



# LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

L.B. Reddy Nagar :: Mylavaram-521 230 :: Krishna Dist. :: A.P  
Approved by AICTE, New Delhi. Affiliated to JNTUK, Kakinada

## B.Tech.(III Semester) (R14) Supplementary Examinations, August/September 2021

### TIME TABLE

TIME : 10.00 AM to 01.00 PM

A.Y. 2020-21

DATE	ASE	CE	CSE	ECE	EEE	EIE	IT	ME
26-08-2021 (Thursday)	S134 - Applied Mathematics - III	S134 - Applied Mathematics - III	S134 - Applied Mathematics - III	S300 - Mathematics-III	S134 - Applied Mathematics-III	S134 - Applied Mathematics - III	S134 - Applied Mathematics - III	S134 - Applied Mathematics- III
27-08-2021 (Friday)	S408 - Thermodynamics	S304 - Mechanics of Fluids	S197 - Discrete Mathematics	S126 - Analog Electronic Circuits	S301 - Measurement and Instrumentation	S126 - Analog Electronic Circuits	S197 - Discrete Mathematics	S408 - Thermodynamics
28-08-2021 (Saturday)	S233 - Engineering Fluid Mechanics	S391 - Strength of Materials - I	S169- Computer Organization	S189 - Digital Electronic Circuits	S216 - Electrical Machines - I	S189 - Digital Electronic Circuits	S290 - Linux Programming	S309 - Metallurgy and Material Science
31-08-2021 (Tuesday)	S390 - Strength of Materials	S396 - Surveying	S324 - Object Oriented Programming through C++	S361 - Pulse and Switching Circuits	S210 - Electrical Circuits - II	S220- Electrical Technology	S325 - Object Oriented Programming using Java	S305 - Mechanics of Materials
01-09-2021 (Wednesday)	S225 - Elements of Aerospace Engineering	S208 - Electrical and Electronics Engineering	S253- Free Open Source Software	S428 - Random Variables and Stochastic Processes	S206 - Electric and Magnetic Fields	S206 - Electric and Magnetic Fields	S191 - Digital Logic Design	S208 - Electrical and Electronics Engineering
02-09-2021 (Thursday)	S143 - Basic Electrical Engineering	S171 - Concrete Technology	S295- Managerial Economics and Financial Analysis	S378 - Signals and Systems	S144 - Basic Electronic Devices and Circuits	S378 - Signals and Systems	S327 - Operating Systems	S293 - Machine Drawing
03-09-2021 (Friday)	S243 - Environmental Studies	S243 - Environmental Studies	S243 - Environmental Studies	S355 - Professional Ethics and Human Values	S355 - Professional Ethics and Human Values	S355 - Professional Ethics and Human Values	S243 - Environmental Studies	S243 - Environmental Studies

Note: Any omissions or clashes in the time table may please be informed to the Controller of Examinations immediately.

Date: 07-08-2021

CONTROLLER OF EXAMINATIONS

PRINCIPAL

Copy to: 1. Vice-Principal, Deans & HoDs  
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**LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING  
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L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.: A.P.

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

**S143-BASIC ELECTRICAL ENGINEERING**

(ASE)

Time : 3 hours

Max. Marks : 75

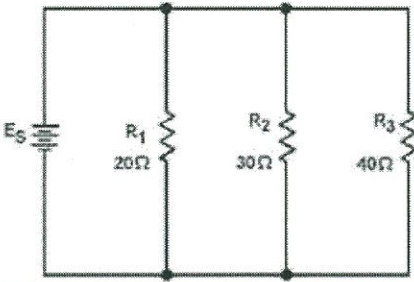
**PART-A**

(Compulsory question)

Q.No	Questions	Marks
1(a)	Identify the quantity which is the same in all parts of the parallel circuit.	1M
(b)	What is the function of starter?	1M
(c)	Define efficiency of transformer.	1M
(d)	Write the condition for maximum torque in induction motor.	1M
(e)	Define gravity control in a measuring instrument.	1M
(f)	Draw the practical and ideal current sources.	2M
(g)	Name the main parts of D.C machine.	2M
(h)	Draw the equivalent circuit of transformer.	2M
(i)	Define synchronous reactance.	2M
(j)	Examine the merits and demerits of gravity control.	2M

**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

2(a)	Find the equivalent resistance for the circuit shown below. <div style="text-align: center;">  </div>	8M
(b)	Two inductors 4H and 9H are connected in parallel. Calculate the resultant inductance of the circuit.	7M
3(a)	Draw the long shunt and short shunt D.C Compound generators and write the necessary equations.	8M
(b)	A 8 pole lap wound D.C shunt generator has an 960 conductors has flux per pole of 0.04wb per pole. Is driven at 400rpm. Find generated EMF.	7M
4(a)	Differentiate between ideal and practical transformers.	8M
(b)	Draw the phasor diagram of transformer for lagging load.	7M
5(a)	Explain the working principle of induction motor.	7M
(b)	A 6 pole induction motor is fed by 3 phase, 50HZ supply and running with a full load slip of 3 %.compute the full load speed of induction motor and also the frequency of rotor emf.	8M
6(a)	Explain gravity control method to produce controlling torque.	7M
(b)	Explain air friction damping method to produce damping torque.	8M
7(a)	Explain the core type and shell type transformers.	8M
(b)	Define form factor and peak factor for sinusoidal wave form.	7M
8.	Write a short notes on following (i) air friction damping (ii) fluid friction damping (iii) eddy current damping.	15M



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L.B.Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.::A.P  
B.Tech III Semester ~~Regular~~/Supplementary Examinations

**S225 - ELEMENTS OF AEROSPACE ENGINEERING**

(AE)

Time : 3 hours

Max.Marks : 75

**PART - A**

( Answer all the questions )

(1M x 5 + 2M x 5 = 15M)

- 1 (a) Name the control surface existing in a horizontal stabilizer? [1 M]
- (b) Draw the diagram of a cambered airfoil. [1 M]
- (c) What is monopropellant? [1 M]
- (d) Explain about the structural element "spar". [1 M]
- (e) Explain the way to reduce aerodynamic heating on space vehicles. [1 M]
- (f) What is Yawing motion? [2 M]
- (g) Write about Single slotted flap. [2 M]
- (h) What is rocket staging? [2 M]
- (i) Draw the diagram of a wing rib with cut-out sections. [2 M]
- (j) What is re-entry vehicle? [2 M]

**PART - B**

( Answer any 4 questions )

(15M x 4 = 60M)

- 2 (a) If 680.4 kg of air pumped into a previously empty 25.485 N/m<sup>3</sup> storage tank and the air temperature in the tank is uniformly at 294.3 K, what is the air pressure in the tank in atmospheres? (1 atm = 1.01 × 10<sup>5</sup> pa). [8 M]
- (b) Consider the low speed flight of the space shuttle as it is nearing a landing. If the air pressure and the temperature at the nose of the shuttle are 1.2 atm and 300K respectively. What are the density and specific volume? [7 M]
- 3 (a) Why the phenomenon of airfoil stall is of critical importance in airplane design? [10 M]
- (b) An airplane is flying at a velocity of 100m/s at a standard altitude of 3Kms where ( $P_{\infty} = 7.0121 \times 10^4 \text{ N/m}^2$ ,  $\rho_{\infty} = 0.90926 \text{ Kg/m}^3$ ). The pressure coefficient at a point on the fuselage is -2.2. What is the pressure at this point? [5 M]
- 4 (a) Calculate the burnout velocity of a single stage rocket motor Considering the mass of 5000kg and a structural mass of 500Kg and a payload mass of 50Kg. [10 M]
- (b) Write advantages and disadvantages of solid propellants. [5 M]
- 5 (a) Briefly explain about Monocoque and Semi- monocoque structures. [7 M]
- (b) Draw diagrams of Monocoque and Semi-monocoque with internal components. [8 M]
6. What is Kepler's third law? Derive an equation to support Kepler's third law. [15 M]
- 7 (a) Write about different flaps with the help of their diagrams. [8 M]
- (b) Explain how flaps are helpful in producing lift. [7 M]
8. Explain in detail about the entry corridor. [15 M]

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31 AUG 2021

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**R14**

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

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

**S390 - STRENGTH OF MATERIALS**

(AE)

Time : 3 hours

Max.Marks : 75

**PART - A**

( Answer all the questions )

(1M x 5 + 2M x 5 = 15M)

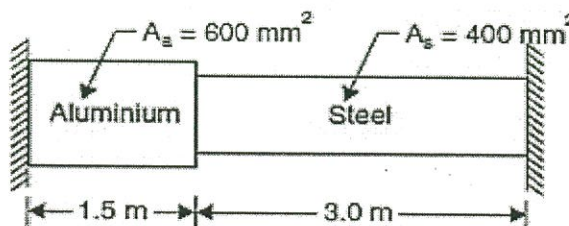
- 1 (a) What is Hook's law. [1 M]
- (b) What are the sign conventions for shear force? [1 M]
- (c) Write about power transmitted by a shaft? [1 M]
- (d) What do you understand by the term "theories of failure"? [1 M]
- (e) What is statically determinate beam? [1 M]
- (f) If a copper bar is cooled to  $-50^{\circ}\text{C}$ , what are the stresses induced? [2 M]
- (g) How does a beam differ from a tension or a compression member? [2 M]
- (h) What do you mean by section modulus? Find an expression for section modulus for rectangular cross section? [2 M]
- (i) State maximum shear stress theory. Explain. [2 M]
- (j) Explain the procedure to find the deflection of beam by using moment area method? [2 M]

**PART - B**

( Answer any 4 questions )

(15M x 4 = 60M)

- 2 (a) The composite bar shown in Figure is rigidly fixed at the ends A and B. Determine the reaction developed at ends when the temperature is raised by  $18^{\circ}\text{C}$ . Given  $E_a = 70 \text{ kN/mm}^2$ ,  $E_s = 200 \text{ kN/mm}^2$ ,  $\alpha_a = 11 \times 10^{-6}/^{\circ}\text{C}$ ,  $\alpha_s = 12 \times 10^{-6}/^{\circ}\text{C}$ . [8 M]

