(b)	Give the comparisons between PROM, PAL and PLA with respect to various performance features.	8M
5(a)	Design a 4-bit synchronous counter.	8M
(b)	Design a Mod-16 ripple down-counter using J-K flip flops.	7M
6(a)	A clocked sequential circuit with single input x and single output z produces an output z=1 whenever the input x detect the sequence 1101 and overlapping is allowed. Obtain the state diagram, state table and design the circuit with D flip-flops.	8M
(b)	Draw the state diagram, state table, and ASM chart for a 2-bit binary counter having one enable input such that E=1 counting enabled, and E=0 counting disabled.	7M
7(a)	Draw the circuit of T flip-flop using NOR gates and explain its operation with the help of its characteristic table.	8M
(b)	Design a Mod-6 asynchronous up counter using J-K flip flops.	7M
8(a)	Realize 1x16 demultiplexer using 1x4 demultiplexers.	7M
(b)	Realize the given functions using PLA (i) $F_1(P,Q,R)=\sum$m(2,3,4,6,7) (ii) $F_2(P,Q,R)=\sum$m(1,3,5,7)	8M

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B.Tech. (IV Semester) Supplementary Examinations

S127-ANALOG ELECTRONICS
(EEE)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

Q.No	Questions	Marks	CO	BL
1(a)	Hybrid π capacitance.	1M	CO1	L1
(b)	What is tuned amplifier?	1M	CO2	L2
(c)	Voltage Series feedback amplifier also called as___.	1M	CO3	L2
(d)	Draw RC High pass circuit.	1M	CO4	L2
(e)	What is clamper?	1M	CO5	L1
(f)	Expression for CE short circuit gain.	2M	CO1	L3
(g)	Class B power amplifier efficiency percentage.	2M	CO2	L2
(h)	Expression for closed loop gain for negative feedback.	2M	CO3	L3
(i)	Expression for rise time.	2M	CO4	L2
(j)	State the clamping circuit theorem.	2M	CO5	L2

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

Q.No	Questions	Marks	CO	BL
2(a)	Determination of Hybrid- π Parameters in terms of low frequency parameters.	7M	CO1	L3
(b)	Explain base spreading resistance.	8M	C01	L2
3(a)	What is power amplifier, Classify and derive the efficiency of transformer coupled class A power amplifier with neat sketches.	7M	CO2	L2
(b)	Draw and explain Class C amplifier.	8M	CO2	L2
4(a)	Classify negative feedback amplifiers , also describe how their input and output impedances will vary.	7M	CO3	L2
(b)	Explain Transconductance amplifier in detail.	8M	CO3	L2
5(a)	Briefly explain the Compensated attenuators.	7M	CO4	L2
(b)	Describe the response of Low pass RC circuit for step input.	8M	CO4	L2
6(a)	What is nonlinear wave shaping, briefly explain shunt clippers?	7M	CO5	L2
(b)	Explain Positive clampers in detail.	8M	CO5	L2
7(a)	Explain Compensated attenuators and state these applications.	7M	CO5	L2
(b)	Compare and contrast all power amplifiers based on efficiency and conduction angle.	8M	CO2	L4
8(a)	Explain Complementary symmetry Class B Power amplifier.	7M	CO2	L2
(b)	The main application of low pass RC circuit is integrator. Give the supporting explanation.	8M	CO4	L4

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B.Tech. IV Semester ~~Regular~~/Supplementary Examinations
S217-ELECTRICAL MACHINES-II
(EEE)

Time : 3 hours   Max. Marks : 75

PART-A
(Answer all questions)

1(a)	What are the two types of 3-phase induction motors?	[1M]
(b)	Is it possible to add an external resistance in the rotor circuit of a 3-phase cage induction motor? Give reason for your answer.	[1M]
(c)	What is the value of forward slip and backward slip of single–phase induction motor at starting?	[1M]
(d)	What is the type of rotor used in high speed synchronous generator?	[1M]
(e)	What is the speed of a 6 pole, 50 Hz Synchronous motor?	[1M]
(f)	Define the term Crawling.	[2M]
(g)	Draw the torque- slip characteristics of 3-phase induction motor.	[2M]
(h)	Why single phase induction motor is not self starting? Mention any one method of starting.	[2M]
(i)	What are the different methods to find out the voltage regulation of synchronous generator?	[2M]
(j)	What is purpose of damper winding in synchronous motor?	[2M]

