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MODEL QUESTION PAPERS

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

Model question paper-I

ELECTRICAL CIRCUIT ANALYSIS

II YEAR I SEMESER

Time: 3 hours **Max Marks: 70**

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

5*14=70M

SECTION-I

1. a) What are the initial conditions? Why are they needed? Explain [7M]

b) The switch in the below figure has been in position *a* for a long time, At t = 4 s the switch is moved to position *b* and left there. Determine $v(t)$ at t = 10 s. [7M]

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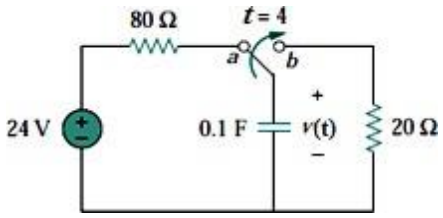
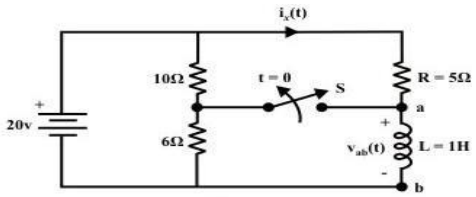
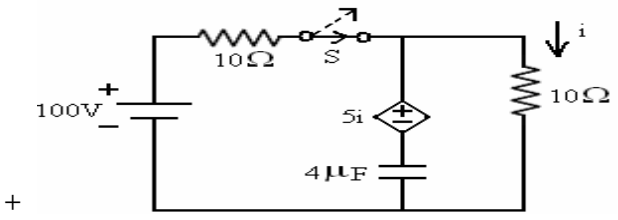


(OR)

2. a) . a) In the given circuit the switch is opened at t=0.Find (i) $V_{ab}(0-)$ (ii) $i_x(0-)$ (iii) $i_x(0+)$ (iv) $V_{ab}(0+)$ (v) $i_x(t=\infty)$ (vi) $i_x(t)$ for t>0. [7M]



b) For the circuit shown below Figure, find the current equation when switch S is opened at t = 0. [7M]



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SECTION-II

3. a) Explain about the transient response of series RL circuit to the AC excitation for zero initial conditions [7M]

b). Derive the expression for the current in a series RL circuit (R = 10Ω, L = 10mH) excited by a sinusoidal voltage of 100V, 50 Hz if the supply is connected at t = 0. Assume zero initial conditions. . [7M]

(OR)

4. a) Explain about the transient response of series RC circuit to the AC excitation for zero initial conditions. [7M]

b) Derive the expression for the current in a series RC circuit (R = 10Ω, C= 5μF) excited by a sinusoidal voltage of 230V, 50 Hz if the supply is connected at t = 0. Assume zero initial conditions. [7M]

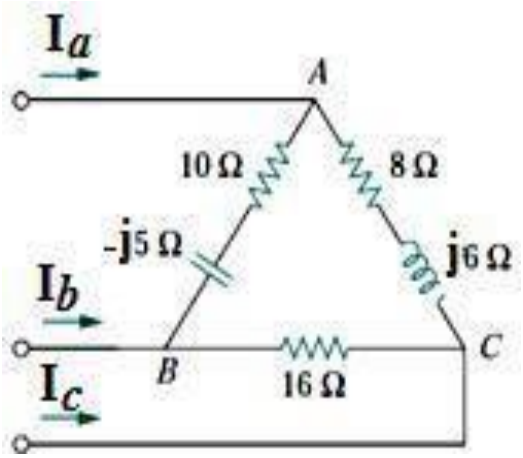
SECTION-III

5. a) A balanced delta-connected load has a phase current $I_{AC} = 10\angle -30^0$ A:
   i) Determine the three line currents assuming that the circuit operates in the positive phase sequence.
   ii) Calculate the load impedance if the line voltage is $V_{AB} = 110\angle 0^0$ V. [7M]

b) A balanced star-connected load absorbs a total power of 5 KW at a leading power factor of 0.6 when connected to a line voltage of 240 V. Find the impedance of each phase and total complex power of load. [7M]

(OR)

6. The unbalanced -load as shown in below figure is supplied by balanced voltages of 200V in the positive sequence. Find the line currents. Take **V***ab* as reference. [14M]



SECTION-IV

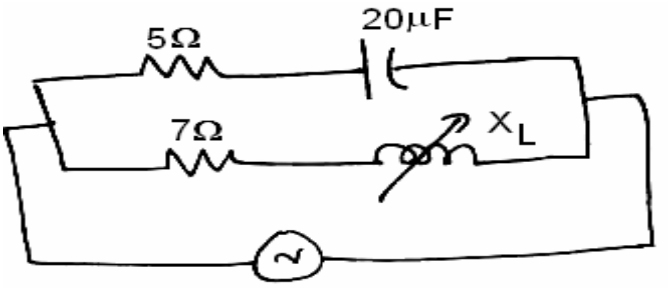
7. a) Explain the locus diagram of series R-L circuit when R is variable. [7M]

b) Explain the locus diagram of series R-C circuit and when C is variable. [7M]

(OR)

8.a) Derive expression for half power frequencies of a R L C series network. [7M]

b) Construct the admittance locus diagram and determine the variable inductance values so that the phase angle between the supply voltage and supply current is zero for the Fig.5. ω = 200 rad/s. [7M]



SECTION-V

9. a) Define driving point impedance. . [4M]

b) Comment on the time domain response of a second order system if the poles are equal negative real values. [5M]

c) What are the properties of transfer function? Explain. [5M]

(OR)

10) a) Derive the relation between ABCD and 'Z'-parameters. [7M]

b) A two port network has the following parameters: Z11 = 4 Ω, Z12 = 1 Ω, Z21 = 3 Ω and Z22 = 3 Ω. Calculate short circuit parameters. [7M]

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

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Model question paper-II

ELECTRICAL CIRCUIT ANALYSIS

II YEAR I SEMESER

Time: 3 hours **Max Marks: 70**

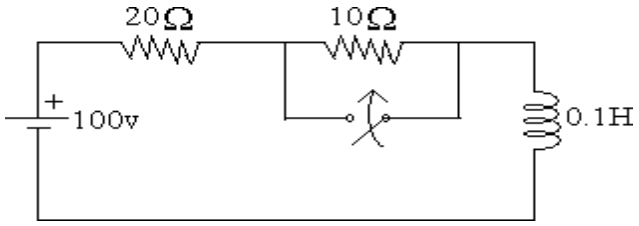
Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

5*14=70M

SECTION-I

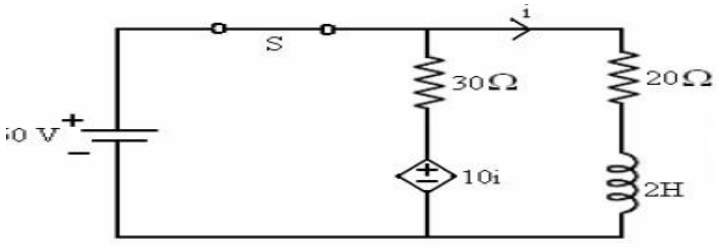
1.a) In a series RL circuit with R = 3 ohm and L = 1 H, a DC voltage of V = 50 V is applied at t = 0. Find the transient response of current and plot the response. [7M]

b) A dc voltage of 100V is applied in the circuit shown in figure below and the switch is kept open. The switch K is closed at t = 0. Find the complete expression for the current. [7M]



(OR)

2.a) For the below circuit (Fig. 1), find the current equation i(t), when the switch is opened at t = 0. [14M]



SECTION-II

3. a)Explain about the transient response of series RLC circuit to the AC excitation for zero initial conditions. [7M]

b) Derive the expression for the voltage across the inductor and capacitor in a series RLC circuit (R = 5Ω,L = 5mH, C = 5μF) excited by a sinusoidal voltage of 100V, 50 Hz if the supply is connected at t= 0. Assume zero initial conditions.. [7M]

(OR)

4.a) Explain about the transient response of parallel RL circuit to the AC excitation for zero initial conditions. [7M]

b) A parallel RL circuit is connected to an A.C voltage $v=100\sin(500t+30^0)$ at t=0.If R=5 ohms and L=0.01H,find the equation for the current. [7M]

SECTION-III

5. a) Explain the measurement of power in a balanced 3-phase system using a single watt meter. [7M]

b) What is the relationship between phase and neutral line currents in a three phase unbalanced system. [7M]

(OR)

