AR13

CODE: 13EE2006 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, January-2019

ELECTRO MAGNETIC FIELDS

(Electrical & Electronics Engineering)

Time: 3 Hours **Max Marks: 70**

PART-A

ANSWER ALL QUESTIONS **[1 x 10 = 10 M]**

1. a) The Scalar electric potential is given by $V= 3x + 5y^2 + 4z^3$. Find its gradient.
   b) Define Gauss's law.
   c) Express energy density in terms of D and E.
   d) If a parallel plate capacitor offers 4F for d=2cm, calculate C for d=0.5cm.
   e) The electromagnet has 50 turns and a current of 1A flows through the coil. If the length of the magnet circuit is 200 mm, find the magnetic field strength?
   f) Define the Ampere's law.
   g) Two long parallel conductors carry 100 A. If the conductors are separated by 20mm, find the force per metre length of each conductor.
   h) Write Lorentz force equation?
   i) Define pointing vector?
   j) Write the two Maxwell's equations for time varying EM fields.

PART-B

Answer one question from each unit **[5x12=60M]**

UNIT-I

2. a) Use the definition of the dot product to find the interior angles at A and B of the triangle defined by the three points A(1,3,-2), B(-2, 4,5) and O(0,0,0). 6M
   b) Point charges of 50nC each are located at A (1, 0, 0), B (-1, 0, 0), C (0, 1, 0), and D (0, -1, 0) in free space. Find the total force on the charge at A. 6M

(OR)

3. a) Describe the three coordinate systems with suitable diagrams. 4M
   b) Derive the expression for electric field intensity due to infinite line charge. 8M

UNIT-II

4. a) Derive Laplace's and Poison's equation. 5M
   b) Derive the expression for Electric field intensity due to electric dipole. 7M

(OR)

5. a) Derive the formula for energy density in electrostatic fields.Is the Energy density is Uniform? 6M
   b) Derive the capacitance of a uniformly charged spherical capacitor of inner radius a, outer radius b. 6M

UNIT-III

6. a) State Biot-Savart's law and deduce an expression for $\vec{H}$ at a point located at a distance of ***r*** metres from an infinitely long straight conductor carrying ***I*** amperes. 8M
   b) Derive the expression curl H = J. Apply ampere's law. 4M

(OR)

7. a) "Magnetic field intensity due to a circular current loop varies inversely at any point on its axis" – Justify. 6M
   b) Find the magnetic field intensity at a point on the axis, 5m from the centre of a circular coil of area $100cm^2$ and carrying a current of 50A. 6M

UNIT-IV

8. a) Find the force and Torque on a closed loop carrying current in the magnetic field. 8M
   b) Derive Lorentz force equation. 4M

(OR)

9. a) Determine the forces per unit length on two long, straight, parallel conductors if each carries a current of 10.0A in the same direction and the separation distance is 0.20m. 6M
   b) Derive the expression for force on a straight current carrying conductor placed in a magnetic field. 6M

UNIT-V

10. Derive Maxwell's four equations in point form and in differential form. 12M

(OR)

11. a) Show that energy stored in Magnetic fields is = ½ B.H J/m^3. 4M
    b) Generate Ampere's law for time varying fields. Also list the Maxwell's equations in integral and point form for free space conditions. 8M

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AR13

CODE: 13ME2006 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, January-2019

ENGINEERING METALLURGY & MATERIAL SCIENCE
(Mechanical Engineering)

Time: 3 Hours **Max Marks: 70**

PART-A

ANSWER ALL QUESTIONS **[1 x 10 = 10 M]**

1. a) Write an example of metal that crystallizes as HCP
   b) What is the packing factor of FCC unit cell?
   c) Write the peritectic reaction
   d) What is ledeburite?
   e) How nodules are obtained in SG cast iron?
   f) How malleable iron is produced?
   g) What is a alpha stabilizer in titanium alloys?
   h) What is hardness?
   i) What is yield point?
   j) What is the method to produce powders of refractory metals?