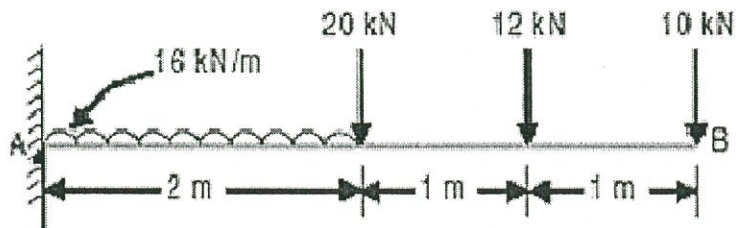


- (b) A circular rod of 25 mm diameter and 500 mm long is subjected to a tensile force of 60 kN. Determine modulus of rigidity, bulk modulus and change in volume if Poisson's ratio = 0.3 and Young's modulus  $E = 2 \times 10^5 \text{ N/mm}^2$ . [7 M]
- 3 (a) Derive the relation between shear force, bending moment and intensity of loading. [7 M]



### S390 - STRENGTH OF MATERIALS

- (b) A cantilever of length 2.0 m carries a uniformly distributed load of 1 kN/m run over a [8 M]  
length of 1.5 m from the free end. Draw the shear force and bending moment  
diagrams for the cantilever beam.
4. (a) Explain about theory of simple bending. [5 M]
- (b) Calculate the power transmitted by a solid shaft of diameter 300 mm at 200 rpm, if [10 M]  
the maximum torque exceeds the mean by 25 percent and the working shear stress is  
60 N/mm<sup>2</sup>. Find the angle of twist in length of 20 mm diameter if  $G = 0.84 \times 10^5$  N/  
mm<sup>2</sup>. If a 100 mm hole is bored axially in the shaft, what power will it transmit,  
other conditions remaining unchanged?
- 5 (a) A wooden beam 100 mm wide, 250 mm deep and 3 m long is carrying a UDL of 45 [8 M]  
KN/m. Determine the maximum shear stress and sketch the variation of shear stress  
along the depth of the beam.
- (b) The stresses at point of a machine component are 150 Mpa and 50 Mpa both [7 M]  
tensile. Find the intensities of normal, shear and resultant stresses on a plane  
inclined at an angle of  $55^\circ$  with the axis of major tensile stress.
- 6 (a) A simply supported beam of length L is subjected to a central load of W. Find the [8 M]  
maximum slope and deflection of the beam?
- (b) A spherical container of 1 m diameter has 15 mm thick plates. Calculate the [7 M]  
change in its diameter, if it contains a fluid under a pressure of 2 MPa. Take  
 $E=200$ Gpa and  $\mu=0.28$ .
7. A cantilever of length 4 m is loaded as shown in figure. Draw shear force and bending [15 M]  
moment diagrams for the cantilever beam.



- 8 (a) A cantilever beam 6 m long is subjected to a UDL of 5 KN/m over its entire span. [8 M]  
Find the slope and deflection of cantilever beam at its free end. Take  
 $EI=2.5 \times 10^{12}$  kN- mm<sup>2</sup>.
- (b) A copper pipe of 350 mm internal diameter and 75mm thickness carries water [7 M]  
under a pressure of 9 N/mm<sup>2</sup>. Determine maximum and minimum intensities of  
hoop stress across the section.

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

**S233-ENGINEERING FLUID MECHANICS**

(ASE)

Time : 3 hours

Max. Marks : 75

**PART-A**

(Compulsory question)

Q.No	Questions	Marks
1 (a)	Poise is a unit of what property of fluid.	1M
(b)	What is the application of Venturi meter?	1M
(c)	What is the nature of variation of velocity of ideal flow in a pipe?	1M
(d)	What is the meaning for radial blades/vanes in hydraulic turbine?	1M
(e)	Define overall efficiency of centrifugal pump.	1M
(f)	What is metacenter?	2M
(g)	Define Streamline.	2M
(h)	What is the Darcy-Weisbach equation for flow through ducts?	2M
(i)	What is the term meant by head race?	2M
(j)	What is the purpose of impeller in a centrifugal pump?	2M

**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

2(a)	The space between two parallel plates kept 3 mm apart is filled with an oil of dynamic viscosity 0.2 Pa.s. What is the shear stress on the lower fixed plate, if the upper plate is moved with a velocity of 1.5m/s?	7M
(b)	A thin plate is separated from two fixed plates by very viscous liquids $\mu_1$ and $\mu_2$ , respectively. The plate spacings $h_1$ and $h_2$ are unequal. The contact area is $A$ between the center plate and each fluid. Assuming a linear velocity distribution in each fluid, derive the force $F$ required to pull the plate at velocity $V$ .	8M
3(a)	What is venturimeter? Derive an expression for discharge through venturimeter with a neat sketch.	7M
(b)	Derive the acceleration of a fluid particle in a velocity field and give detailed physical explanation of each term.	8M
4(a)	Distinguish between (i) viscous and non-viscous flow (ii) laminar and turbulent flow.	7M
(b)	Describe with neat sketches, how Reynolds identified and demonstrated the laminar and turbulent flows in pipe?	8M
5(a)	Classify the hydraulic turbines. Write on working of Pelton wheel with neat sketch.	7M
(b)	Explain the construction and working of Francis Turbine with neat sketch.	8M
6(a)	Describe the working principle of Reciprocating pumps with neat sketch.	7M
(b)	Classify the Reciprocating pumps.	8M
7(a)	Derive Darcy-Weisbach equation for head loss ( $h_f$ ) due to a flow in pipe with length $L$ and diameter $D$ in terms of the friction factor ' $f$ '. Consider the velocity of flow in pipe as $V$ .	7M
(b)	Develop the relation between friction factor $f$ and Reynolds number $Re$ for laminar flow through pipe.	8M
8(a)	Derive the equation for work done by the impeller of a centrifugal pump on the fluid handled.	7M
(b)	A single acting reciprocating pump is running at 50 rpm has a stroke length of 0.25m. The delivery and suction heads are 50m and 5m. The piston diameter is 0.15m. Find discharge capacity of pump in $m^3/sec$ .	8M

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

**S408-THERMODYNAMICS**

(AE & ME)

Time: 3 hours

Max. Marks: 75

**PART-A**

(Compulsory question)

- 1(a) What is Quasi static process? [1M]
- (b) Define enthalpy and internal energy. [1M]
- (c) What is a Refrigerator and Heat pump? [1M]
- (d) Define dryness fraction of steam. [1M]
- (e) List out the processes in VCR system. [1M]
- (f) Distinguish between Point & Path functions with examples. [2M]
- (g) Explain steady flow energy equation applied to open systems. [2M]
- (h) Explain Reversible and Irreversible processes with examples. [2M]
- (i) Define the terms Mass fraction and Mole fraction. [2M]
- (j) List out the processes in Simple Rankine cycle. [2M]

**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

- 2(a) Define thermodynamic work and derive an expression for displacement work for a non-flow process by clearly stating under which conditions that equation is valid. [7M]
- (b) A quantity of gas is compressed according to  $PV^{1.25} = \text{Constant}$ . The initial temperature and pressure of the gas is 15 C and 1 bar respectively. Find the work done in compressing 1 kg of air to 3 bar and the heat rejected through the walls of the cylinder.  $K = 1.4$  for air. [8M]
- 3(a) Apply the SFEE to the following engineering devices  
(i) Compressor (ii) Turbine (iii) Nozzle. [7M]
- (b) A closed system undergoes a thermodynamic cycle consisting of four separate and distinct processes. The heat and work transferred in such process are as tabulated below.

Process	Heat Transfer in kJ/min	Work Transfer in kJ/min
1-2	20,000	0
2-3	-10,000	30,000
3-4	0	20000
4-1	15,000	-25,000

Show that the data is consistent with the first law of thermodynamics. Also evaluate the network output in kW and change in internal energy in each process and for cycle. [8M]

- 4(a) State and Prove Carnot's theorem. [7M]



- (b) 300 kJ/s of heat is supplied at a constant temperature of 290 C to a heat engine. Heat rejection takes place at 8.5 C. The following results are obtained:  
(i) 215 kJ/s are rejected (ii) 150 kJ/s are rejected and (iii) 75 kJ/s are rejected.  
Classify which result report reversible, irreversible and impossible cycle. [8M]
- 5(a) Explain (i) Dalton's law of additive pressures (ii) Amagat's law of additive volumes. [7M]  
(b) Find the enthalpy, specific volume, internal energy and entropy of 1 kg of steam at 10 bar, when the condition of steam is (i) 0.85 dry (ii) dry and saturated (iii) superheated with degree of superheat being 50 C. [8M]
- 6(a) Develop an expression for thermal efficiency of Carnot cycle by showing the cycle on P-v and T-s coordinates. [7M]  
(b) Determine the air standard efficiency (ideal efficiency) of a compression ignition engine working on Diesel cycle. The geometry of the engine cylinder: bore 250 mm, stroke 375 mm and a clearance volume of 1500 cm<sup>3</sup>. The fuel injection cut-off occurring at 6 % of the stroke. Assume the ratio of specific heats as 1.4 for the air. [8M]
7. In a gas turbine unit, the gases flows through the turbine at the rate of 15 kg/s and the power developed by the turbine is 12000kW. The enthalpies of the gases at inlet and outlet are 1260 kJ/kg and 400 kJ/kg respectively. The velocity of the gases at the inlet and exit are 50 m/s and 110 m/s respectively. Calculate (i) the rate at which heat is rejected in the turbine (ii) the area of the inlet pipe, given that the specific volume of the gases at the inlet is 0.45 m<sup>3</sup>/kg. [15M]
- 8(a) Derive expressions for entropy change of an ideal gas when subjected to thermodynamic process. [7M]  
(b) Explain the working of simple Vapour compression refrigeration cycle with the help of schematic diagram. Show the cycle on T-s and P-h planes. [8M]