PART-B
(Answer any FOUR questions)

2(a) Draw the equivalent circuits of a 3-phase induction motor and explain in detail. [7M]

(b) The power input to a 500V, 50Hz, 6-pole, 3-phase induction motor running at 975 rpm is 40 kW. The stator losses are 1 kW and the friction and windage losses total 2 kW. Calculate: i) the slip ii) the rotor copper loss iii) shaft power. [8M]

3. Draw the circle diagram from no load and short circuit test of a 3-phase 14.92 KW, 400V,6 pole induction motor from the following test results (line values):
No load test: 400V, 11A, p.f. =0.2
S.C.test   : 100V, 25A, p.f.=0.4.
Rotor copper loss= stator copper loss
From the diagram find line current, slip, p.f, efficiency at full load. [15M]

4. Describe the principle of operation of all types of capacitor split phase motor. [15M]

5(a) Analyze the armature reaction in a synchronous generator with different load p.f. [7M]

(b) A three phase synchronous generator is rated at 100 MVA, unity p.f., 11KV star connected 50HZ, 120rpm. Determine (i) Number of poles   (ii) KW rating (iii) Current rating (iv) Input at rated KW load with efficiency 97%. [8M]

6(a) Describe V-curves of 3-phase synchronous motor. [7M]

(b) Three phase star connected synchronous motor rated 200KVA, 2000V, has an effective resistance of 1.5ohms, and synchronous reactance of 20ohms per phase. Determine the internal power developed by the motor when it is operating at the rated current of 0.8 power factor leading. [8M]

7. Describe the principle of operation of three phase induction motor with neat diagrams. [15M]

8. Write the procedure for mmf method for finding the regulation of synchronous generator and discuss in detail. [15M]

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B.Tech. IV Semester ~~Regular~~/Supplementary Examinations
S164-COMPLEX VARIABLES AND STATISTICAL METHODS
(EEE)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

1(a)	Define Analytic function at a point $z = a$.	[1M]
(b)	Identify the order of the poles of $\frac{1}{(z-2)(z+1)^2}$.	[1M]
(c)	If $P(C \cap D) = \frac{1}{6}, P(C) = \frac{1}{2}$ then find $P\left(\frac{D}{C}\right)$.	[1M]
(d)	Define sample mean.	[1M]
(e)	When do we use t-distribution for testing of hypothesis?	[1M]
(f)	Define Conjugate harmonic function.	[2M]
(g)	Find the zeros and poles of $\frac{z-2}{z^2+1}$.	[2M]
(h)	Find the mean of the Binomial distribution.	[2M]
(i)	Explain large sample and small sample.	[2M]
(j)	What is critical region?	[2M]

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

2(a)	Show that the function $e^x Cosy$ is harmonic. Determine its harmonic conjugate.	[7M]
(b)	Evaluate $\int_C \frac{z+4}{z^2+2z+5} dz$ using Cauchy's integral formula, where C is $|z + 1 - i| = 2$.	[8M]
3(a)	Find the Laurent series of the function $\frac{z^2-1}{(z+2)(z+3)}$ if $2 < |z| < 3$.	[7M]
(b)	Find the residue of $\frac{z^2-2z}{(z+2)^2(z^2+4)}$ at each pole.	[8M]
4(a)	In a bolt factory machines A, B, C manufacture 20%, 30% and 50% of the total of their output and 6%, 3% and 2% are defective. A bolt is drawn at random and found to be defective. Find the probabilities that it is manufactured from (i) Machine A. (ii) Machine B. (iii) Machine C.	[8M]
(b)	Find the mean and standard deviation of a normal distribution in which 7% of items are under 35 and 89% are under 63.	[7M]
5.	Samples of size 2 are taken from the population 3, 6, 9, 15, 27 with replacement. Find (a) the mean and standard deviation of the population (b) the Mean and standard deviation of the sampling distribution of means.	[15M]
6(a)	A sample of 400 items is taken from a population whose standard deviation is 10. The mean of the sample is 40. Test whether the sample has come from a population with mean 38. Also calculate 95% confidence interval for the population.	[7M]
(b)	Calculate the regression equations of Y on X from the data given below, taking deviations from actual means of X and Y. Also estimate the likely demand when the price is Rs. 20.	