PART-B

Answer one question from each unit **[5x12=60M]**

UNIT-I

2. (a) What is packing factor? Calculate packing factor of a FCC unit cell. 6M
   (b) Write an account of various kinds of point defects 6M

(OR)

3. (a) What are various intermediate alloy phases 6M
   (b) Explain the factors effecting the formation of substitutional solid solutions 6M

UNIT-II

4. (a) Explain the construction of a binary phase diagram of a isomorphous system 6M
   (b) What is coring and how it is eliminated 6M

(OR)

5. (a) Explain the equilibrium cooling of a hypoeutectoid steel 6M
   (b) Explain the mechanism of solidification of a pure metal 6M

UNIT-III

6. (a) Explain the annealing treatment and what are its advantages 6M
   (b) Sketch and explain TTT curve of eutectoid steel 6M

(OR)

7. (a) Sketch and explain the microstructure, properties and applications of white cast iron and grey cast iron. 6M
   (b) Explain the composition, properties and applications of (i) Duralumin (ii) Muntz metal (iii) Ti-4Al-6V 6M

UNIT-IV

8. (a) What is endurance limit? Explain the fatigue testing procedure 6M
   (b) Explain the creep curve 6M

(OR)

9. (a) Explain the stress strain curve of ductile material 6M
   (b) Distinguish between ductile fracture and brittle fracture 6M

UNIT-V

10. Explain various powder making methods 12M

(OR)

11. What are the applications of powder metallurgy 12M

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AR13

CODE: 13EE2008 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, January-2019

ELECTRICAL TECHNOLOGY
(Electronics and Communication Engineering)

Time: 3 Hours **Max Marks: 70**

PART-A

ANSWER ALL QUESTIONS **[1 x 10 = 10 M]**

1. a) What is the role of back empf in a dc machine
   b) Define the term Back emf with respect to dc motor.
   c) Draw a no load phasor diagram of a transformer
   d) Enumerate the various losses in a transformer.
   e) Write the difference between slip ring and squirrel case induction motors.
   f) Define slip and explain its effect on a three phase induction motor
   g) Discuss the advantage of rotating filed type of alternator?
   h) Which are the various parameters of an armature winding
   i) Define permanent magnet moving coil?
   j) State the advantages and errors in PMMC instruments?

PART-B

Answer one question from each unit **[5x12=60M]**

UNIT-I

2. a Explain the load characteristics of a D.C generator. 6M
   b A 4 pole, 100 V d.c shunt generator with lap connected armature having filed and armature resistances of 50 Ω and 0.1 Ω respectively, supplied 60,100 v,40 W lamps.All lamps are connected in parallel. Calculate the total armature and generated e.m.f. Assume brush drop to be 1 V/brush. 6M

(OR)

3. a What is the necessity of a starter in a dc motor? Explain with the help of a neat sketch, the principle of operation of a 3-point starter. 6M
   b The no load test of a 45kW,230 V d.c shunt motor gave the following results: 6M
   Input current = 14A
   Filed current = 2.55A
   Resistance of armature at 75^{o}c =0.032 Ω
   Brush drop = 2V
   Estimate the full load current and efficiency

UNIT-II

4. a Describe phasor diagram on no load and on load of a transformer. 6M
   b The following data refer to a Single –Phase Transformer: 6M
   Turn ratio 19.5:1; R_1 =25 Ω; X_1 =100 Ω; R_2 = 0.06 Ω; X_2 = 0.25 Ω No-load current=1.25A leading the flux by $30^{o.}$ The secondary delivers 200A at a terminal voltage of 500 V and p.f. of 0.8 lagging. Determine by the aid of a vector diagram, the primary applied voltage, the primary p.f. and the efficiency.

(OR)

5. a Explain the open circuit test of a transformer 6M

b A 50kVA, 2200/110 V transformer when tested gave the following results: 6M
O.C test (L.V.side): 400 W, 10A, 110V.
S.C test (H.V.side): 808 W, 20.5A, 90V.
Compute all the parameters of the equivalent ckt. referred to the H.V.Side and draw the resultant ckt.

UNIT-III

6. a Explain the methods of starting of a squirrel cage motor. 6M

b A 440V, 3-ϕ, 50-Hz, 4-pole, Y-connected induction motor has a full-load speed of 1425 rpm. The rotor has an impedance of (0.4+J4) Ω and rotor/stator turn ratio of 0.8. Calculate (i) full-load torque (ii) rotor current and full-load rotor Cu loss (iii) power output if windage and friction losses amount to 500 W (iv) maximum torque and the speed at which it occurs (v) starting current and (vi) starting torque. 6M

(OR)

7. a Explain the difference between Slip Ring and squirrel cage induction motor. 6M

b A 3- phase induction motor has a 4-pole, Y-connected stator winding. The motor runs on 50-Hz supply with 200V between lines. The motor resistance and standstill reactance per phase are 0.1 Ω and 0.9 Ω respectively. Calculate 6M

(a) The total torque at 4% slip
(b) the maximum torque
(c) The speed at maximum torque if the ratio of the rotor to stator turns is 0.67. Nelgect stator impedance.