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

**S134-APPLIED MATHEMATICS-III**

(AE, CE, CSE, EEE, EIE, IT & ME)

Time : 3 hours

Max. Marks : 75

**PART-A**

(Compulsory question)

- 1 (a) Evaluate  $\int_0^1 x^3 dx$  by Trapezoidal rule. [1M]
- (b) Verify the relation  $\nabla = 1 - E^{-1}$  [1M]
- (c) Write the solution of IVP  $y' = x^2 + y^2$ ;  $y(0) = 1$  using Picard's method. [1M]
- (d) Find  $\text{div } \vec{F}$ , where  $\vec{F} = \text{grad } (x^3 + y^3 + z^3 - 3xyz)$ . [1M]
- (e) State Gauss Divergence Theorem. [1M]
- (f) Write the Simpson's 3/8 rule for evaluating  $\int_{x_0}^{x_n} f(x) dx$ . [2M]
- (g) Evaluate  $\Delta^{10} [(1-ax)(1-bx^2)(1-cx^3)(1-dx^4)]$ . [2M]
- (h) Briefly explain the Runge-Kutta method. [2M]
- (i) Determine the constant  $a$  so that the vector  $\vec{V} = (x+3y)i + (y-2z)j + (x+az)k$  is Solenoidal. [2M]
- (j) Define surface integral. [2M]

**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

- 2 (a) Find a root of the equation  $x^3 - 2x - 5$  by the method of false position correct to three decimal places. [7M]
- (b) Evaluate  $\int_0^6 \frac{dx}{1+x^2}$  Using Trapezoidal and Simpson's 1/3<sup>rd</sup> rule. [8M]

- 3 (a) From the following table, estimate the number of students who obtained marks between 40 and 45. [7M]

Marks:	30-40	40-50	50-60	60-70	70-80
No. of students:	31	42	51	35	31

- (b) Given the values [8M]

x	5	7	11	13	17
f(x)	150	392	1492	2366	5202

Evaluate  $f(9)$ , using Lagrange's formula.

- 4 (a) Find by Taylor's series method the value of  $y$  at  $x = 0.1$  and  $x = 0.2$  to five places of decimals from  $\frac{dy}{dx} = x^2 y - 1$ ,  $y(0) = 1$ . [7M]
- (b) Use Runge-Kutta method of fourth order to find  $y$  when  $x = 1.2$  in steps of 0.1, given that  $\frac{dy}{dx} = x^2 + y^2$  and  $y(1) = 1.5$ . [8M]



- 5(a) Show that  $\nabla^2(r^n) = n(n+1)r^{n-2}$ . [7M]
- (b) Find the directional derivative of  $\nabla \cdot \nabla \phi$  at the point (1, -2, 1) in the direction of the normal to the surface  $xy^2z = 3x + z^2$ , where  $\phi = 2x^3y^2z^4$ . [8M]
6. Verify Stokes theorem for a vector field defined by  $\vec{F} = -y^3\vec{i} + x^3\vec{j}$ , in the region  $x^2 + y^2 \leq 1$ . [15M]

- 7(a) Find by Newton's method, the real root of the equation  $3x = \cos x + 1$  correct to four decimal places. [7M]

- (b) Calculate the value of  $\int_0^{\frac{\pi}{2}} \sin x \, dx$  by Simpson's 1/3 rule, using 11 ordinates. [8M]

- 8(a) The population of a town in the decimal census was given below. Estimate the population for the year 1925.

year	1891	1901	1911	1921	1931
Population (thousands)	46	66	81	93	101

[7M]

- (b) Using Lagrange's formula find the value of y when x = 10. [8M]

x	5	6	9	11
f(x)	12	13	14	16

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B.Tech. (III Semester) Supplementary Examinations

**S208-ELECTRICAL AND ELECTRONICS ENGINEERING**

(CE&ME)

Time : 3 hours

Max. Marks : 75

**PART-A**

(Compulsory question)

Q.No	Questions	Marks	CO	BL
1(a)	State limitations of ohm's law.	1M	CO1	L1
(b)	State the principle of a transformer.	1M	CO2	L1
(c)	List the advantages of slip ring induction motor over squirrel cage induction motor.	1M	CO3	L1
(d)	Distinguish between static and dynamic forward resistances of a diode.	1M	CO4	L2
(e)	What is meant by measurement?	1M	CO5	L1
(f)	Define current, voltage and power.	2M	CO1	L1
(g)	Classify the different types of losses in a transformer.	2M	CO2	L1
(h)	Discuss the importance of slip in an Induction motor.	2M	CO3	L2
(i)	Why BJT is used as switch?	2M	CO4	L1
(j)	State the advantages of PMMC instruments.	2M	CO5	L1

**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

2(a)	In the circuit shown, determine the current through the 2 ohm resistor and the total current delivered by the battery. Use Kirchhoff's laws.	7M	CO1	L3
(b)	Classify types of electric circuit elements depending on their characteristics and explain in detail. Differentiate resistor, inductor and capacitor elements using their voltage-current characteristics.	8M	CO1	L2
3(a)	Derive an expression for EMF induced in a transformer.	7M	CO2	L4
(b)	A transformer supplied a load of 32A at 415V. If the primary voltage is 3320 V, find the following: (i) Secondary volt ampere (ii) Primary current (iii) Primary volt ampere. Neglect losses and magnetizing current.	8M	CO2	L3
4(a)	Explain the principle and construction of a 3 phase induction motor.	7M	CO3	L2
(b)	Demonstrate the procedure for calculation of voltage regulation by synchronous impedance method.	8M	CO3	L3
5(a)	Explain the operation of full wave rectifiers with relevant waveforms.	7M	CO4	L2
(b)	Describe the working of a PN junction diode with neat diagrams. Also explain its V-I characteristics.	8M	CO4	L3
6(a)	With the help of diagrams, explain the construction and working principle of permanent magnet moving coil instruments. Obtain the expression for its deflecting torque.	7M	CO5	L4
(b)	List the advantages and applications of CRO.	8M	CO5	L2
7(a)	Explain the tests on a single phase transformer.	7M	CO2	L3
(b)	Describe the construction and working of attraction type MI instrument.	8M	CO5	L2
8(a)	Draw the circuit diagram for half-wave rectifier and explain its working.	7M	CO4	L2
(b)	The frequency of stator EMF is 50 Hz for an 8-pole three phase induction motor. If the rotor frequency is 2.5 Hz, calculate the slip and the actual speed of rotor.	8M	CO3	L3

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

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

**S304-MECHANICS OF FLUIDS**

(CE)

Time : 3 hours

Max. Marks : 75

**PART-A**

(Compulsory question)

Q.No	Questions	Marks
1(a)	Define compressibility of fluid.	1M
(b)	Define Local Acceleration.	1M
(c)	What is meant by velocity approach in the weirs?	1M
(d)	What do you mean by 'Viscous Flow'?	1M
(e)	What is the value of Reynold's number for laminar boundary layer?	1M
(f)	State the Pascal's law of fluid.	2M
(g)	Define the center of pressure of the body.	2M
(h)	Name any four different forces present in a fluid flow.	2M
(i)	Define the term Pipes in series.	2M
(j)	State Buckingham's $\pi$ theorem.	2M

**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

2(a)	State and Prove the Pascal's law.	7M
(b)	A pipe contains an oil of specific gravity 0.8. A differential manometer connected at the two points A and B of the pipe shows a difference in mercury level as 0.2m. Find the difference of pressure at the two points.	8M
3(a)	Derive an expression for the depth of centre of pressure from free surface of liquid of an inclined plane surface submerged in the liquid.	7M
(b)	A rectangular plane surface is 2 m wide and 3 m deep. It lies in vertical plane in water. Determine the total pressure and position of centre of pressure on the plane surface.	8M
4(a)	State the momentum equation. How will you apply momentum equation for determining the force exerted by a flowing liquid on a pipe bend?	7M
(b)	An Orifice meter is to be fitted onto a horizontal pipe 20cm diameter carrying oil of specific gravity is 0.85 for the purpose of flow measurement. The differential head is to be indicated by U-tube manometer contain mercury. If the manometer reading is not to exceed 20cm, when the flow is 5 kg/sec. What should be the diameter of orifice. Take $C_d$ is 0.62.	8M
5(a)	Derive Darcy Weisbach equation for friction head loss in pipes.	7M
(b)	The rate of flow of water through a horizontal pipe is $0.3 \text{ m}^3/\text{s}$ . The diameter of the pipe which is 250 mm is suddenly enlarged to 500 mm. The pressure intensity in the smaller pipe is $13.734 \text{ N/cm}^2$ . Determine the (i) loss of head due to sudden enlargement, (ii) pressure intensity in the large pipe.	8M
6(a)	Explain briefly the term boundary layer.	7M
(b)	The variables controlling the motion of a floating vessel through water are the drag force $F$ , the speed $V$ , the length $L$ , the density and dynamic viscosity $\mu$ of water and acceleration due to gravity $g$ . Derive an expression for $F$ by dimensional analysis.	8M
7(a)	Explain in detail how the flow is demonstrated using Reynolds's experiment.	7M
(b)	A crude oil of viscosity 0.97 poise and relative density 0.9 is flowing through a horizontal circular pipe of diameter 100 mm and of length 10 m. Calculate the difference of pressure at the two ends of the pipe, if 100 kg of the oil is collected in a tank in 30 seconds.	8M
8(a)	What do you mean by dimensionless numbers? Explain any three of them.	7M
(b)	Find the displacement, and shape factor for the velocity profile in laminar boundary layer as $u/U = 3/2(y/\delta) - (1/2)(y/\delta)^3$ .	8M



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B.Tech. (III Semester) Supplementary Examinations

**S295-MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS**

(CSE)

Time : 3 hours

Max. Marks : 75

**PART-A**

(Compulsory question)