6.a)Explain how to measure reactive power in a three phase balanced system.[7M]

b) A three phase three wire system has a balanced star connected load with a 60Ω resistance in each phase. The circuit is supplied with a balanced supply of 150V, 50 Hz. Determine the line current. [7M]

SECTION-IV

7. Show that the resonant frequency ω_0 of an RLC series circuit is the geometric mean of ω_1 and ω_2, the lower and upper half power frequencies respectively. [14M]

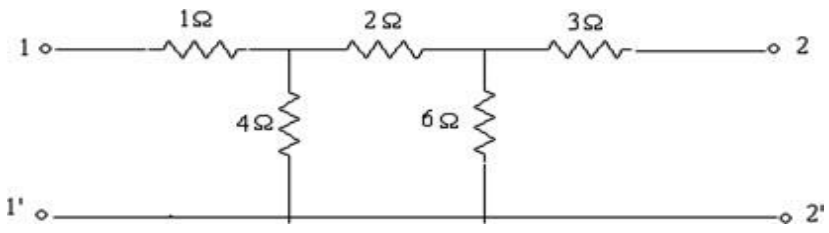
(OR)

8. A voltage $V = 50\angle 0^0$ V is applied to a series circuit consisting of fixed inductive reactance X_L = 5ohms and a variable resistance R. Sketch the admittance and current locus diagrams. [14M]

SECTION-V

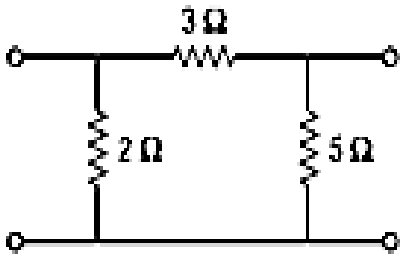
9. .a) Obtain the transmission line parameters when the two transmission networks having the transmission parameters A1, B1, C1, D1 and A2, B2, C2, D2 are connected in cascade.[7M]

b) Obtain 'Y' – parameters for the given network shown in below figure. [7M]



(OR)

10) Determine the *h* parameters for the circuit shown in below figure. [14M]



MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

Model question paper-III

ELECTRICAL CIRCUIT ANALYSIS

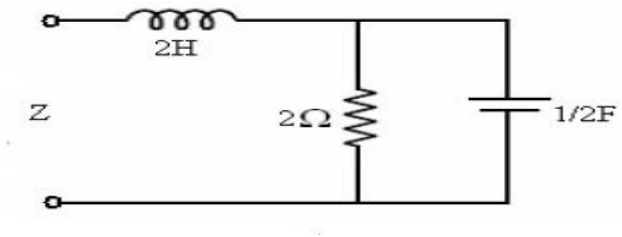
II YEAR I SEMESER

Time: 3 hours **Max Marks: 70**

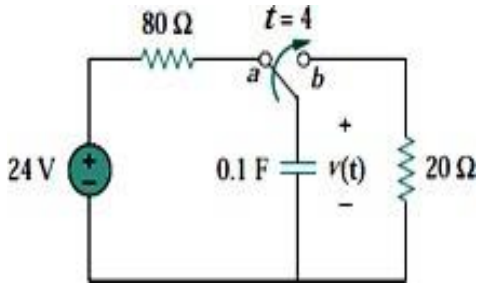
Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

SECTION-I **5*14=70M**

1.a) Transform the below circuit in to 'S' domain and determine the Laplace transform impedance. [7M]

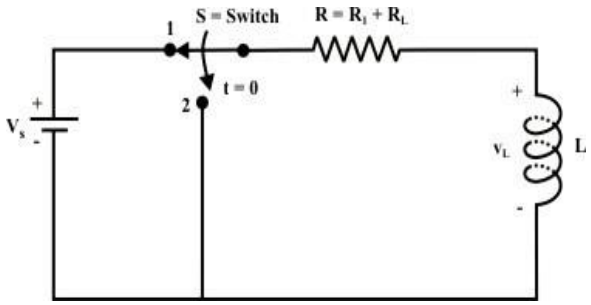


b)At t = 0, switch 1 in below figure is closed, and switch 2 is closed 4 s later. Find i(t) for t > 0. Calculate i for t = 2 s and t = 5 s. [7M]



(OR)

2. a) In the given circuit the switch is shifted from position 1 to 2 at t=0.Determine i(t) for t>0. .[7M]



b) What are the initial conditions? Why are they needed? Explain. [7M]

SECTION-II

3 a) Explain about the transient response of series RL circuit to the AC excitation for zero initial conditions. [7M]

b) Derive the expression for the current in a series RL circuit (R = 10Ω, L = 10mH) excited by a sinusoidal voltage of 100V, 50 Hz if the supply is connected at t = 0. Assume zero initial conditions. [7M]

(OR)

4. a) Explain about the transient response of series RC circuit to the AC excitation for zero initial conditions [7M]

b)Derive the expression for the current in a series RC circuit (R = 10Ω, C= 5μF) excited by a sinusoidal voltage of 230V, 50 Hz if the supply is connected at t = 0. Assume zero initial conditions. [7M]

SECTION-III

5. a) Explain the measurement of power in a balanced 3-phase system using a single watt meter. [7M]

b) Three coils each having a resistance of 50 Ω and an inductive reactance of 45 Ω are connected in star and fed by a 3-phase, 400 V, 50 Hz system. Find (i) Line current (ii) Power (iii) Power factor. [7M]

(OR)

6. a) Three impedances each of (10+j3) ohms are connected in star to a 220 V, 3-phase, 50 Hz supply. Calculate the line currents and power delivered to the load. [7M]

b) Derive the relation between phase and line values of a 3-phase balanced delta connected system. [7M]

SECTION-IV

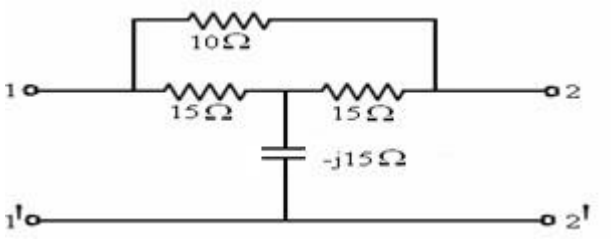
7. Explain the procedure to draw the locus diagram of R-L series circuit when L is varying. [14M]

(OR)

8. A series RLC circuit has to be designed so that it has a band width of 320 Hz and inductance of the coil is 0.2H. It is has to resonate at 350Hz, determine the resistance of coil and capacitance of condenser. If the applied voltage is 150V, determine the voltage across capacitor and coil. [14M]

SECTION-V

9. Determine the transmission parameter and hence determine the short circuit admittance parameters for the below circuit. [14M]



(OR)

10. Explain about the ABCD –parameters and derive the condition for symmetry and reciprocity. [14M]

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

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Model question paper-IV

ELECTRICAL CIRCUIT ANALYSIS

II YEAR I SEMESER

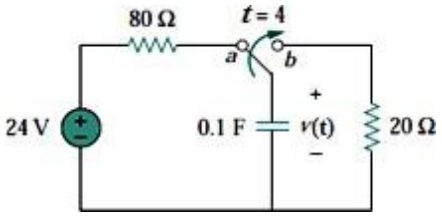
Time: 3 hours **Max Marks: 70**

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

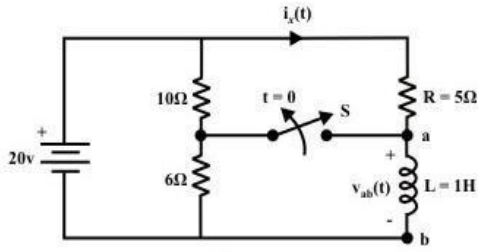
5*14=70

SECTION-I

1. a) The switch in the below figure has been in position *a* for a long time, At t = 4 s the switch is moved to position *b* and left there. Determine *v(t)* at t = 10 s. [7M]

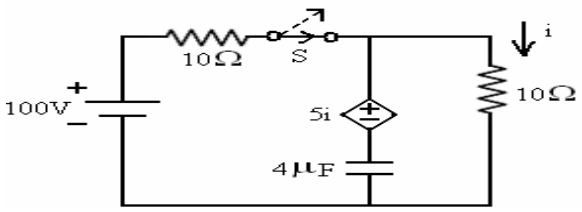


b) In the given circuit the switch is opened at t=0.Find (i) $V_{ab}(0-)$ (ii) $i_x(0-)$ (iii) $i_x(0+)$ (iv) $V_{ab}(0+)$ (v) $i_x(t=\infty)$ (vi) $i_x(t)$ for t>0. [7M]



(OR)