UNIT-IV

8. a Expain how the regulation of an alternator can be predetermined? 6M

b A 4-pole ,3-ϕ, 50Hz star connected alternator has a single layer winding in 36 slots with 30 conductors per slot. The flux per pole is 0.05Wb and winding is full pitched. Find the line voltage. 6M

(OR)

9. a Explain in detail about the constructional features and operation of an alternator? 6M

b A 3-ϕ star connected alternator is rated at 1600kVA,13,500 V. The armature effective resistance and synchronous reactance are 1.5 Ω and 30 Ω respectively per phase. Calculate the percentage regulation for a load of 1280 kW at power factors of (a) 0.8 leading and (b) 0.8 lagging. 6M

UNIT-V

10. a Explain the working and defection torque of repulsion type of moving iron instruments. 6M

b The working coil of a 0-400V moving iron voltmeter requires a 300 ampere turns to give full scale deflection. The added resistance is to be three times the coil resistance. Find the diameter of a wire for the coil if the wire be of copper having a resistivity of 1.7×10^{-6} Ωcm; the mean length of one turn = 13.5cm. 6M

(OR)

11. a Derive the torque equation of Moving Coil instruments. 6M

b Draw the constructional details of attracted armature type moving iron instrument. Also explain its principle of operation. 6M

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AR13

CODE: 13EE2003 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, January-2019

ELECTRICAL AND ELECTRONICS ENGINEERING
(Common to CSE & IT Branches)

Time: 3 Hours **Max Marks: 70**

PART-A

ANSWER ALL QUESTIONS **[1 x 10 = 10 M]**

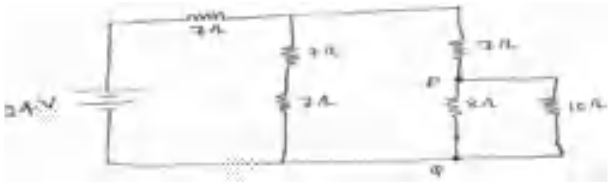
1. a) When three capacitors 1F each are connected in series, what is the equivalent capacitance.
   b) A 100Ω resistance is directly switched on across a 10 V battery. What is the current through resistor?
   c) List and give the applications of different types of DC machines.
   d) What is the necessity of three-point starter in a dc motor?
   e) What are various losses in Transformer?
   f) In an Induction motor, slip is always Positive, Why?
   g) Define indicating instruments.
   h) Which type of signals are measured using Permanent magnet Moving coil instrument?
   i) What is an Ideal diode? Draw its characteristics.
   j) Difference between full wave and bridge rectifier.

PART-B

Answer one question from each unit **[5x12=60M]**

UNIT-I

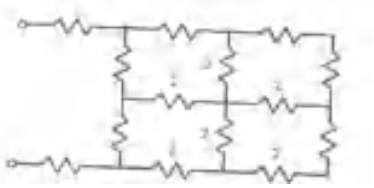
2. a) Find the voltage drop across the 10Ω resistor for the network shown below: 6M



   b) Define and explain Kirchhoff's laws with example. 6M

(OR)

3. a) Classify different types of network elements. 6M
   b) Find the equivalent resistance R_{AB} 6M



UNIT-II

4. a) Explain the construction of DC Machine. 6M
   b) Derive the torque equation in DC motor. 6M

(OR)

5. a) Explain the construction and working of three-point starter. 6M
   b) A four-pole generator having wave-wound armature winding has 51 slots, each slot containing 20 conductors. What will be the voltage generated in the machine when driven at 1500 rpm assuming the flux per pole to be 7.0 mWb? 6M

UNIT-III

6. a) Explain about torque-slip characteristics in 3-Ø Induction motor. 6M
   b) Derive the e.m.f equation of a transformer. 6M

(OR)

7. a) With neat diagram explain the construction and working of Alternator. 6M
   b) Explain in detail about voltage regulation of transformer. 6M

UNIT-IV

8. With neat diagram explain the working of permanent magnet moving coil instrument. Write the advantages and disadvantages of moving coil instrument 12M

(OR)

9. a) The resistance of a moving coil voltmeter is 12,000 W. The moving coil has 100 turns and is 4 cm long and 3 cm wide. The flux density in the air gap is 6×10^{-2} Wb/m2. Find the deflection produced by 300 V if the spring control gives a deflection of one degree for a torque of 25×10^{-7} Nm. 6M
   b) Classify different types of instruments. 6M

UNIT-V

10. a) Explain the working of a PN-junction diode. 6M
    b) Explain the working of transistor as an amplifier 6M

(OR)

11. Explain the working of bridge rectifier. 12M

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