Q.No	Questions	Marks	CO	BL
1(a)	Define Demand.	1M	CO1	L1
(b)	What is Marginal Rate of Technical Substitutes?	1M	CO2	L1
(c)	Write a brief notes Market structure.	1M	CO3	L1
(d)	Sketch the significance of capital.	1M	CO4	L1
(e)	Outline few lines of Errors of Omission.	1M	CO5	L1
(f)	Mention the exceptions of Law of Demand.	2M	CO1	L1
(g)	Write Differences between explicit and implicit costs.	2M	CO2	L2
(h)	What do you understand about Product differentiation?	2M	CO3	L1
(i)	State the meaning of Net Present Value.	2M	CO4	L2
(j)	List out different types of Accounting Concepts.	2M	CO5	L1

**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

2(a)	How do you explain the relation of managerial economics with other subjects?	7M	CO1	L2
(b)	Explain the nature of problems studies in managerial economics. What is the importance of the study of such problems in business management.	8M	CO1	L3
3(a)	If sales are 10,000 units and selling price is Rs 20 per unit, variable cost Rs 10 per unit and fixed cost is Rs. 80,000. (i) Find out BEP in units and in sales revenue. (ii) What is the profit earned? (iii) What should be the sales per earning a profit of Rs. 60,000?	7M	CO2	L3
(b)	Explain how cost - output relationship helps the enterprise or entrepreneurs in expansion decisions.	8M	CO2	L2
4(a)	Outline the need of public enterprises? Explain the recent achievement of public enterprises.	7M	CO3	L2
(b)	Explain the following: (i) Monopoly (ii) Duopoly (iii) Oligopoly (iv) Imperfect competition.	8M	CO3	L1
5(a)	A project involves initial outlay of Rs. 1,29,600. Its working life is expected to be 3 years. The cash inflows are likely to be as follows: year1 Rs. 64,000; Year 2 Rs. 56,000 and Year 3 Rs. 24,000. Compute the internal rate of return.	7M	CO4	L3



## S295-MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

(b)	A Company has an estimated Life of 4 years and an investment opportunity costing Rs.2,50,000 with the following expected Net Cash Flow After Taxes and Before Depreciation.	8M	CO4	L4															
	<table><tr><th>Years</th><th>Net Cash Flows (Rs.)</th><th>P.V. of Rs.1 @24% D.f</th></tr><tr><td>1</td><td>1,20,000</td><td>0.806</td></tr><tr><td>2</td><td>90,000</td><td>0.650</td></tr><tr><td>3</td><td>1,60,000</td><td>0.524</td></tr><tr><td>4</td><td>30,000</td><td>0.423</td></tr></table>				Years	Net Cash Flows (Rs.)	P.V. of Rs.1 @24% D.f	1	1,20,000	0.806	2	90,000	0.650	3	1,60,000	0.524	4	30,000	0.423
	Years				Net Cash Flows (Rs.)	P.V. of Rs.1 @24% D.f													
	1				1,20,000	0.806													
	2				90,000	0.650													
	3				1,60,000	0.524													
	4				30,000	0.423													
Using 24% as the cost of capital predict the following:																			
(i)Net Present Value @24% D.f.																			
(ii)Profitability Index @24%D.f																			
(iii)Pay-back Period																			
6(a)	Define Financial Accounting. Explain the importance and Limitations of Financial Accounting.	7M	CO5	L4															
(b)	Prepare Trial Balance as on 31.12.2009 under balances method from the following information: Capital Rs.6,000; Cash in hand Rs. 500; Bills Receivable Rs.4,550 ; Land & Building Rs.6,000; Purchases Rs. 7,000; Sales Rs.8,000; Debtors Rs.3,300; Creditors Rs.600; Bills Payable Rs. 2,750; Bank Overdraft Rs.4,000.	8M	CO5	L3															
7(a)	Summarize the features of Cobb Douglas production function.	7M	CO2	L1															
(b)	Explain how a firm attains equilibrium in the short run and in the long run under conditions of perfect competition	8M	CO3	L2															
8(a)	Demonstrate the time value of money and how is it useful in capital budgeting.	7M	CO4	L3															
(b)	Record the following transactions in the books of Krishna Mohan. 2007, June 1st Business started with cash Rs.25,000 and Cheque Rs.20,000. June 2nd Interest paid for Rs.5,000 June 3rd Commission paid by cheque Rs.2,000 June 4th Salaries paid for Rs.5,000 June 5th Machinery purchased for Rs.6,000 June 6th Rent received for Rs.20,000	8M	CO5	L3															

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

**S253-FREE OPEN SOURCE SOFTWARE**

(CSE)

Time : 3 hours

Max. Marks : 75

**PART-A**

(Compulsory question)

- 1(a) Discuss the need of Open source software. [1M]
- (b) What is the syntax of 'expr' statement in Shell programming. [1M]
- (c) What is the purpose of "ps" command ? [1M]
- (d) What are the logical operators available in "awk"? [1M]
- (e) How variables are declared in PHP? [1M]
- (f) Explain about inode in Unix File system. [2M]
- (g) Write a short note on Shell variables. [2M]
- (h) In what way "tr" command is used in Unix? [2M]
- (i) What is the role of positional parameters in "awk"? [2M]
- (j) What are the advantages of R-tool? [2M]

**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

- 2(a) With the help of a diagram, explain the UNIX file system hierarchy. [7M]
- (b) Explain the following commands with syntax  
(i) date (ii) telnet (iii) ftp (iv) uname (v) printf (vi) echo. [8M]
- 3(a) Write a shell script to create a pattern of matching exactly the word "stratton0" from among the strings "stratton0", "stratton12", "stratton01", "stratton123", "stratton012", "stratton1stratton234".  
**Input Strings:** "stratton0", "stratton12", "stratton01", "stratton123", "stratton012", "stratton1stratton234".  
**Output:** stratton0 (which matches the pattern "stratton0" exactly) [7M]
- (b) Explain different modes in "vi" editor and list commands in each mode. [8M]
- 4(a) What is sed command? With examples explain the differences between line addressing and context addressing in sed. [7M]
- (b) Write a short note on sort command. Discuss its options with example. [8M]
- 5(a) With respect to awk, explain the following with example  
(i) NR and NF (ii) index (iii) Split (iv) length (v) system. [7M]
- (b) Write the syntax of awk instruction. Explain with example. [8M]
- 6(a) Write a short note on R-Tool. [7M]
- (b) What is Octavia? Explain its architecture. [8M]
- 7(a) Define a Job. How is job control done in UNIX? [7M]
- (b) Write a short note on awk built-in variables. [8M]
- 8(a) What is the purpose of PHP? Explain the role of PHP in web development. [7M]
- (b) Which command is used for listing file attributes? Explain the significance of each field in the output. [8M]

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B.Tech. (III Semester) Supplementary Examinations

**S324-OBJECT ORIENTED PROGRAMMING THROUGH C++  
(CSE)**

Time : 3 hours

Max. Marks : 75

**PART-A**

(Compulsory question)

Q.No	Questions	Marks	CO	BL
1(a)	What are the major issues facing the software industry today?	1M	CO1	L3
(b)	What is POP? Discuss its features?	1M	CO2	L1
(c)	What is a function ? How will you define a function in C++?	1M	CO3	L1
(d)	What is a virtual base class?	1M	CO4	L3
(e)	What is a stream?	1M	CO5	L4
(f)	What do you mean by dynamic binding? How it is useful in OOP?	2M	CO1	L1
(g)	Describe the major parts of a C++ program.	2M	CO2	L1
(h)	What types of functions are available in C++? Explain.	2M	CO3	L1
(i)	How is cout able to display various types of data without any special instructions?	2M	CO4	L3
(j)	What is the role of iomanip file?	2M	CO5	L1

**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

2(a)	Describe how data are shared by functions in procedure-oriented programs?	7M	CO1	L3
(b)	Write a program to input an integer value from keyboard and display on screen "WELL DONE" that many times.	8M	CO1	L4
3(a)	What is inline function? When will you make a function inline and why?	7M	CO2	L3
(b)	What is a class? How objects of a class are created?	8M	CO2	L4
4(a)	Design a class having the constructor and destructor functions that should display the number of object being created or destroyed of this class type.	7M	CO3	L3
(b)	Write a C++ program, to find the factorial of a number using a constructor and a destructor.	8M	CO3	L4
5(a)	Illustrate the concept of inheritance with the help of an example.	7M	CO4	L3
(b)	Write a program in c++ which demonstrate the use of inheritance.	8M	CO4	L4
6(a)	What do you understand by function returning a pointer? Give any suitable example to support your answer.	7M	CO5	L3
(b)	Differentiate between compile time polymorphism and run time polymorphism.	8M	CO5	L4
7(a)	Write a program to read two numbers from the keyboard and display the larger value on the screen.	7M	CO5	L3
(b)	How does a main () function in c++ differ from main () in c?	8M	CO4	L4
8(a)	What is recursion? While writing any recursive function what thing(s) must be taken care of?	7M	CO4	L3
(b)	What is the use of a constructor function in a class? Give a suitable example of a constructor function in a class.	8M	CO5	L4



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

**S169-COMPUTER ORGANIZATION**

(CSE)

Time : 3 hours

Max. Marks : 75

**PART-A**

(Compulsory question)

Q.No	Questions	Marks
1(a)	What for the Program Counter is used in any CPU?	1M
(b)	What is a microinstruction?	1M
(c)	Define the term "throughput".	1M
(d)	What is Valid bit?	1M
(e)	Why strobe signals are used in asynchronous data transfer?	1M
(f)	What is an effective address?	2M
(g)	What is the function of Stack Pointer?	2M
(h)	What is the use of loop buffer in pipelining?	2M
(i)	What is a memory mapping table?	2M
(j)	What is the purpose of DMA?	2M