Price (Rs.)	10	12	13	12	16	15
Amount Demanded	40	38	43	45	37	43

[8M]

7(a)	Prove that an analytic function with constant real part is constant.	[7M]
(b)	An ambulance service claims that it takes on the average less than 10 minutes to reach its destination in emergency calls. A sample of 36 calls has a mean of 11 minutes and the variance of 16 minutes. Test the claim at 0.05 level of significance.	[8M]
8.	Applying the Calculus of residues, Evaluate $\int_0^{2\pi} \frac{Cos\, 3\theta}{5-4\, Cos\, \theta} d\theta$.	[15M]

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

S351-PROBABILITY AND STATISTICS
(IT&ME)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

Q.No	Questions	Marks	CO	BL
1(a)	Write the mathematical definition of probability.	1M	CO1	L1
(b)	Define Poisson distribution.	1M	CO2	L1
(c)	If $\vartheta\_1=7$ and $\vartheta\_2=9$ then what is the table of F at 5% level of significance.	1M	CO4	L1
(d)	Define standard error.	1M	CO3	L1
(e)	Write the formula for the regression line equation of Y on X.	1M	CO5	L1
(f)	Calculate E(X), from the following probability mass function. <table><tr><td>x</td><td>0</td><td>1</td><td>2</td></tr><tr><td>P(x)</td><td>0.2</td><td>0.3</td><td>0.5</td></tr></table>	2M	CO1	L 2
(g)	For a Binomial variate X , if n=6 and p=0.5 then find P(X=0).	2M	CO2	L 2
(h)	For the population observations {3,7,8} , calculate the population mean μ and population variance σ^2.	2M	CO3	L 2
(i)	Define Type-I and Type-II errors.	2M	CO4	L 2
(j)	Write the formula to find the Spearman's Rank correlation coefficient.	2M	CO5	L 2

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

Q.No	Questions	Marks	CO	BL
2(a)	The probability mass function of random variable X is given as follows <table><tr><td>X</td><td>-3</td><td>-2</td><td>-1</td><td>0</td><td>1</td><td>2</td><td>3</td></tr><tr><td>P(x)</td><td>0.05</td><td>0.10</td><td>0.30</td><td>0</td><td>0.30</td><td>0.15</td><td>0.10</td></tr></table> Compute (i)E(x) (ii) V(X) (iii) E(4X+5) (iv) V(2X+3)	7M	CO1	L3
(b)	The problem solving capacities of four students A, B, C, D are 1/3 , 2/5, 1/5 and 1/4 respectively. If all of them try to solve a given problem independently then find the probability that the problem is being solved.	8M	CO1	L2
3(a)	Out of 800 families with 5 children each, how many would you expect to have i)3 boys ii)5 girls iii)either 2 or 3 boys iv)at least one boy ? Assume equal probability for boys and girls.	7M	CO2	L3
(b)	If X has a Poisson distribution such that P(X=1)=P(X=2), then find the mean value λ also calculate P(X= 4) and P(X≥1).	8M	CO2	L3
4(a)	A population consists of five numbers {2,3,6,8,11}. Consider all possible samples of size 2 which can be drawn without replacement from this population. Calculate the Population mean, Population Standard deviation, mean of the sampling distribution of means and Standard error of sample mean.	7M	CO3	L3