2. a) For the circuit shown below Figure, find the current equation when switch S is opened at t = 0. [7M]



b) In a series RL circuit with R = 3 ohm and L = 1 H, a DC voltage of V = 50 V is applied at t = 0. Find the transient response of current and plot the response. [7M]

SECTION-II

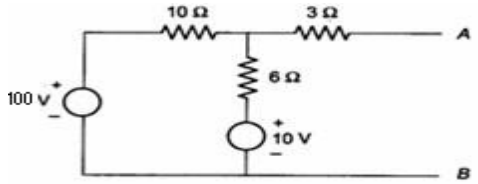
3 .a) Explain about the transient response of series RLC circuit to the AC excitation for zero initial conditions. [7M]

b) Derive the expression for the voltage across the inductor and capacitor in a series RLC circuit (R = 5Ω,L = 5mH, C = 5μF) excited by a sinusoidal voltage of 100V, 50 Hz if the supply is connected at t= 0. Assume zero initial conditions. [7M**]**

(OR)

4. a) Explain about the transient response of parallel RL circuit to the AC excitation for zero initial conditions. [7M]

b) A parallel RL circuit is connected to an A.C voltage $v=100\sin(500t+30^0)$ at t=0.If R=5 ohms and L=0.01H,find the equation for the current. [7M]



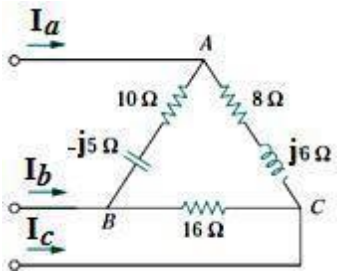
SECTION-III

5. a) A balanced delta-connected load has a phase current $I_{AC}= 10\angle -30^0$ A:
i) Determine the three line currents assuming that the circuit operates in the positive phase sequence.
ii) Calculate the load impedance if the line voltage is $V_{AB}= 110\angle 0^0$ V. [7M]

b)A balanced star-connected load absorbs a total power of 5 KW at a leading power factor of 0.6when connected to a line voltage of 240 V. Find the impedance of each phase and total complex power of load. [7M]

(OR)

6. a) The unbalanced -load as shown in below figure is supplied by balanced voltages of 200V in the positive sequence. Find the line currents. Take **V***ab* as reference. [7M]



b) Prove that two watt-meters are sufficient to measure power in three phase system. [7M]

SECTION-IV

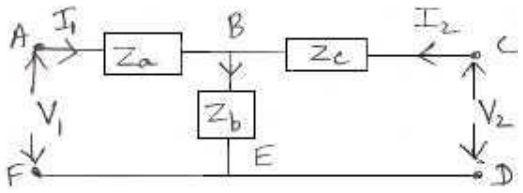
7. Explain about the series resonance and derive the expression for resonant frequency. [14M]

(OR)

8. Define the bandwidth and derive the expressions for bandwidth of series resonating circuit and its relation with Q-factor. [14M]

SECTION-V

9. a) Find the Z parameters and Y parameters of the T- network shown in figure below. [7M]



b) Define driving point impedance. [7M]

(OR)

10) Comment on the time domain response of a second order system if the poles are equal negative real values. [14M]

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

UG Model question paper-I

ELECTROMAGNETIC FIELDS

II YEAR I SEMESER

EEE

Time: 3 hours **Max Marks: 70**

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

SECTION-I **5*14=70M**

1.a) Derive the expression for electric field intensity due to line charge.

b) Four concentrated charges $Q_1 = 0.3\ \mu C$, $Q_2 = 0.2\ \mu C$, $Q_3 = -0.3\ \mu C$, $Q_4 = 0.2\ \mu C$ are located at the vertices of a plane rectangle. The length of rectangle is 5 cm and breadth of the rectangle is 2 cm. Find the magnitude and direction of resultant force on Q_1. [7+7]

(OR)

2.a) Explain the Laplace and Poisson's equations for electrostatic fields.

b) Using Gauss law, derive an expression for electric field intensity at any point inside and outside of a sphere of radius 'a' due to a uniform spherical charge distribution of volume charge density of 'ρ'. [7+7]

SECTION-II

3.a) Derive the expression for energy stored and energy density in static electric field.

b) A parallel plate capacitor consists of two square metal plates of side 500 mm and separated by a 10 mm slab of Teflon with $\epsilon_r = 2$ and 6 mm thickness is placed on the lower plate leaving an air gap of 4mm thick between it and upper plate. If 100 V is applied across the capacitor, find D, in Teflon and air. [7+7]

OR

4.a) State and prove the conditions on the tangential and normal components of electric flux density and electric field intensity, at the boundary between the dielectrics.

b) A square parallel plate capacitor 200 mm on side with a plate spacing of 25 mm is filled with a dielectric slap (ε_r =240 of the same dimensions if 100 V is applied to the capacitor) Find: (i) the polarization P in the dielectric and (ii) the energy stored by the capacitor.

[7+7]

SECTION-III

5.a) State Biot-Savart's law for magnetic field B due to a steady line current in free space.

b) Derive an expression for magnetic field intensity due to infinite sheet of current. [7+7]

OR

6.a) A steady current of 10 A is established in a long straight hollow aluminum conductor having inner and outer radius of 1.5 cm and 3 cm respectively. Find the value of B as function of radius

b) Derive an expression for the magnetic field strength at the center of a square loop of side 'a' meters and N turns. [7+7

SECTION-IV

7.a) Derive point form of Ampere's circuital law.

b) Two infinitely long parallel conductors are separated by a distance '*d*'. Find the force per unit length exerted by one of the conductor on the other if the currents in the two conductors are I_1 and I_2. [7+7]

OR

8.a) Derive the expression for inductance of a solenoid.

b) A single-phase circuit comprises two parallel conductors A and B, each 1 cm diameter and spaced 1 meter apart. The conductors carry currents of +100 and -100 amperes respectively. Determine the magnetic field intensity at the surface of each conductor and also exactly midway between A and B. [7+7]

SECTION-V

9.a) A conductor with cross sectional area of 10 cm^2 carries a conduction current of $0.2 \sin(109t)$ mA. Given that $\sigma = 2.5 \times 10^6$ S/m and $\varepsilon_r = 6$, calculate the magnitude of the displacement current density.

b) Derive the Maxwell's equations in point and integral form for time varying fields. [7+7]

OR

10.a) Explain the concept of displacement current and obtain an expression for the displacement current density.

b) Derive Maxwell's fourth equation, $\nabla \times E = -\frac{\partial B}{\partial t}$. [7+7]

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

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UG Model question paper-II

ELECTROMAGNETIC FIELDS

II YEAR I SEMESER

EEE

Time: 3 hours **Max Marks:70**

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

5*14=70M

SECTION-I

1.a) Three equal positive charges of 4×10^{-9} coulomb each are located at three corners of a square, side 20cm. determine the electric field intensity at the vacant corner point of the square.

b) State and explain Maxwell's first law. [7+7]

OR

2.a) What is an electric dipole? Obtain expression for torque experienced by an electric dipole in a uniform electric field.

b) Derive the expression for Potential gradient. [7+7]

SECTION-II

3.a) Derive the expression for the energy stored in the charged condenser.

b) The capacitance of a parallel plate condenser is 0.2μF. Potential difference between the plates is 2V. Calculate the energy stored by the charged condenser. [7+7]

OR

4.a) Differentiate static electric and magnetic fields.

b) Derive Equation of continuity. What is its significance? [7+7]

SECTION-III

5.a) Find the Magnetic Field Intensity due to a straight current carrying filament.

b) Find the magnetic field intensity at the centre O of a square loop of sides equal to 5M and carrying 10A of current. [7+7]

OR

6.a) State Ampere's circuital law and prove the same.

b) In the region 0 < r < 0.5m, in cylindrical co-ordinates, the current density is $J = 4.5e^{-2r}\hat{a}_z\left(A/m^2\right)$ and J = 0 elsewhere. Use Amperes law to find H [7+7]

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SECTION-IV

7.a) Derive an expression for magnetic field strength H, due to a current carrying conductor of finite length placed along the y-axis, at a point P in x-z plane and r distant from the origin.

b) What is scalar magnetic potential? Give its limitations. [7+7]

OR

8.a) A toroid with cross section of radius 2cm has a silicon steel core of mean length 28cm and an air gap of length 1mm. Assume the air-gap area is 10% greater than the adjacent core and find the mmf required to establish an air-gap flux of 1.5 mwb.

b) Explain the concept self and mutual inductances. [7+7]