**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

2(a)	Show that the block diagram of the hardware that implements the following register transfer statement $P:R2 \leftarrow R1$ .	7M
(b)	Construct a common bus system by using multiplexers and show the diagram.	8M
3(a)	Write a short notes on the following (i) Micro-operation (ii) Microinstruction (iii) Micro-program (iv) Microcode	7M
(b)	Give relative merits and demerits of hardwired control unit and micro-programmed control unit.	8M
4(a)	Give the Hardware organization of associative memory.	7M
(b)	With the help of internal organization of an associative memory cell, explain single bit read and write operations.	8M
5.	What is a page fault? Name various page replacement policies for Virtual memory. Give their relative merits.	15M
6(a)	Give the block diagram for an I/O interface Unit.	7M
(b)	What are the different ways of that computer buses can be used to communicate with memory and I/O?	8M
7(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
8(a)	What are the different modes of transfer? Give their relative advantages of using each of them.	7M
(b)	Explain the Programmed I/O data transfer mechanism between I/O device and CPU through an interface.	8M



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B.Tech. (III Semester) Supplementary Examinations

**S378-SIGNALS AND SYSTEMS**

(ECE&EIE)

Time : 3 hours

Max. Marks : 75

**PART-A**

(Compulsory question)

Q.No	Questions	Marks
1(a)	When the signal $x(t)$ is said to be causal?	1M
(b)	Write the expression of trigonometric Fourier series.	1M
(c)	Write the mathematical form of time integration property of Fourier Transform.	1M
(d)	What type of system is described by a differential equation?	1M
(e)	When the ROC is lies between two poles?	1M
(f)	Obtain the average power of a step signal $u(t)$ .	2M
(g)	What are the reasons for Gibb's oscillations?	2M
(h)	Find the Fourier Transform of $(t-1)e^{-t}u(t)$ .	2M
(i)	How to examine the stability of a continuous time system?	2M
(j)	Find the initial value of a causal signal $x(t)$ , if $X(s) = \frac{3s+2}{s(2s+3)}$ .	2M

**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

2(a)	Define signal. Discuss about continuous time and analog signals.	7M
(b)	Test the signal $x(t)=e^{-2t}u(t)$ for even/odd, causality and periodicity.	8M
3(a)	When the Fourier Series is said to be existence? Explain.	7M
(b)	Obtain the trigonometric Fourier Series representation of half wave rectified sine wave.	8M
4(a)	What is the need of Fourier Transform? How to derive Fourier Transform from Fourier Series?	7M
(b)	Find the Fourier Transform of a causal signal $x(t)=e^{-2t}u(t)$ . Draw its magnitude and Phase spectrum.	8M
5(a)	Define the System function and Impulse response. How response of LTI system can be computed from impulse response? Explain.	7M
(b)	Compute the response of a system having input $x(t)=2e^{-3t}u(t)$ and impulse response $h(t)=3e^{-2t}u(t)$ .	8M
6(a)	State and prove initial and final value theorems.	8M
(b)	Find initial value and final value of a signal $x(t)$ from $X(s) = \frac{s+3}{s(s+2)}$ .	7M
7(a)	When the given signal $x(t)$ is said to be bounded? Explain with an example.	7M
(b)	Obtain the period of signal $x(t)=2\sin(t)+3\cos(2t)+4\sin(3t)$ .	8M
8(a)	State and prove time differentiation property of Fourier Transform.	7M
(b)	Find the Fourier Transform of $x(t)=\sin(3t)u(t)$ .	8M

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

**S428-RANDOM VARIABLES AND STOCHASTIC PROCESSES**

(ECE)

Time : 3 hours

Max. Marks : 75

**PART-A**

(Compulsory question)

Q.No	Questions	Marks
1 (a)	List all the possible real values of random variable $X = 5s^2 - 1$ , where $S = \{0, 1, 2.5, 6\}$ and classify the random variable.	1M
(b)	Summarize any two properties of N-dimensional Gaussian random variables.	1M
(c)	Define the random process with one example.	1M
(d)	Verify $S_{XX}(\omega) = \frac{\omega^2}{\omega^6 + 3\omega^2 + 3}$ is valid or not.	1M
(e)	How the autocorrelation of a system response $Y(t)$ is related to auto correlation of $X(t)$ is $R_{XX}(\tau)$ & system impulse response is $h(\tau)$ ?	1M
(f)	Summarize the properties of moment generating function.	2M
(g)	What is the coordinate rotation angle used to convert any correlated random variables into uncorrelated Gaussian random variables, and also find the coordinate rotation angles if $\sigma_X = \sigma_Y = \sigma$ , & $\rho = 1$ & $-1$ .	2M
(h)	Apply the autocorrelation properties, find mean, mean square value of $X(t)$ whose $R_{XX}(\tau) = 16 + 4\exp(-0.7\tau)$ .	2M
(i)	List any two properties of cross PSD.	2M
(j)	Determine the frequency response of the system $h(t) = t \exp(-t)u(t)$ .	2M

**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

2(a)	Explain the concept of random variable and mention its classifications. Give one example each to illustrate the same.	8M												
(b)	A discrete random variable X takes values from 1 to 5 with probabilities given below. <table><tr><td>X</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr><tr><td>P(X)</td><td>0.1</td><td>0.2</td><td>0.4</td><td>0.2</td><td>0.1</td></tr></table> Compute the mean and variance of the random variable X.	X	1	2	3	4	5	P(X)	0.1	0.2	0.4	0.2	0.1	7M
X	1	2	3	4	5									
P(X)	0.1	0.2	0.4	0.2	0.1									
3(a)	Define the Joint density function of X & Y and prove the following (i) $\int_{-\infty}^{\infty} \int_{-\infty}^{\infty} f_{XY}(x, y) dx dy = 1$ (ii) $\int_{-\infty}^x \int_{-\infty}^y f_{XY}(x, y) dx dy = F_{XY}(x, y)$	8M												
(b)	Two random variables X and Y have means $\bar{X} = 1$ and $\bar{Y} = 2$ variances $\sigma_X^2 = 4$ and $\sigma_Y^2 = 1$ and a correlation coefficient $\rho_{XY} = 0.4$ . New random variables W and V are defined by $V = -X + 2Y$ , $W = X + 3Y$ . Find (i) The means (ii). The Variances (iii) The Correlations (iv) The correlation coefficient $\rho_{VW}$ of V and W.	7M												



### S428-RANDOM VARIABLES AND STOCHASTIC PROCESS

4(a)	Define and explain stationarity of a random process $X(t)$ and its types.	7M
(b)	Find Auto Correlation Function of the process $X(t) = A + B \cos(\omega_0 t + \theta)$ , where $A, B, \omega_0$ are constants and $\theta$ is uniformly distributed random variable on the interval $(0, 2\pi)$ .	8M
5(a)	Develop a relation between Cross Power Spectral Density and Cross Correlation Function of a random process $X(t)$ and $Y(t)$ .	7M
(b)	Evaluate the power spectrum of $X(t)$ , whose autocorrelation is $R_{XX}(\tau) = A\left[1 - \left(\frac{ \tau }{T}\right)\right] \quad , \quad -T \leq \tau \leq T$ $0 \quad , \quad \text{elsewhere}$ Plot the auto correlation and PSD.	8M
6(a)	Derive the expression for cross correlation function of system response.	7M
(b)	Determine the response of LTI system with $h(t) = t^3 e^{-t} \quad , \quad t > 0$ $0 \quad , \quad t < 0$ and $X(t) = A \quad , \quad 0 < t < T$ $0 \quad , \quad \text{Otherwise}$	8M
7(a)	Compute and Sketch the spectrum of random process whose auto correlation function $R_{XX}(\tau) = \frac{A_0^2}{2} \sin(\omega_0 \tau)$ , plot correlation and its spectrum	8M
(b)	Express the spectral density function of $Z(t) = X(t)Y(t)$ in terms of $S_{XX}(\omega)$ , where $X(t)$ & $Y(t)$ are stastically independent to each other and if the autocorrelation function of $Y(t)$ is $R_{YY}(\tau) = \frac{1}{2} \cos(\omega_0 \tau)$	7M
8(a)	Determine the mean value of system response has $h(t) = e^{-Wt} \quad , \quad t > 0$ $0 \quad , \quad t < 0$ and $R_{XX}(\tau) = A^2 + B \exp(- \tau )$ , where $A, B$ are constants.	7M
(b)	Derive the expression for LTI system response. Find & Sketch the block diagram of the system with output $Y(t) = X(t) - X(t-\tau)$ , where $\tau$ is a delay, and $X(t)$ is input random process.	8M

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B.Tech. (III Semester) Supplementary Examinations

**S189-DIGITAL ELECTRONIC CIRCUITS**

(ECE&EIE)

Time : 3 hours

Max. Marks : 75

**PART-A**

(Compulsory question)

Q.No	Questions	Marks
1(a)	What does the base or radix of a number system indicate?	1M
(b)	What is AND-OR realization?	1M
(c)	What are code converters?	1M
(d)	What is meant by a ring counter?	1M
(e)	What is meant by a state transition table?	1M
(f)	Define minterm and maxterms.	2M
(g)	Which gate is called any or all gate? Why?	2M
(h)	List out the types of ROM's available.	2M
(i)	Write the importance of clear input in a flip flop.	2M
(j)	Draw the Mealy state model block diagram.	2M