(b)	A random sample of size 100 is taken from a population with s.d is 5.1.Given that the sample mean is 21.6. Construct a 95% confidence interval for the population mean.	8M	CO3	L3
5(a)	A stenographer claims that she can take dictation at a rate of 120 words per minute. Can we reject her claim on the basis of 100 trials in which she demonstrates a mean of 116 words with a standard deviation of 15 words? Use 5% level of significance.	7M	CO4	L3
(b)	The daily wages in rupees of skilled workers in two cities are as follows 	City	Size of sample	s.d of wages in sample
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CITY-A	16	25
CITY-B	13	32	 Test at 5% level of significance the equality of variances of the wage distribution in the two cities.	8M	CO4	L3
6(a)	Find Karl Pearson's correlation coefficient for the following data of heights of fathers(x) and heights of their sons(y). 	Heights of fathers (inches)	65	66	67	67	68	69	70	72
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Heights of sons (inches)	67	68	65	68	72	72	69	71		7M		L3
(b)	Fit a second-degree polynomial to the following data by the method of least squares. 	X	1	2	3	4	6	8
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Y	2.4	3	3.6	4	5	6		8M	CO3	L3
7(a)	Fit a straight line to the following data by the method of least squares. 	X	6	7	7	8	8	8	9	9	10
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Y	5	5	4	5	4	3	4	3	3		7M	CO5	L3
(b)	Find the rank correlation coefficient for the following data of ranks for 10 sets of data. 	X	6	5	3	10	2	4	9	7	8	1
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Y	5	8	4	7	10	2	1	6	9	3		8M	CO5	L3
8(a)	Random samples of 400 men and 600 women were asked whether they would like to have a flyover near their residence. 200 men and 325 women were in favor of the proposal. Test the hypothesis that proportions of men and women in favor of the proposal are same, at 5% level.	7M	CO4	L3
(b)	Fit a Poisson distribution and obtain the expected frequencies from the following data. 	X	0	1	2	3	4
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f	109	65	22	3	1		8M	CO2	L3

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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)	Difference between natural and artificial draught.	1M
(c)	Define the term vacuum. How is it measured?	1M
(d)	List the different methods of compounding.	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)	Write the salient features of a Benson boiler.	2M
(h)	What are the sources of air in the condensers?	2M
(i)	What are the methods adopted to prevent erosion of turbine blades?	2M
(j)	List out the types of dynamic 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°C and ambient temperature is 22°C and minimum amount of air per kg of fuel is 17kg.	8M
4(a)	Starting from fundamentals derive an expression for exit velocity of steam in a steam nozzle.	7M
(b)	Steam having pressure of 10.5bar and 0.95 dryness is expanded through a convergent-divergent nozzle and the pressure of steam leaving the nozzle is 0.85bar. Find the velocity at the throat for maximum conditions. Index of expansion may be assumed as 1.135. Calculate mass rate of flow of steam through the nozzle.	8M
5(a)	Illustrate the working principle of a reaction turbine with neat sketch.	8M
(b)	List the advantages and disadvantages of steam turbines.	7M
6(a)	Derive an expression for work done with clearance volume of reciprocating compressor with proper P-V diagram.	7M
(b)	If the compressor is driven at 400r.p.m and is a single acting, single-cylinder machine, calculate the cylinder bore required, assuming a stroke to bore ratio of 16:1. Calculate the power of the motor required to drive the compressor if the mechanical efficiency of the compressor is 90% and that of the motor transmission is 90%.	8M
7(a)	Bring out specific reasons for the conversion of gravimetric analysis into volumetric analysis and vice versa with one example.	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)	Enumerate the construction and working principle of a Vanes sealed compressor.	7M
(b)	A single-stage reciprocating compressor takes 1m³ of air per minute at 1.013 bar and 15°C and delivers it at 7bar. Assuming that the law of compression is $pv^{1.35}$=constant, and the clearance is negligible, calculate the indicated power.	8M

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B.Tech. (IV Semester) Supplementary Examinations

S286-KINEMATICS OF MACHINES
(ME)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

Q.No	Questions	Marks
1(a)	Define crank of a four bar chain.	1M
(b)	List out the components of acceleration of rotating link.	1M
(c)	Define angle of dwell.	1M
(d)	Write the expression for length of open belt.	1M
(e)	Define pitch circle of a gear.	1M
(f)	List out the inversions of a double slider crank chain.	2M
(g)	Calculate the number of instant centers of a 4-bar chain is having.	2M
(h)	Classify the followers according to shape.	2M
(i)	Explain briefly the tight side and slack sides of belt with the help of sketch.	2M
(j)	Derive the train value of a reverted gear train.	2M