SECTION-V

9. Write Maxwell's equation for static fields. Explain how they are modified for time varying electric and magnetic fields. [14]

OR

10.a) Generalize Ampere's law for time varying fields.

b) In a material for which $\sigma = 5.0$ s/m and $\in r = 1$, the electric field intensity is E = 250 Sin1010t (V/m). Find the conduction and displacement current densities and the frequency at which they have equal magnitudes. [7+7]

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UG Model question paper-III

ELECTROMAGNETIC FIELDS

II YEAR I SEMESER

EEE

Time: 3 hours **Max Marks: 70**

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

5*14=70M

SECTION-I

1.a) Determine the potential a (0,0,4) m caused by a total charge 10^{-8} C distributed uniformly along a disc of radius 4m lying in the z=0 plane and centered at origin.

b) Define work done and electric potential. Show that the electric field intensity is negative gradient of potential. [7+7]

OR

2.a) Find the value of electric field intensity at any point along the axis of a uniformly charged disc.

b) State Gauss law and mention few applications of it. [7+7]

SECTION-II

3.a) What is an electric dipole and dipole moment? Derive an expression for torque experienced by an electric dipole.

b) A parallel plate capacitor has conducting plates of area equal to $0.04m^2$. The plates are separated by a dielectric material whose $\epsilon_r = 2$ with the plate separation of 1cm. Find its capacitance value. [7+7]

OR

4.a) Derive the boundary conditions of two dielectric media.

b) Explain about equation of continuity in electrostatic fields. [7+7]

SECTION-III

5.a) Using ampere's circuital law, find MFI due to an infinite sheet of current.

b) What is the magnetic field, H in Cartesian coordinates due to z- directed current element? Find **J** if I=2A.

OR

6.a) What is meant by Curl? Give its significance.

b)A steady current of I amperes flow in a circular bent in the form of square loop of side 'a'. Find the MFI (H) at the center of the loop.

[7+7]

SECTION-IV

8.a) Find the force between two straight long and parallel current carrying conductors in the same and opposite directions.

b) Explain the concept of scalar and vector magnetic potentials. [7+7]

OR

9.a) Find the inductance of Solenoid.

b) Derive the expression for energy stored and energy density in a magnetic field. [7+7].

SECTION-V

10. Write Maxwell's equations in point form and explain physical significance of the equations. [14]

OR

11.a) State and explain the Faraday's laws in electromagnetic induction.

b)Explain statically and dynamically induced e.m.fs. . [7+7]

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

UG Model question paper-IV

ELECTROMAGNETIC FIELDS

II YEAR I SEMESER

EEE

Time: 3 hours **Max Marks: 70**

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

5*14=70M

SECTION-I

1.a) If V=2x2y+20z-(4/(x2+y2)) Volts, Find ***E*** and ***D*** at P (6,-2.5,3)

b) Derive Laplace and Poisson equation. [7+7]

OR

2.a) A circular disc of radius 'a' m is charged uniformly with a charge density of σ c/ m^2. Find the electric field at a point 'h' m from the disc along its axis.

b) What is an electric dipole? Obtain expression for torque experienced by an electric dipole in a uniform electric field. [7+7]

SECTION-II

3.a) Show the expression of the capacitance for a spherical capacitor consists of 2 concentric spheres of radius 'a'&'b' also obtain the capacitance for an isolated sphere.

b) Find the capacitance of a conducting sphere of 2 cm in diameter, covered with a layer of polyethelene with $\in r$ = 2.26 and 3 cm thick. [7+7]

OR

4.a) Derive an expression for capacitance of co-axial cable.

b) In a material for which σ = 5.0 s/m and $\in$ r = 1, the electric field intensity is E = 250 Sin1010t (V/m). Find the conduction and displacement current densities.

[7+7]

SECTION-III

5.a) Using Biot-Savart's law, find the magnetic field intensity on the axis of a circular loop with radius R and carrying a steady current I.

b) Find the magnetic field intensity at the centre of square loop of side 5m carrying 10A of current. [7+7]

OR

6.a) State Ampere's circuital law and explain any two applications of Ampere's circuital law.

b) Derive the equation to show that curl of magnetic field intensity in equal to current density. [7+7]

SECTION-IV

7.a) Show that the force between two parallel conductors carrying current in the same direction is attractive.

b) A magnetic field, $B = 3.5 \times 10^{-2}$along the x-axis. If the conductor current is 5 A in the -A_x direction, what force must be applied to hold the conductor in position. [7+7]

OR

8.a) Derive the expression for self inductance of a coaxial cable of inner radius 'a' and outer radius 'b'.

b) Determine the inductance of a solenoid of 2500 turns wound uniformly over a length of 0.25m on a cylindrical paper tube, 4 cm in diameter and the medium is air. [7+7]

SECTION-V

9.a) Write Maxwell's equations in integral form for time varying Fields.

b) Generalize Ampere's law for time varying fields. [7+7]

OR

10.a) State and explain Faraday's laws of electromagnetic induction.

b) In a material for which $\sigma = 5.0$ s/m and $\in r = 1$, the electric field intensity is E = 250 Sin1010t (V/m). Find the conduction and displacement current densities, and the frequency at which they have equal magnitudes. [7+7]

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

UG Model question paper-I

ELECTRICAL MACHINES-I

II YEAR ISEMESER

EEE

Time: 3hours Max Marks: 70M

Note: This question of 5 sections. Answer five questions, choosing one question from each section and each question paper contains carries 14 marks.

Section-I

1 a) Explain in detail about Faraday's law of electromagnetic induction [7M]

b) Explain with neat diagram Statically Induced EMF and Dynamically Induced EMF with one application of each. [7M]

OR

2a Derive the relation between self inductance, mutual inductance and coefficient of coupling. [7M]

b) Two coupled coils of L1 = 0.8 H and L2 = 0.2 H have a coupling coefficient k = 0.9. Find the mutual inductance M. [7M]

Section-II

3 a) Explain the basic principle of operation of a D.C. generator [7M]

b) With neat diagram give the constructional features of D.C. machine. [7M]

OR

4a) Describe the constructional details of the armature of a D.C. machine giving suitable diagrams. [7M]

b) Give the materials and functions of the following parts of a D.C. machine. (i) Field poles, (ii) Yoke, (iii) Commutator, (iv) Commutating poles and (v) Armature. [7M]

Section-III

5a) Draw the schematic diagram of separately excited D.C. generator. Also write the current and voltage equations. [7M]

b) Draw the schematic diagram of D.C. series generator. Also write the current and voltage equation. [7M]

OR

6a) In a 110 V D.C. compound generator, the resistance of the armature, shunt field and series field are 0.06 Ω, 25 Ω and 0.04 Ω respectively. The load consists of 200 lamps each rated at 55 W, 110V. Find the total e.m.f. generated and the armature current when the machine is connected in, (a) Long shunt and (b) Short shunt. [7M]

b) Draw the schematic diagram of D.C. short shunt generator and also write the current and voltage equation. [7M]

Section-IV

7a) Write the principle of working of D.C. motor [7M]
b) A 250 V D.C. motor takes 41 amp at full load. Its armature and shunt field resistance are 0.1 Ω and 250 Ω. Find back emf. on full load. [7M]

OR

8 a) Draw the schematic diagram of D.C. series motor. Also write the back emf. Current and voltage equations. [7M]
b) A D.C. series motor working on 200 V supply draws a current of 50 A, its armature and series field resistance are 0.03 Ω and 0.02 Ω respectively. Calculate back emf. [7M]

Section-V

9 a) List the different methods of speed control of D.C. shunt motor. [7M]
b) In a Hopkinson's test on 220 V, 100 kW generators the circulating current is equal to the full load current and in addition, 90 A are taken from the supply. Obtain the efficiency of each machine. [7M]

OR

10 a) what is Swinburne's test? List the advantages and the disadvantages of Swinburne's test Conducted on D.C. motor. [7M]

b) Write about Hopkinson's test and give its limitations. What are the advantages of Hopkinson's test?

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

UG Model question paper-I

ELECTRICAL MACHINES-I

II YEAR ISEMESER

EEE

Time: 3hours Max Marks: 70M

Note: This question of 5 sections. Answer five questions, choosing one question from each section and each question paper contains carries 14 marks.