**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

2(a)	Express the following decimal numbers in (i) 8421 BCD code, (ii) XS-3 code (i) 286 (ii) 807 (iii) 429.5 (iv) 158.7	7M
(b)	perform the following decimal additions in the BCD code. (i) 25+13 (ii) 679.6+536.8	8M
3(a)	Minimize the following expression using K-map and implement the minimized function using NAND gates. $F(A,B,C,D) = \sum m(1,4,7,10,13) + \sum d(5,14,15)$ .	7M
(b)	Minimize the following expression using K-map and implement the minimized function using logic gates. $F(A,B,C,D) = \sum m(4,5,7,12,14,15) + \sum d(3,8,10)$ .	8M
4(a)	Distinguish between half adder and full adder.	7M
(b)	With the help of block diagram explain the working of parallel adder.	8M
5(a)	Realize SR-flip flop using NOR gates and explain its operation with the help of truth table and characteristic table and derive the characteristic equation.	7M
(b)	Draw and discuss the excitation table of SR flip flop.	8M
6(a)	Design a sequence detector which generates an output $z=1$ , whenever the sequence 0110, and generates a 0 at all other times. The overlapping sequences are detected. Implement the circuit using D flip-flops.	7M
(b)	Sketch a part of an ASM chart that specifies a conditional operation to increment register W during state $T_1$ and transfers to state $T_2$ if control inputs Z and F are equal to 0 and 1, respectively.	8M
7(a)	Realize AND, NOT, OR, NOR logic gates using NAND gate.	7M
(b)	Summarize the steps used to convert AND/OR/NOT logic in to NAND/NOR logic.	8M
8(a)	Minimize the following boolean expressions (i) AABBC (ii) ABCBAC (iii) $A'.1.A.A$ (iv) $ABCA'B'$ (v) $ABB'AC$ (vi) $BBB'B$ .	7M
(b)	Minimize the following boolean expressions (i) $P+Q+P$ (ii) $P+Q+R+P'$ (iii) $P+Q+R+R+R'$ (iv) $P+Q+R+1$ (v) $0+P+Q+1$ (vi) $P+P+P+P$ (vii) $P+PQ+PQR+PQRS$ .	8M

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**LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING  
(AUTONOMOUS)**

L.B.ReddyNagar :: Mylavaram – 521 230 :: Krishna Dist.:A.P.  
B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

**S300- MATHEMATICS-III**

**(ECE)**

Time : 3 hours

Max.Marks : 75

**PART-A**

(Compulsory question)

- 1(a) If  $f(z) = z^2 - z$  find its real and imaginary parts. [1M]
- (b) Find the derivative of the function  $\sin z$  [1M]
- (c) Write Maclaurin's series expansion of the function  $\cos z$ . [1M]
- (d) How can we define gradient of a scalar function? [1M]
- (e) Write MATLAB command to find the value of  $e^{\frac{\pi i}{4}}$ . [1M]
- (f) Show that the function  $e^x \sin x$  is harmonic. [2M]
- (g) Evaluate  $\int_0^{\pi i} \cos z dz$ . [2M]
- (h) Find the poles of the function  $\frac{1}{(z^2 + 4)(z + 1)^2}$ . [2M]
- (i) Evaluate  $\int_{-1}^1 \int_{-2}^2 \int_{-3}^3 dx dy dz$ . [2M]
- (j) Write MATLAB program to find roots of the equation  $x^6 - x^4 - x^3 - 1 = 0$ . [2M]

**PART-B**

(Answer any FOUR questions. All questions carry equal marks.)

- 2(a) Applying Milne-Thomson method form the analytic function  $f(z) = u + iv$  if real part is  $u = y + e^x \cos y$ . Also find its imaginary part. [7M]
- (b) Applying the analyticity of the function  $f(z)$  prove that  $\left( \frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2} \right) |f(z)|^2 = 4 |f'(z)|^2$  [8M]
- 3(a) Separate real and imaginary parts of the function  $\cot z$  [7M]
- (b) Applying Cauchy's Integral formula evaluate  $\int_C \frac{z^3 e^{-z}}{(z-1)^3} dz$  where C is  $|z-1| = \frac{1}{2}$ . [8M]
- 4(a) Applying Taylor's theorem expand the function  $f(z) = \frac{z-1}{z+1}$  about the point  $z=0$  and  $z=1$ . [7M]
- (b) Evaluate using residue theorem  $\int_C \frac{4-3z}{z(z-1)(z-2)} dz$  where C is the circle  $|z| = \frac{3}{2}$ . [8M]
- 5(a) Calculate the directional derivative of  $f(x, y, z) = xy^2 + yz^3$  at the point  $(2, -1, 1)$  in the direction of the vector  $\vec{i} + 2\vec{j} + 2\vec{k}$ . [7M]
- (b) Evaluate by Green's theorem  $\int_C (y - \sin x) dx + \cos x dy$  where C is the triangle enclosed by the lines  $y = 0$ ,  $x = \frac{\pi}{2}$ ,  $\pi y = 2x$ . [8M]



- 6(a) Write MATLAB program to solve the following system of equations by finding inverse of the coefficient matrix  
 $x + y + z = 11$ ;  $2x - 6y - z = 0$ ;  $3x + 4y + 2z = 0$  [7M]
- (b) Using MATLAB commands write a program to solve  $\frac{dy}{dx} = x - y^2$  with initial condition  $y(0) = 0$  [8M]
- 7(a) If  $\tan(A + iB) = x + iy$  then prove that  $x^2 + y^2 + 2x \cot 2A = 1$  [7M]
- (b) Find Laurent's series expansion of  $\frac{1}{z^2 - 3z + 2}$  for the region  $1 < |z| < 2$  [8M]
- 8(a) Prove that  $\text{curl}(\text{grad} \phi) = \vec{0}$  and  $\text{div}(\text{curl} \vec{F}) = 0$ . [7M]
- (b) Write MATLAB program to solve the equation  $xe^x - 2 = 0$  by finding an initial value for the given equation. [8M]

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

B.Tech. (III Semester) Supplementary Examinations

**S144-BASIC ELECTRONIC DEVICES AND CIRCUITS**

(EEE)

Time : 3 hours

Max. Marks : 75

**PART-A**

(Compulsory question)

Q.No	Questions	Marks
1(a)	What is meant by drift current?	1M
(b)	Define efficiency of a Rectifier.	1M
(c)	What is avalanche multiplication?	1M
(d)	What is the Stability factor of a fixed bias transistor?	1M
(e)	What is an oscillator?	1M
(f)	What is Hall effect?	2M
(g)	Find the PIV of a half wave rectifier, if the DC voltage is 15V.	2M
(h)	How would you bias the two junctions of a Transistor to operate it in the active region?	2M
(i)	What is a sensistor and how it can be used for bias compensation?	2M
(j)	List the features of a CC amplifier.	2M

**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

2(a)	Define the terms depletion capacitance and diffusion capacitance. Distinguish depletion and diffusion capacitances.	7M
(b)	Derive the expressions for depletion capacitance and diffusion capacitance.	8M
3(a)	Derive an expression for regulation of a bridge rectifier in terms of diode resistance and load resistance.	8M
(b)	List out the advantages and disadvantages of bridge rectifier.	7M
4(a)	Explain the operation of n-p-n transistor with neat sketch.	8M
(b)	Summarize early effect and pinch-off voltage.	7M
5(a)	Describe briefly thermal runaway and thermal stability.	7M
(b)	Define stability factors $S$ , $S'$ and $S''$ .	8M
6(a)	Draw the circuit of Colpitts oscillator and describe the working of it.	7M
(b)	Derive the expressions for frequency of oscillations and condition for oscillations of colpitts oscillator.	8M
7(a)	Describe the two types of breakdown in transistor.	8M
(b)	Distinguish NPN and PNP transistor.	7M
8(a)	What is filter? What is the need for filters in power supplies? classify filters.	8M
(b)	Compare different types of filters.	7M



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

B.Tech. (III Semester) Supplementary Examinations

**S206-ELECTRIC AND MAGNETIC FIELDS**

(EEE & EIE)

Time : 3 hours

Max. Marks : 75

**PART-A**

(Compulsory question)

Q.No	Questions	Marks
1(a)	What are the equipotential surfaces?	1M
(b)	Define electric flux.	1M
(c)	What is the value of free space permeability?	1M
(d)	Define Lorentz law of force.	1M
(e)	Define time-varying field.	1M
(f)	Define Dipole.	2M
(g)	Write the expressions for Laplace's and Poisson's equations.	2M
(h)	State Biot-savart's Law.	2M
(i)	Write Neumann's formulae.	2M
(j)	Define Dynamic Induced EMF.	2M

**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

2(a)	Develop the Maxwell's first equation.	7M
(b)	Analyse the electric field of a spherical shell of radius R meters.	8M
3(a)	Define (i) permittivity (ii) relaxation time (iii) dielectric strength and (iv) Volume charge density.	7M
(b)	Develop the expression for Capacitance of a parallel plate capacitor.	8M
4(a)	Planes $z = 3$ and $z = 8$ carry current $K = -16 \mathbf{a}_x$ A/m and $K = 12 \mathbf{a}_x$ A/m, respectively. Determine H at (1, 3, -1).	7M
(b)	Derive an expression for Magnetic field intensity due to infinitely long straight conductor by using Ampere's circuital law.	8M
5(a)	Derive the formula for torque on a current loop placed in a uniform magnetic field.	7M
(b)	What is the maximum Torque on a square loop of 1000 turns in a field of uniform flux density 10 Tesla, if loop has a side of 10 cm and carries a current of 5A? Also calculate the magnetic moment of the loop.	8M
6(a)	Write the Maxwell's equations in differential and integral for harmonically time varying fields.	7M
(b)	For a lossy dielectric, $\sigma = 5$ S/m and $\epsilon_r = 1$ . The electric field intensity is $E = 40 \sin 10^4 t$ . Find $J_C$ , $J_D$ and frequency at which both have equal magnitudes.	8M
7(a)	Find the current passing through spherical shell of $r = 0.02$ m in spherical coordinate system, if $J = 10^4 \sin\theta \mathbf{a}_r$ A/m <sup>2</sup> .	7M
(b)	Explain the capacitance and derive its basic expression.	8M
8(a)	Derive the formula for torque on a current loop placed in a uniform magnetic field.	7M
(b)	A current distribution gives rise to the vector magnetic potential $A = x^2 y \mathbf{a}_x + y^2 x \mathbf{a}_y - x y z \mathbf{a}_z$ Wb/m. Calculate B at (-1, 2, 5).	8M



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

B.Tech. (III Semester) Supplementary Examinations

**S210-ELECTRICAL CIRCUITS-II**

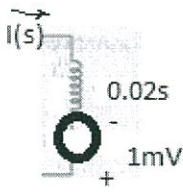
(EEE)