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

2(a)	Explain completely, successfully and incompletely constrained motions of kinematics pairs with examples.	7M
(b)	Show how the Peaucellier mechanism satisfies the condition for exact straight line motion.	8M
3(a)	Enumerate the procedure for the velocity diagram of 4 bar mechanism by assuming suitable proportions.	7M
(b)	Derive the condition of correct steering in case of an automobile.	8M
4(a)	Discuss the displacement, velocity and acceleration curves of a Uniform velocity follower.	7M
(b)	Determine the maximum permissible angle between the shaft axes of a Hooke 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)	Discuss the various tensions developed in belts.	7M
(b)	Find the power transmitted by a belt running over a pulley 700 mm diameter at 300 rpm, $\mu=0.3$ and angle of lap 160° and maximum tension in the belt is 2.453kN.	8M
6(a)	State and prove the law of gearing for constant velocity ratio.	7M
(b)	Derive the expression for train value of compound gear train.	8M
7(a)	Discuss the Skotch yoke mechanism with an illustration.	7M
(b)	Describe the T. Chebicheff straight-line motion mechanism with neat sketch.	8M
8(a)	Discuss the displacement, velocity and acceleration curves of a simple harmonic motion follower.	7M
(b)	A Hooke's joint connects two shafts whose axes intersect at 150⁰. The driving shaft rotates uniformly at 120rpm. The driven shaft operates against a steady torque of 150 Nm and carries a wheel whose mass is 45 Kg and radius of gyration 150mm. Find the maximum torque which will be exerted by the driving shaft.	8M

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

S252-FLUID MECHANICS AND HYDRAULIC MACHINERY
(ME)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

Q.No	Questions	Marks
1(a)	What is a Real fluid?	1M
(b)	What is Eulerian method?	1M
(c)	Define displacement thickness.	1M
(d)	Define the term turbine.	1M
(e)	Define slip.	1M
(f)	Define Surface tension.	2M
(g)	State the momentum equation.	2M
(h)	How can you define laminar boundary layer?	2M
(i)	Define the term mechanical efficiency.	2M
(j)	List out the different efficiencies of centrifugal pump.	2M

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

2(a)	Describe about Newton's law of viscosity.	7M
(b)	If the velocity distribution over a plate is given by $u= (2/3) y-y^2$ in which u is the velocity in meter per second at a distance y meter above the plate, estimate the shear stress at y=0 and y=0.15m. Take dynamic viscosity of fluids as 8.63 poises.	8M
3(a)	Formulate an expression for the discharge through the venturimeter.	7M
(b)	An oil of sp.gr. 0.8 is flowing through a venturimeter having inlet diameter 20cm and throat diameter 10cm. The oil-mercury differential manometer shows a reading of 25cm. Calculate the discharge of oil through the horizontal venturimeter. Take C_d=0.98.	8M
4(a)	What are the different methods of preventing the separation of boundary layers?	7M
(b)	Discover the displacement thickness, the momentum thickness and energy thickness for the velocity distribution in the boundary layer given by $(u/U)= (y/δ)$ where u is the velocity at a distance y from the plate and u=U at y=δ, where δ boundary layer thickness. Also calculate the value of $δ*/Θ$.	8M
5(a)	List out the classification of hydraulic turbines.	7M
(b)	Explain the working principle of pelton wheel turbine.	8M
6(a)	Formulate the expression for work done by reciprocating pump.	7M
(b)	Deduce an expression for work done by double acting reciprocating pump.	8M
7(a)	Deduce an expression for the force exerted by the jet on the inclined plate moving in the direction of the jet.	7M
(b)	A jet of water of diameter 10cm strikes a flat plate normally with a velocity of 15m/s. the plate is moving with a velocity of 6m/s in the direction of the jet and away from the jet. Find (i) the force exerted by the jet on the plate (ii) work done by the jet on the plate per second.	8M
8(a)	Illustrate the governing mechanism of turbines.	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

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