Section-I

1) A) When two coils are connected in series, their effective inductance is found to be 10H .When the connections of one coil are reversed , the effective inductance is 6H.If the coefficient of coupling is 0.6, calculate the self inductance of each coil and the mutual inductance. [7M]

B) Two coupled coils of L1 = 0.8 H and L2 = 0.2 H have a coupling coefficient k = 0.9. Find the mutual inductance M. [7M]

OR

2 a) Coil 1 of a pair of coupled coils has a continuous current of 5 A, and the corresponding 1 2 are 0.2 and 0.4 mWb respectively. If the turns are N1φ1 1 and φfluxes =500 and N2 =1500, find L1 ,L2 , M and k. [7M]

b) Write short notes on dot convention used in magnetically coupled coils. [7M]

Section-II

3 a) Derive the EMF equation of a D.C. generator. [7M]

b) An 8-pole D.C. generator has per pole flux of 40 m wb and winding is connected in lap with 960 conductors. Calculate the generated e.m.f. on open circuit when it runs at 400 r.p.m. If the armature if wave wound at what speed must the machine be driven to generate the same voltage. [7M]

OR

4a) the armature of a 6-pole generator has a wave winding containing 664 conductors. Calculate the generated emf. when flux per pole is 60 m wb and the speed is 250 r.p.m. Find the speed at which the armature must be driven to generate an emf. of 550 V if the flux per pole is reduced to 58 m wb. [7M]

b) Derive the expression for calculating the demagnetizing and cross magnetizing ampere turns per pole in a D.C. generator with usual notation. [7M]

Section-III

5a) Draw the external and internal characteristics of a separately excited D.C. generator. [7M]

b) What is critical speed? Explain the significance of critical speed [7M]

OR

6) In a 110 V compound generator, the resistance of the armature, shunt and series windings are 0.06, 25 and 0.04 Ω respectively. The load consists of 200 lamps each rated at 55 W, 110 V. Find the emf. generated and armature current when the machine is connected, (a) Long shunt, (b) Short shunt and (c) How will the ampere-turns of series winding be changed if in, (i) A diverter of resistance Ω be connected in parallel with the series winding? Ignore armature reaction and brush contact drop. (14M)

Section-IV

7a) In a 4-pole lap wound D.C. compound motor develops back emf. of 200 V. The field produces a flux of 0.025 wb and the armature contains 400 conductors. Calculate the speed developed.
b) Why is starter necessary for D.C. motor? [7M]

OR

8)A 4-pole, 500 V, shunt motor has a total of 720 armature conductors which are wave wound. The full-load armature current is 60 A, and the flux per pole is 0.03 m wb. The armature resistance is Ω. The voltage drop across a brush is 1 volt. Calculate the full-load speed of the motor. (14M)

Section-V

9 a) What are the different methods of speed control of a D.C. motor? Explain.? (7M)
b) Explain with neat diagram, how can you find efficiency of small D.C. motor with brake test.(7M)

OR

10) Describe a method of determining the efficiency of D.C. shunt motor at various loads, without actually putting the load on the motor. State the assumptions made in the method described. (14M)

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

UG Model question paper-I

ELECTRICAL MACHINES-I

II YEAR ISEMESER

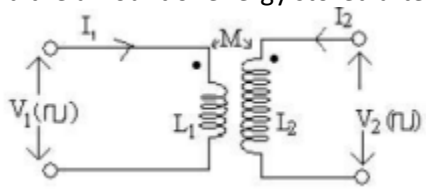
EEE

Time: 3hours Max Marks: 70M

Note: This question of 5 sections. Answer five questions, choosing one question from each section and each question paper contains carries 14 marks.

Section-I

1a) In the network shown in figure, L1 =1H, L2 =2H, M=1.2H. Assuming the inductance coils to be ideal, find the amount of energy stored after 0.1 see of the circuit connected to a d.c.source of 10V.



[7M]

b Coil 1 of a pair of coupled coils has a continuous current of 5 A, and the corresponding 1 2 are 0.2 and 0.4 mWb respectively. If the turns are N1φ1 1 and φfluxes =500 and N2 =1500, find L1 ,L2 , M and k.

OR

2a) Derive the relation between self inductance, mutual inductance and coefficient of coupling.

b) 1. i. Define the following: a. Self inductance b. Mutual Inductance c. Static Induced e.m.f d.. Dynamically induced e.m.f [7M]

Section-II

3 a) What is armature reaction? Describe the effects of armature reaction on the operation of a D.C. machine. How the armature reaction is minimized. [7M]

b) The armature of a 2-pole, 200 V generator has 400 conductors and runs at 300 r.p.m. Calculate the useful flux per pole. If the number of turns in each field coil is1200, what is the average value of the e.m.f. induced in each coil on breaking the field, if the flux dies away completely in 0.1 (Ø = 0.1 wb E_{ave} = 1200). [7M]

OR

4 a) A 4-pole lap connected D.C. generator having 50 slots on its armature with 6 conductors per slot, the flux per pole 30 m wb and generates an open circuit voltage of 180 V (i) Find the speed at which the motor will run for the above condition, (ii) Keeping the speed constant, suggest a changein the armature of the generator such that the generator is capable to generate at no load a voltage of 90 V, with the same rated flux. [7M]

b) What is the fundamental difference between a simple lap winding and a simplex wave winding? Draw simple diagrams to show the above windings**.** [7M]

Section-III

5 a) What are the requirements of voltage build up in self-excited D.C Generator. [7M]
b) Draw the load characteristics of shunt, series and compound generators. Describe these characteristics nature and applications. [7M]

OR

6 a) Mention the reasons for the compounding D.C. generator. Neatly sketch and explain the external characteristics of a D.C. compound generator. [7M]

b) Distinguish between internal and external characteristic of a D.C. generator. How can the internal characteristic be derived from the external characteristic of a separately excited generator. [7M]

Section-IV

7 a) Explain the principle of operation of a D.C. motor. Derive the equation for the torque developed by a D.C. motor. [7M]
b) A 12-pole lap connected 230 V shunt motor has 410 conductors. It takes 41 A on full-load. The flux per pole is 0.05 wb. The armature and field resistances are 0.1 Ω and 230 Ω respectively. Contact drop per brush is 1 V. Determine the speed of motor at full load Why is starter necessary for D.C. motor. [7M]

OR

8 a) Why the e.m.f. induced in D.C. motor is called as back e.m.f. and then explains principle of operation of D.C. motor. [7M]

b) Define Torque. Derive the expression for torque developed by a D.C. motor from fundamentals. [7M]

Section-V

9 a) How can you conduct the retardation test on D.C. shunt motors. [7M]
b) Describe any one laboratory test procedure to separate the losses in a D.C. machine. [7M]

OR

10 a) Explain how rotational losses can be estimated using retardation test. [7M]
b) What are the various methods of speed control of D.C. series motors. [7M]

R18

MALLAREDDY COLLEGE OF ENGINEERING AND TECHNOLOGY, HYDERABAD

B.Tech II Year I Semester Examinations, Model Paper I -2019

ANALOG ELECTRONICS

Time: 3 hours **Max. Marks: 70**

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

SECTION-I

1a. Draw the V-I characteristics of a diode with zero cut-in voltage and equivalent resistance of 100Ω. Draw the load line if RL is also 100 Ω. [7]

1b. Explain V-I characteristics of pn junction Diode. [7]

(OR)

2a. Draw and explain the circuit diagram of full-wave rectifier with capacitor filter. Derive the Ripple factor equation. [7]

2b. Derive expressions for ripple factor, regulation and rectification efficiency of a Center tapped Transformer Full wave rectifier. [7]

SECTION-II

3. Draw a Self bias circuit and explain its operation. Calculate the Stability factor S [14]

(OR)

4. what is a load line? Explain its significance. [7]
Find the Q-point of self-bias transistor circuit with the following specifications: V_{CC} = 22.5V, R_L = 5.6kΩ, R_C = 1kΩ, R_I = 90kΩ, R_2 = 10kΩ, V_{BE} = 0.7V and β = 55. Assume $I_B >> I_{CO}$ [7]

SECTION-III

5a. Compare the three transistor amplifier configurations with related to A_i, Av, Ri & R_o

5b. For the emitter follower with Rs = 0.5K, R_L = 50K, h_{fe}= -50, h_{ie}= 1K, h_{oe} = 25μA/V, $h_{re}=2.5x10^{-4}$ Calculate A_i, Av, Ri & R_o

(OR)

6. Explain thermal runway and thermal stability [14]

SECTION-IV

7. Explain the construction and principle of operation of Depletion type N-Channel MOSFET [14]

(OR)

8. With the help of neat sketches and characteristic curves explain the construction & operation of a JFET and mark the regions of operation on the characteristics [14]