Time : 3 hours

Max. Marks : 75

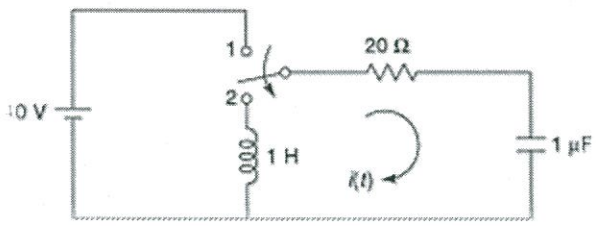
**PART-A**

(Compulsory question)

Q.No	Questions	Marks
1(a)	How power factor is measured using wattmeters, write the necessary expression used.?	1M
(b)	Define time constant of an R-C circuit.	1M
(c)	Define h-parameters: $h_{11}$ , $h_{22}$ , $h_{12}$ and $h_{21}$ .	1M
(d)	Define frequency spectrum.	1M
(e)	Name at least two applications of filters.	1M
(f)	Illustrate the Y-Y source/load configuration.	2M
(g)	A 2mH inductor with some initial current can be represented as shown in the figure below, where S is the Laplace transform variable. The value of initial current is .....	2M
		
(h)	Define Transfer impedance ratio.	2M
(i)	Define periodic function and list its properties.	2M
(j)	Differentiate between Foster and Cauer forms.	2M

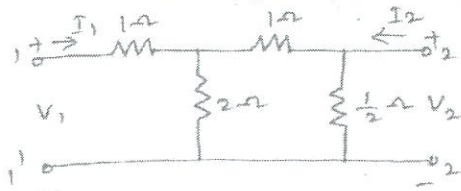
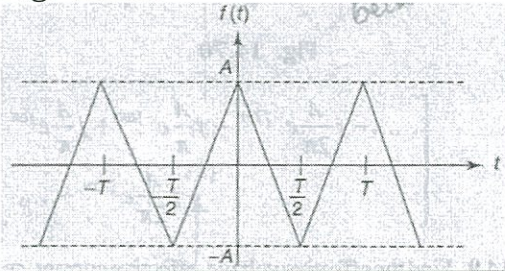
**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

2(a)	Define the following terms with reference to a 3-phase system phase sequence. (i) Positive phase sequence (ii) negative phase sequence (iii) balanced load.	8M
(b)	Two wattmeters are used to measure power input to a 1.5kV, 50 Hz, 3-phase motor running on full load at an efficiency of 85% . Their readings are 250kW and 80kW respectively. Calculate (i) input (ii) power factor (iii) line current and (iv) output.	7M
3(a)	In the network shown in Fig. below, the switch is changed from the position 1 to the position 2 at $t = 0$ , steady condition having reached before switching. Find the values of $i$ , $\frac{di}{dt}$ and $\frac{d^2i}{dt^2}$ at $t = 0^+$ .	7M
		



**S210-ELECTRICAL CIRCUITS-II**

(b)	Briefly describe: (i) Significance of initial conditions in a network (ii) What is the time constant for RL and RC circuit?	8M
4(a)	Express Z and Y parameters in terms of ABCD parameters.	7M
(b)	Calculate the <b>Z</b> parameters for the network shown in Fig. below. 	8M
5.	Determine the trigonometric Fourier series of the waveform shown in Fig. below. 	15M
6(a)	List the properties of Hurwitz polynomial.	7M
(b)	Test whether the polynomial $P(s) = s^3 + s^2 + 2s + 2$ is Hurwitz.	8M
7(a)	A balanced load of phase impedance $100 \Omega$ and power factor 0.8 is connected (i) in star, and (ii) in delta, to a 400 V, 3-phase supply. Calculate the power dissipation in each case.	7M
(b)	A three phase 4 wire, 230V ABC system supplies a delta connected load in which $Z_A = 10 \angle 10^\circ \text{ ohm}$ , $Z_B = 15 \angle 30^\circ \text{ ohm}$ , $Z_C = 10 \angle -30^\circ$ . Find the line current, the neutral current and load power.	8M
8.	A series RL circuit with $R = 10\Omega$ and $L = 5H$ contains a current $i(t) = 10 \sin (1000t) + 5 \sin (3000t) + 3 \sin (5000t)$ . Find the effective value of voltage and the average power.	15M

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LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING  
(AUTONOMOUS)

L.B.Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.::A.P  
B.Tech III Semester ~~Regular~~/Supplementary Examinations

**S216 - ELECTRICAL MACHINES – I**  
(EEE)

Time : 3 hours

Max.Marks : 75

30X

**PART - A**

( Answer all the questions )

(1M x 5 + 2M x 5 = 15M)

- 1 a. How hysteresis and eddy current losses are minimized? [1 M]
- b. How will you find the direction of emf using Fleming's right hand rule? [1 M]
- c. What is mean by leakage flux? [1 M]
- d. What is the angle by which no-load current will lag the ideal applied voltage? [1 M]
- e. How does change in frequency affects the operation of a given transformer? [1 M]
- f. Describe the lap winding? [2 M]
- g. What is the purpose of using 3 point starter? [2 M]
- h. What is statically induced emf? [2 M]
- i. What happens if DC supply is applied to the transformer? [2 M]
- j. Distinguish auto transformer with ordinary transformer? [2 M]

**PART - B**

( Answer any 4 questions )

(15M x 4 = 60M)

- 2 a. Illustrate the self excited dc machines? [8 M]
- b. A DC shunt generator supplies a load of 7.5KW and V=200V. Calculate the induced emf if armature resistance is 0.6 ohm and field resistance of 80 ohm. [7 M]
- 3 a. Illustrate the applications of dc machines? [7 M]
- b. A dc series motor operates at 800 rpm with a line current of 100A from 230V mains. Its armature and shunt field resistances are 0.15 ohm and 0.4 ohm. Find the speed at which the motor runs at a line current of 25A. Assuming flux at this current is 45% of flux at 100A. [8 M]
- 4 a. What are the properties of ideal transformers? Draw and explain the phasor diagram of ideal transformer under no load? [7 M]
- b. A 2200/250V transformer takes 0.5A at a power factor of 0.3 on open circuit. Find the magnetizing and working components of no load primary current and draw the corresponding phasor diagram. [8 M]



## S216 - ELECTRICAL MACHINES – I

- 5 a. Conduct open circuit test on single phase transformer and determine the core [7 M ] parameters?
- b. Discuss the necessary equations for determining efficiency and regulation of a [8 M ] transformer under short circuit test?
- 6 a. Examine the operation of off load tap changing of a transformer. [7 M ]
- b. The primary and secondary voltages of an auto transformer are 500V and 400V [8 M ] respectively. Show with the aid of a diagram, the current distribution in the winding. When the secondary current is 100A. Calculate the economy of copper in this particular case.
- 7 a. Describe the various flux control methods of dc series motor? [7 M ]
- b. A 230V DC shunt motor has an armature resistance of 0.5 ohm and field [8 M ] resistance of 115 ohm. At no load, the speed is 1200 rpm and the armature current is 2.5A. On the application of rated load, the speed drops to 1120 rpm. Determine the line current and power input, when the motor delivers at rated load.
8. A 100KVA, 3-phase, 50hz, 3300/400V, transformer is delta connected on the [15 M ] HV side and star connected on the LV side. The resistance HV winding is 3.5 ohm/phase and that of LV winding is 0.025 ohm/phase. Calculate the iron losses of the transformer at normal voltage and frequency if its full load efficiency be 95.8% at 0.8 power factor.

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

B.Tech. (III Semester) Supplementary Examinations

**S301-MEASUREMENT AND INSTRUMENTATION**

(EEE)

Time : 3 hours

Max. Marks : 75

**PART-A**

(Compulsory question)

Q.No	Questions	Marks
1(a)	The purpose of shunt used in milli ammeter is to perform.	1M
(b)	What are the types of DC bridges?	1M
(c)	The principle of Potentiometer is.	1M
(d)	In an Energy meter what type of Registering mechanism used.	1M
(e)	Give the principle of capacitive transducers.	1M
(f)	List out examples for the absolute instrument. Why did you use shunt in milli ammeter.	2M
(g)	How can you avoid the effect of stray magnetic field in AC bridges ? define a Volt box.	2M
(h)	Name the errors caused in Current transformer.	2M
(i)	How current coil is connected in Induction type energy meter?	2M
(j)	What is the function of Piezoelectric transducer?	2M

**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

2(a)	Explain the constructional details of PMMC instrument with neat sketch and discuss their advantages and disadvantages.	7M
(b)	How would you evaluate and compensate these errors in moving iron instruments (i) Hysteresis error (ii) Temperature error (iii) Errors due to stray magnetic fields.	8M
3(a)	List out the problems associated with measurement of low resistances. How are they overcome through use of Kelvin's double bridge?	8M
(b)	Derive the expression for the unknown resistance by using Kelvin's bridge.	7M
4(a)	Justify the Standardization procedure of DC Crompton's potentiometer.	8M
(b)	Create and mark the characteristics of potential transformers in detailed manner.	7M
5(a)	Describe with a neat sketch the working of single phase Energy meter. Discuss the friction compensation and creep prevention in an Energy meter.	7M
(b)	List the various types of errors occurring in an energy meter and also methods used for compensation the errors.	8M
6(a)	Describe the construction, principle of working of Hall effect transducers.	7M
(b)	Illustrate the applications of Hall effect transducers.	8M
7(a)	Explain the various methods of providing damping torque in an indicating instrument.	8M
(b)	Why scale of moving iron instrument is non-uniform while that of PMMC instrument is uniform?	7M
8(a)	Why is it preferable in bridge circuits that the equations of balance are independent of frequency? Explain.	7M
(b)	Deduce the equations for balance in the case of Maxwell's inductance capacitance bridge. Draw the phasor diagram.	8M

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

**S220-ELECTRICAL TECHNOLOGY**

(EIE)

Time : 3 hours

Max. Marks : 75

**PART-A**

(Compulsory question)