SECTION-IV

9a.	Explain principal operation of Tunnel diode.	[7]
9b.	Draw and Explain FET common source amplifier	[7]
	(OR)	
10a.	Explain the working of S.C.R	[7]
10b.	Explain working of photo diode	[7]

R18

MALLAREDDY COLLEGE OF ENGINEERING AND TECHNOLOGY, HYDERABAD

B.Tech II Year I Semester Examinations, Model Paper II -2019

ANALOG ELECTRONICS

Time: 3 hours **Max. Marks: 70**

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

SECTION-I

1a. Derive the equation for diffusion capacitance of a PN junction diode. [7]

1b. Explain different breakdown mechanisms in PN junction diode . [7]

(OR)

2a. A Full wave single phase rectifier makes use of 2 diodes, the internal forward resistance of each is considered to be constant and equal to 30Ω. The load resistance is 1KΩ. The transformer secondary voltage is 200-0-200V (rms).Calculate VDC, IDC, Ripple factor [7]

2b. Derive expression for FWR Rectifier i) DC load current ii) DC output voltage iii) Peak Inverse Voltage of each diode IV) Efficiency v) Ripple factor [7]

SECTION-II

3a. Draw the circuit diagram of a transistor in CE configuration and explain the output characteristics with the help of different regions. [7]

3b. Explain compensation techniques [7]

(OR)

4. Draw a collector to base bias circuit and explain its operation. Calculate the Stability factor S, S', S'' [14]

SECTION-III

5. Compare the three transistor amplifier configurations with related to A_I, A , R & Ro [14]

(OR)

6. Explain thermal runway and thermal stability [14]

SECTION-IV

7a. The field effect transistor is called a voltage-sensitive electronic control device. Explain [7]

7b. Explain V-I characteristics of JFET [7]

(OR)

8a. Explain the construction and principle of operation of Enhancement mode N-channel MOSFET. [7]

8b. Compare BJT & FET [7]

SECTION-V

9a.	Draw and Explain FET Common source Amplifier	[7]
9b.	Explain working principal of PHOTO DIODE	[7]
	(OR)	
10.	Explain the working of Tunnel diode with help of energy band diagrams and Draw V-I Characteristics	[14]

R18

MALLAREDDY COLLEGE OF ENGINEERING AND TECHNOLOGY, HYDERABAD

B.Tech II Year I Semester Examinations, Model Paper III -2019

ANALOG ELECTRONICS

Time: 3 hours **Max. Marks: 70**

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

SECTION-I

1a. Explain in detail, the reason for exponential rise in forward characteristic of a diode with suitable mathematical expression. [7]

1b. Explain and Derive expression for transition capacitance? [7]

(OR)

2a. Explain Full wave bridge rectifier with neat diagram? [7]

2b. Compare Half wave Full wave and bridge rectifier [7]

SECTION-II

3a. Draw and explain input-output characteristics of of CB configuration [7]

3b. Explain early effect and punch through effect [7]

(OR)

4a. Draw and explain fixed bias circuit, derive the stability factors S [7]

4b. Write a short notes on compensation techniques [7]

SECTION-III

5a. Explain thermal runaway and derive the condition for thermal stability [7]

5b. Define the hybrid parameters for a basic transistor circuit and give CE hybrid model. [7]

(OR)

6a. Summarize the salient features of the characteristics of BJT operatives in CE, CB and CC configurations? [7]

6b. Calculate the collector current and emitter current for a transistor with $\alpha_{D.C.} = 0.99$ and $I_{CBO} = 20\mu A$ when the base current is 50μ A. [7]

SECTION-IV

7a. Explain principle of operation JFET and draw the V-I characteristics [7]

7b. Explain how FET act as voltage variable resistor [7]

(OR)

8a. Compare Depletion MOSFET and enhancement MOSFET [7]

8b. Compare JFET and MOSFET [7]

SECTION-V

9a. Draw the FET self biasing circuit [7]

9b. Explain FET common drain amplifier [7]

(OR)

10. With neat energy band diagrams, explain the V-I characteristics of Tunnel diode in detail. Also explain the negative-resistance region in the characteristics and applications of Tunnel diode. [14]

R18

MALLAREDDY COLLEGE OF ENGINEERING AND TECHNOLOGY, HYDERABAD

B.Tech II Year I Semester Examinations, Model Paper IV -2019

ANALOG ELECTRONICS

Time: 3 hours **Max. Marks: 70**

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

SECTION-I

1a. Explain details of V-I characteristics of pn junction diode. [7]

1b. Derive the expression for diffusion capacitance? [7]

(OR)

2a. Explain Full wave bridge rectifier with neat diagram? [7]

2b. Compare Half wave Full wave and bridge rectifier [7]

SECTION-II

3a. Draw and explain input-output characteristics of of CE configuration [7]

3b. Explain early effect and punch through effect [7]

(OR)

4a. Draw and explain voltage divider biase circuit, derive the stability factors S [7]

4b. Write short notes on compensation techniques [7]

SECTION-III

5a. Explain thermal runaway and derive the condition for thermal stability [7]

5b. define the hybrid parameters for a basic transistor circuit and give CE hybrid model. [7]

(OR)

6a. Summarize the salient features of the characteristics of BJT operatives in CE, CB and CC configurations? [7]

6b. Calculate the collector current and emitter current for a transistor with $\alpha_{D.C.} = 0.99$ and $I_{CBO} = 20\mu A$ when the base current is 50μ A. [7]

SECTION-IV

7a. Explain principle of operation JFET and draw the V-I characteristics [7]

7b. Explain FET parameters [7]

(OR)

8a. Compare enhancement MOSFET and enhancement MOSFET [7]

8b. Compare JFET and BJT [7]

SECTION-V

9a. Draw the FET self biasing circuit [7]

9b. Explain FET common drain amplifier [7]

(OR)

10. With neat energy band diagrams, explain the V-I characteristics of Tunnel diode in detail. Also explain the negative-resistance region in the characteristics and applications of Tunnel diode. [14]

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

B.Tech II year – I Semester Examinations, Model Paper-I

ELEMENTS OF MECHANICAL ENGINEERING

Time: 3 hours **Max. Marks: 70**

Answer one question from each section.

Section-I

1. i).Define the following terms:
   a).stress b).strain c).Modulus of elasticity d).Poisson's ratio
   ii)A mild steel rod 2m long and 3cm diameter is subjected to an axial pull of 10 KN. If modulus of elasticity for steel is $2x10^5$ N/mm^2. Find i) stress ii)strain iii)Elongation of the rod.

(or)

2. A bar of varying cross section consists of two sections of length 700mm and 900mm with cross sections 400mm^2 and 625mm^2. Iy is subjected to an axial pull of 100KN. Take E=200KN/mm^2. Find the total elongation.

Section-II

1. Explain the types and application of nonferrous metals and alloys.

(or)

2. Explain classification and method of soldering.

Section-III

1. i).Define tems:
   a)density b)specific weight c)viscosity d)Specific Gravity
   ii).calculate the density, specific weight and weight of one litre of petrol of specific gravity=0.7

(or)

2. A pelton wheel has a mean bucket speed of 10m per second with a jet of water flwing at the arte of 700lit/s nder a head of 30m. The bucket deflect the jet through an angle of 160^0. Calculate the power given by water to the runner and the hydraulic efficiency of the turbine. Assume co-efficient of velocity as 0.98

Section-IV

1. explain with neat sketches, the working of a two-stroke petrol engine.

(or)

2. A four- stroke diesel engine has a piston dia 250mm and stroke 400mm. The mean effective pressure is 4 bar and speed is 500rpm. The diameter of the brake drum is

1000mm and the effective brake load is 400N. Find indicated power, brake power and frictional power.

Section-V

1. How are belt drive classified? Briefly explain them neat sketches.

(or)

2. With a neat sketches explain briefly the following with their merits and demerits.

   i)Spur gear ii)Helical gear iii)Bevel gear iv) worm gear

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

B.Tech II year – I Semester Examinations, Model Paper-II

ELEMENTS OF MECHANICAL ENGINEERING

Time: 3 hours **Max. Marks: 70**

Answer one question from each section.

Section-I

1. A steel rod of 30mm diameter is enclosed by a copper tube of 45mm external diameter and internal diameter 35mm. The composite bar of length 300mm is subjected to an axial tensile force of 50KN. Find the stresses in each bar and the load carried by each bars. Adopt E for steel is 210 GPa and E for copper is 110 GPa.

(or)

2. i) Define terms: a) volumetric strain b) bulk modulus c)lateral strain
   A steel rod of 20mm diameter, 4m long carries a tensile load of 50 KN. Calculate the change in the length, diameter and volume of the rod. Take $E=2x10^5$ and poisson's ratio=0.3

Section-II

1. explain classification and applications of composites.

(or)

2. With the help of neat sketch, state and explain the principle and process of electric arc welding.

Section-III

1. i)Define terms: a) hydraulic Gradient line, b) Total energy line
   ii) Determine the rate of flow of water through a pipe of diameter 20cm and length 50m when one end of the pipe is connected to a tank and other end of the pipe is open to the atmosphere. The pipe is horizontal and the height of water in the tank is 4m above the centre of the pipe. The pipe is horizontal and the height of water in the tank is 4m above the centre of the pipe. Consider all minor losses and take f=0.009 in he formula h_f.

(or)

2. A pelton wheel is to be designed for a head of 60m when running at 200 r.p.m. The Pelton wheel develops 95.6475 kW shaft power. The velocity of the buckets=0.45 times the velocity of the jet, overall efficiency=0.85 and co-efficient of the velocity is equal to 0.98.

Section-IV

1. Differentiate between petrol (C.I) engines and diesel (C.I) engines.

(Or)

2. Define the following terms with units related to performance of I.C engines.
   a) Indicated power ii) Brake power iii) Indicated mean effective pressure

   iv) friction power v) Specific fuel consumption.

Section-V

1. A V-belt runs at 1200rpm in a 45^0 V-grooved pulley with a lap of π rad. The mean dia of the pulley is 0.3m and the co-efficient of friction is 0.3. The maximum tension in the belt is 1KN and the resulting centrifugal tension is 300N. Calculate the capacity of the power transmission of the drive.

(or)

2. Two parallel shafts are driven by a spur gear drive of module 4mm. The driving wheel running at 100rpm, drives the other at 300rpm. If the number of teeth on the driving wheel is 120. Find the number of teeth on the follower wheel and the centre distance of the drive

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

B.Tech II year – I Semester Examinations, Model Paper-III

ELEMENTS OF MECHANICAL ENGINEERING

Time: 3 hours **Max. Marks: 70**

Answer one question from each section.

Section-I

1. i).Define the following terms:
   a).normal stress b)normal strain c).Rigidity Modulus d).shear stress
   ii) Find the minimum diameter of a steel wire, which is used to raise a load of 4000n if the stress in the rod is not to exceed 95 MN/m^2.

(or)

2. A steel rod of 3cm diameter is enclosed centrally in a hallow copper tube of external diameter 5cm and internal diameter of 4cm. the composite bar is then subjected to an axial pull of 45000N.if the length of each bar is equal to 15cm, determine i) the stress in the rod and tube,
   And ii) load carried by each bar. Take E for steel $2.1x10^5$ N/mm^2 and for copper 1.1 $x10^5 N/mm^2$.

Section-II

1. Differentiate i) soft solder and hard solder
   ii) solder and spelter

(or)

2. With a neat sketch explain the process oxy- acetylene welding.

Section-III

1. Explain flow through pipes in series and pipes in parallel.

(or)

2. the difference in water surface levels in 2 tanks, which are connected by three pipes in series of lengths 300m,170m and 210m and of diameters 300mm, 200mm and 400mm respectively, is 12m. Determine the rate of flow of water if the co=efficient of friction are 0.005, 0.0052, and 0.0048 respectively, considering i) minor losses also ii) neglecting minor losses.

Section-IV

1. Explain the type of I.C engines and their applications.

(Or)

2. Explain I.C engine with neat sketch.

Section-V

1. How are Belt drives classified? Explain them with neat sketch.

(or)

2. A Gear wheel having 40 teeth running at 200rpm is driving another gear wheel having 20teeth. Find the speed of the driven gear. Also find the pitch circle diameter of both the gear wheels taking module of 6mm.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

B.Tech II year – I Semester Examinations, Model Paper-IV

ELEMENTS OF MECHANICAL ENGINEERING

Time: 3 hours **Max. Marks: 70**

Answer one question from each section

Section-I

1. i) Explain stress strain diagram for mild steel under tensile load
   ii)Determine the change in length, breadth , thickness of a steel bar which is 4m long, 30mm wide and 20mm thickness and is subjected to an axial pull of 30KN in the direction of its length.
   Take $E=2x10^5$ N/mm^2 and poisson's ratio= 0.3

(or)

2. i)Define the term thermal stress.
   ii)A rod is 2m long at a temperature of 10^0 C. Find the expansion of the rod, when the temperature is raised to 80^0 C. If this expansion is prevented, Find the stresses induced in the material of the rod. Take $E=1.0x10^5$ MN/m^2 and $\alpha=0.000012^0C$.

Section-II

1. i) define the terms a)weld ments and b) weldability
   ii)Differentiate AC welding DC welding.

(Or)

2. Expalin the types and application of non-ferrous metals

Section-III

1. A water turbine has a velocity of 6 m/s at the entrance to the draft tube and avelocity of 1.2 m/s at the exit. For friction losses of 0.1 m and a tailwater 5m below the entrance to the draft tube, find the pressure head at the entrance

(Or)

2. A pelton wheel has a mean bucket speed of 100m/sec with a jet of water at the Rate of 70litres/sec under a head of 30mts.The buckets deflect the jet through an angle of 1600.Calculate the power given by water to the runner and the Hydraulic efficiency of the turbine. Assume coefficient of velocity as 0.98

Section-IV

1. Define the following stages during the performance of I.C engines.

A) suction b)compression c)expansion d)exhaust.

(or)

2. The following data observations were recorded during a test on a 4-stroke engine. Bore=25cm stroke=40cm, crank speed=250rpm,net load on the brake drum=700N,diameter of brake drum= 2cm; Indicated mean effective pressure=6bar,fuel consumption=0.0013kg/s. specific gravity of fuel=0.78,calorific value of fuel=43900kJ/kg. Determine i)BP ii)IP iii)FP iv)mechanical efficiency v)indicated and brake thermal efficiency.

Section-V

1. Write note on following
   a) Slip in the belt drive b) creep in the belt drive

(Or)

2. A shaft running at 100 rpm is to drive a parallel shaft at 150rpm. The pulley on the driving on the driving shaft is 35cm. Find the diameter of driven pulley. Calculate the linear velocity of the belt and also velocity ratio.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
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MODEL QUESTION PAPER-1

Name of the Subject: MATHEMATICS - III
Time: 3 hours **Max Marks: 70**
Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

SECTION-I

1. Find the Fourier expansions of f(x) = xcosx; 0<x<2 π . [14M]

OR

2. a) Find the Fourier series of periodicity of $f(x) = 2x - x^2, in\ 0 < x < 3$. [7M]

b) Expand the function f(x) = x as a Fourier series in (-π,π). [7M]

SECTION-II

3. Using Fourier integrals show that $e^{-ax} - e^{-bx} = \frac{2\left(b^2 - a^2\right)}{\pi}\int_0^\infty \frac{\lambda \sin \lambda x}{\left(\lambda^2 + a^2\right)\left(\lambda^2 + b^2\right)} d\lambda, a > 0, b > 0$

OR

4. Find the finite Fourier sine and cosine transform of f(x), defined by f(x)=2x,where $0 < x < 2\pi$ [14M]

SECTION-III

5. Show That the function is defined by $f(z) = \frac{x^3(1+i) - y^3(1-i)}{x^2+y^2}$ at $z \neq 0$, and f(0) = 0 is continuous and satisfies C-R equations at the origin but $f'(0)$ does not exist. [14M]

OR

6. a. Evaluate $\oint \frac{z-1}{(z+1)^2(z-2)} dz\ where\ c: |z - i| = 2$ by Cauchy's Integral Formula. [7M]

b. Evaluate $\int_C \frac{z+4}{z^2+2z+5} dz,\ where\ c: |z + 1 - i| = 2.$ [7M]

SECTION-IV

7. a. Define (i) Removable singularity, (ii) Essential singularity, (iii) Pole Singularity. [6M]

b. Find the Laurent's Series of $f(z) = \frac{z^2-6z-1}{(z-1)(z-3)(z+2)}$ in the region$3 < |z + 2| < 5$. [8M]

OR

8. a. Evaluate by Residue Theorem $\int_C \frac{z-1}{(z+1)^2(z-2)}dz,\ where\ c: |z-i| = 2.$ [7M]

b. Evaluate $\int_0^{2\pi} \frac{d\theta}{5-3Cos\theta}$ by Contour Integration. [7M]

SECTION-V

9.Find and plot the image of the regions (i) $x > 1$ (ii) $y > 0$ (iii) $0 < y < \frac{1}{2}$ [14M]

Under the transformation $w = \frac{1}{z}$.