Q.No	Questions	Marks
1(a)	What is the significance of commutator in a DC Machine?	1M
(b)	What is the condition for maximum efficiency of transformer?	1M
(c)	What are the types of rotors used for an induction motor?	1M
(d)	What are the factors that affect the voltage regulation?	1M
(e)	Why we provide damping torque in instruments?	1M
(f)	What is the principle of operation of DC generator?	2M
(g)	What is the principle operation of transformer?	2M
(h)	On which principle does induction motor works.	2M
(i)	Write the principle of an alternator.	2M
(j)	Draw the diagram of eddy current damping.	2M

**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

2(a)	Analyze the working principle of DC generator.	7M
(b)	Derive the EMF equation of a DC generator.	8M
3(a)	Discuss briefly open circuit test on transformer.	7M
(b)	A 10KVA, 2000/400 single phase transformer has the following data: $R_1=5\Omega$ , $X_1=12\Omega$ , $R_2=0.2\Omega$ , $X_2=0.48\Omega$ . Determine the secondary terminal voltage at full load 0.8 P.f lagging when the primary supply voltage is 2000V.	8M
4(a)	With neat sketch explain the concept of double field revolving theory for single phase induction motors.	7M
(b)	Describe the principle of operation of a three phase induction motor.	8M
5(a)	Derive the EMF equation of Alternator.	7M
(b)	The armature of a 8 pole, 3-phase, 50Hz alternator has 18 slots and 10 conductors/slot. A flux of 0.04wb is entering the armature from pole. Calculate the EMF induced per phase assume $K_p=1$ and $K_d=1$ .	8M
6(a)	Discuss the classification of electrical instruments and principles of operation of electrical instruments.	7M
(b)	Explain the significance of controlling torque and damping torque relevant to the operation of indicating instruments.	8M
7(a)	Give different speed control methods in DC shunt motor and explain one method.	7M
(b)	What are the important characteristics of DC generator? Draw the characteristics of any one dc generator.	8M
8(a)	Deduce the expression for running torque and also derive the condition for maximum running torque in induction motor.	7M
(b)	A 6-pole alternator running at 1000 r.p.m. supplies an 8-pole induction motor. Find the actual speed of the motor if the slip is 2.5% and speed at slip is 3%.	8M

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

B.Tech. (III Semester) Supplementary Examinations

**S305-MECHANICS OF MATERIALS**

(ME)

Time : 3 hours

Max. Marks : 75

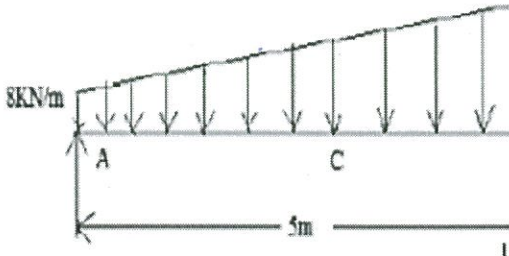
**PART-A**

(Compulsory question)

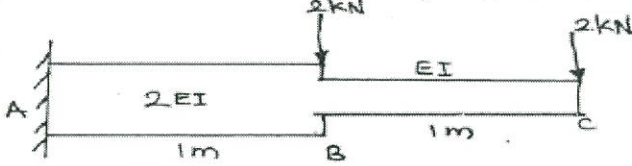
Q.No	Questions	Marks	CO	BL
1(a)	Define Hooke's law.	1M	CO1	L1
(b)	Define Point of contra flexure.	1M	CO2	L1
(c)	Write and Explain terms in the torsion equation.	1M	CO3	L1
(d)	Define polar section modules with formula.	1M	CO4	L1
(e)	Define thin cylinder.	1M	CO5	L1
(f)	Define Poisson's ratio.	2M	CO1	L1
(g)	How loads are classified and list types of loads?	2M	CO2	L1
(h)	Explain theory of simple bending.	2M	CO3	L1
(i)	What is the difference between normal stress and principal stress?	2M	CO4	L1
(j)	List the difference between Thin and Thick cylinders.	2M	CO5	L1

**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

2(a)	Derive the relation between E, K and Poisson's ratio.	7M	CO1	L1
(b)	A bar 30 mm in diameter and 200mm long was subjected to an axial pull of 60 kN. The extension of the bar was found to be 0.1 mm, while decrease in the diameter was found to be 0.004 mm. Find the Young's modulus, Poisson's ratio, rigidity modulus and bulk modulus of the material of the bar.	8M	CO1	L3
3(a)	<p>The intensity of loading on a simply supported beam of 5.0m span increases uniformly from 8KN/m at one end to 16KN/m at the other end as shown in Fig.1. Find the position and magnitude of the maximum bending moment. Also draw S.F.D and B.M.D</p> 	7M	CO2	L3
(b)	A cast iron beam has an I-section with top angle 100mm × 40mm, web 140mm × 20mm and bottom angle 180mm × 40mm. If tensile stress is not to exceed 35MPa and compressive stress 95MPa, what is the maximum uniformly distributed load the beam can carry over a simply supported span of 6.5m.	8M	CO2	L3



4(a)	A steel shaft ABCD having a total length of 2400 mm is contributed by three different sections as follows. The portion AB is hollow having outside and inside diameters 80 mm and 50 mm respectively, BC is solid and 80 mm diameter. CD is also solid and 70 mm diameter. If the angle of twist is same for each section, determine the length of each portion and the total angle of twist. Maximum permissible shear stress is 50 Mpa and shear modulus $0.82 \times 10^5 \text{ MPa}$ .	7M	CO3	L3
(b)	Write assumptions made in theory of pure torsion. Derive equation for torsion with usual notations.	8M	CO3	L2
5(a)	Determine the Principal Stresses (Two Dimensional) using Mohr's Circle using appropriate sketches.	7M	CO4	L2
(b)	Explain Shear stress distribution in beams of circular cross-section with a neat sketch.	8M	CO4	L2
6(a)	For the cantilever beam shown in Figure. Find the deflection and slope at the free end. $EI = 10000 \text{ kN/m}^2$ . 	7M	CO5	L3
(b)	A thin cylindrical shell 3 m long has 1m internal diameter and 15 mm metal thickness. Calculate the circumferential and longitudinal stresses induced and also the change in the dimensions of the shell, if it is subjected to an internal pressure of $1.5 \text{ N/mm}^2$ . Take $E = 2 \times 10^5 \text{ N/mm}^2$ and poisson's ratio $= 0.3$ . Also calculate change in volume.	8M	CO5	L3
7(a)	The stresses at a point in a component are 100 Mpa tensile and 50 Mpa compressive. Determine the magnitude of the normal and shear stresses on a plane inclined at an angle of $25^\circ$ with tensile stress. Also determine the direction of the resultant stress and the magnitude of the maximum intensity of shear stress.	7M	CO1	L3
(b)	A cantilever of length 2.0m carries a uniformly distributed load of $1.5 \text{ kN/m}$ run over the whole length and a point load of 2kN at a distance of 0.5m from the free end. Draw shear force and bending moment diagrams for the cantilever.	8M	CO2	L3
8(a)	A beam is simply supported at its ends over a span of 10 m and carries two concentrated loads of 100 kN and 60 kN at a distance of 2 m and 5 m respectively from the left support. Calculate (i) slope at the left support (ii) slope and deflection under the 100 kN load. Assume $EI = 36 \times 10^4 \text{ kN-m}^2$ .	7M	CO5	L3
(b)	A steel cylindrical shell 3 m long which is closed at its ends, had an internal diameter of 1.5 m and a wall thickness of 20 mm. Calculate the circumferential and longitudinal stress induced and also the change in dimensions of the shell if it is subjected to an internal pressure of $1.0 \text{ N/mm}^2$ . Assume the modulus of elasticity and Poisson's ratio for steel as $200 \text{ kN/mm}^2$ and 0.3 respectively.	8M	CO5	L3

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28 AUG 2021

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H.T.No

**LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING  
(AUTONOMOUS)**

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

B.Tech. (III Semester) Supplementary Examinations

**S309-METALLURGY AND MATERIAL SCIENCE**

(ME)

Time : 3 hours

Max. Marks : 75

**PART-A**

(Compulsory question)

Q.No	Questions	Marks
1(a)	What is the crystal structure of Zinc?	1M
(b)	Define toughness.	1M
(c)	Draw the structure of pearlite.	1M
(d)	What is isoforming?	1M
(e)	What is the purpose of matrix material?	1M
(f)	Define space lattice (or) crystal lattice.	2M
(g)	What is eutectic reaction?	2M
(h)	List out the types of steels with carbon %.	2M
(i)	What are the products you came to know from IT-diagram?	2M
(j)	What is role of tin in bronze?	2M

**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

2(a)	Illustrate the mechanism of crystallization process in pure metals.	7M
(b)	How are solid solutions classified? Give example for each.	8M
3(a)	How Equilibrium diagrams are constructed, Explain with an example?	8M
(b)	Define phase and Construct the phase diagram for two metals completely soluble in liquid state and partially insoluble in solid state.	7M
4(a)	Describe the structural changes during solidification of 0.45% carbon steel in Fe-Fe <sub>3</sub> C phase diagram.	8M
(b)	Differentiate between ledeburite and pearlite.	7M
5(a)	Differentiate hot working process with cold working process.	8M
(b)	With the help of Fe-Fe <sub>3</sub> C phase diagram explain the spheroid annealing processes.	7M
6(a)	Define the term composite. What are advanced composites? Give few examples.	8M
(b)	Explain in detail about the Metal matrix composite.	7M
7(a)	Explain the importance of Alloying element in metals with Examples.	8M
(b)	Yield strength of poly crystalline material increases from 90 MN/m <sup>2</sup> to 180 MN/m <sup>2</sup> on decreasing the grain diameter from 0.03 to 0.01 mm. Find the yield strength for a grain size of 0.0225mm.	7M
8(a)	Discuss the cooling process of 0.6% C steel from 1500°C to room temperature in Fe-Fe <sub>3</sub> C Equilibrium diagram.	8M
(b)	Differentiate white cast iron with Malleable cast iron.	7M

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