OR

10. a. Find the Fixed Points of the Transformation.

(i). $w = \frac{2i-6z}{iz-3}$ (ii). $w = \frac{6z-9}{z}$ (iii). $w = \frac{z-1}{z+1}$ (iv). $w = \frac{2z-5}{z+4}$. [7M]

b. Define Bilinear Transformation and Show That Every Bilinear Transformation is Conformal. [7M]

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
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MODEL QUESTION PAPER-2

Name of the Subject: MATHEMATICS – III
TIME: 3hours **Max. Marks: 70**
Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

SECTION-I

1. Find the half – range cosine series for the function $f(x)=(x-1)^2$ in the interval $0<x<1$ and Show that $\sum_{n=1}^{\infty}\frac{1}{(2n-1)^2}=\frac{\pi^2}{8}$ [14M]

OR

2. Expand $f(x)=e^x, -\pi<x<\pi$ as a Fourier series. Derive a series for $\frac{\pi}{sinh\pi}$ [14M]

SECTION-II

3. Find the Fourier sine transform of $\frac{x}{a^2+x^2}$ and Fourier cosine transform of $\frac{1}{a^2+x^2}$ [14M]

OR

4. Find Fourier sine and cosine transforms $f(x)=\frac{e^{-ax}}{x}$ and deduce that [14M]

$$\int_0^{\infty}\frac{e^{-ax}-e^{-bx}}{x}\sin sx\,dx=\tan^{-1}\left(\frac{s}{a}\right)-\tan^{-1}\left(\frac{s}{b}\right)$$

SECTION-III

5. a. Evaluate $\int_C \frac{z+4}{z^2+2z+5}dz,\ where\ c: |z+1-i|=2.$ [7M]

b. Find the analytic function whose real part is $e^{2x}(xCos2y-ySin2y)$. [7M]

OR

6. State and Prove Cauchy's Integral Formula. [14M]

SECTION-IV

7. a. Find the Laurent's Series of $\frac{1}{z^2-4z+3}$ for $1<|z|<3$. [7M]

b. Find the Taylor's Series of e^z about z = 3. [7M]

OR

8. Evaluate $\int_C \frac{z-3}{z^2+2z+5}dz$, where c is the Circle given by [14M]
(i). $|z|=1$, (ii). $|z+1-i|=2$, (iii). $|z+1+i|=2$

SECTION-V

9. a. Find the Bilinear Transformation which maps the points (0, 1, i) into the points (1+i, -i, 2-i). [10M]

b. Write Cross-Ratio of four points z_1, z_2, z_3, z_4. [4M]

OR

10. a. Show that the function w = $\frac{4}{z}$ transforms the straight line x = c in the z – plane into a circle in the w-plane [10M]

b. Define Critical Point and Bilinear Transformation [4M]

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
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MODEL QUESTION PAPER-3

Name of the Subject: MATHEMATICS - III
Time: 3 hours **Max Marks: 70**
Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

SECTION-I

1. Find the Fourier series of period 2π for the function $f(x) = x^2 - x \; in \; (-\pi, \pi)$.
Hence deduce the sum of the series $\frac{1}{1^2} + \frac{1}{2^2} + \frac{1}{3^2} + - - - - = \frac{\pi^2}{6}$ [14M]

OR

2.a) Obtain sine series for $f(x) = \pi x - x^2$, in 0<x< π. [7M]

b). Obtain fourier series for the function $f(x) = xsinx$ in $(-\pi, \pi)$ [7M]

SECTION-II

3. Using Fourier Integral, show that $\int_0^\infty \frac{1-\cos\lambda\pi}{\lambda}.\sin\lambda x \, d\lambda = \begin{cases} \frac{\pi}{2} if \; 0 < x < \pi \\ 0, if \; x > \pi \end{cases}$
[14M]

OR

4. Find the Fourier transform of f(x) = $\begin{cases} a^2 - x^2, if \; |x| < a \\ 0, if \; |x| > a > 0 \end{cases}$ Hence show that $\int_0^\infty \frac{sinx - cosx}{x^3} \; dx = \frac{\pi}{4}$
[14M]

SECTION-III

5 a. Find analytical function whose real part is $r^2 Cos2\theta + rSin2\theta$. [7M]

b. If f (z) is an analytic function of z, prove that $\left(\frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2}\right)|f(z)|^2 = 4|f^1(z)|^2$. [7M]

OR

6 a. Evaluate $\int_C \frac{z^2 - z + 1}{z - 1} dz, \; where \; c: |z| = \frac{1}{2}$. [7M]

b. Evaluate $\int_C \frac{logz}{(z-1)^3} dz, where \; c: |z - 1| = \frac{1}{2}$ using Cauchy's Integral Formula. [7M]

SECTION-IV

7. a. Expand $\frac{7z-2}{(z+1)z(z-2)}$ about the point z = -1 in the region $1 < |z+1| < 3$ as Laurent's Series [7M]

b. Expand f(z) = Cosz in Taylor's Series about $z = \frac{\pi}{4}$. [7M]

OR

8. a. State and Prove Cauchy's Residue Theorem [7M]

b. Evaluate $\int_{-\infty}^{\infty} \frac{x^2}{(1+x^2)(x^2+4)}\,dx$. [7M]

SECTION-V

9. a. Show that the function $w = \frac{4}{z}$ Transforms the line x = c in the z- plane into a Circle in the w- plane. [7M]

b. Under the Transformation $w = \frac{z-i}{1-iz}$ find the image of the Circle

(i). $|w| = 1$, (ii). $|z| = 1$. [7M]

OR

10. Find the Bilinear Transformation which maps 1 + i, - i, 2 - i of the z- plane into the points 0, 1, i respectively of the w-plane. Find the Fixed and Critical Points of this Transformation. [14M]

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MODEL QUESTION PAPER-3

Name of the Subject: MATHEMATICS - III
Time: 3 hours **Max Marks: 70**
Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

SECTION-I

1.Obtain the Fourier series for $f(x) = x - x^2$ in the interval $[-\pi, \pi]$. Hence show that $\sum_{n=1}^{\infty} \frac{(-1)^{n-1}}{n^2} = \frac{\pi^2}{12}$ [14M]

(or)

2. Find the Fourier series of the function $f(x) = x^2 - 2$, when $-2 \le x \le 2$ [14M]

SECTION – II

3. Find the Fourier transform of f(x) defined by
$f(x) = \begin{cases} 1 - x^2, if\ |x| \le 1 \\ 0, if |x| > 1 \end{cases}$ [14M]

Hence evaluate $\int_0^{\infty} \frac{x\cos x - sinx}{x^3} \cos\frac{x}{2} dx$

OR

4. Find the Fourier sine transform of f(x), defined by
$f(x) = \begin{cases} x, 0 \le x \le \frac{\pi}{2} \\ \pi - x, \frac{\pi}{2} \le x \le \pi \end{cases}$ [14M]

Section-III

5. a. Find the analytic function whose real part is $e^{2x}(xCos2y - ySin2y)$. [7M]

b. Show That $f(z) = z + 2\bar{z}$ is not analytic anywhere in the complex plane. [7M]

OR

6. a. State and Prove Cauchy's Integral Theorem. [7M]

b. Evaluate $\int_0^{1+i} [x^2 + 2xy + i(y^2 - x)]dz\ along\ y = x^2$ [7M]

Section-IV

7. a. Find the Laurent's Series of $\frac{1}{z^2 - 4z + 3}$ for $1 < |z| < 3$. [7M]

b. Find the Taylor's Series of e^z about z = 3. [7M]

OR

8. a. Find the Residue at z = 0 of the function $f(z) = \frac{1+e^z}{Sinz+zCosz}$. [7M]

b. Evaluate $\int_C \frac{z-3}{z^2+2z+5}dz$, where c is the Circle given by

(i). $|z| = 1$, (ii). $|z+1-i| = 2$, (iii). $|z+1+i| = 2$. [7M]

Section-V

9. a. Find the image of $|z| = 2$ under the transformation w = 3z. [7M]

b. Under the Transformation $w = \frac{1}{z}$ find the image of the Circle $|z-2i| = 2$. [7M]

OR

10. Find the Bilinear Transformation that maps the points $(\infty, i, 0)$ into the points$(0, i, \infty)$. [14M]