Code: 5G234

II B.Tech. I Semester Supplementary Examinations March/April 2023
Electromagnetic Fields
(Electrical and Electronics Engineering)

Max. Marks: 70   Time: 3 Hours
Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)
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Marks

UNIT–I

1. a) Two point charges Q_1=35 micro coulombs and Q_2=60 micro coulombs are located at (-4,-6,-8) and (3, 5, 2) respectively. Find force on Q_1.   8M

   b) State and explain Gauss law.   6M

OR

2. Two small identical conducting spheres have charge of 2 nC and -0.5 nC respectively. When they are placed 4cm apart, What is the force between them? If they are brought into contact and then separated by 4 cm, what is the force between them?   14M

UNIT–II

3. a) Derive the expression for capacitance of a parallel plate capacitor with composite dielectrics.   7M

   b) Distinguish between conduction and convection current densities.   7M

OR

4. a) Derive the expression for potential due to dipole?   7M

   b) Derive the expression for Torque on a dipole in an electric field.   7M

UNIT–III

5. a) State and explain Ampere's circuital law with any one application.   7M

   b) State and explain Biot-savart's law.   7M

OR

6. A uniform solenoid 100 mm in diameter and 400 mm long has 100 turns of wire and a current of I=3A.Find the magnetic field on the axis of the solenoid.
   a) at the center b) At one end c) Half way from the center to one end.   14M

UNIT–IV

7. a) Derive an expression for the force between two parallel conductors?   7M

   b) Derive an expression for the inductance of solenoid?   7M

OR

8. a) Derive an expression for energy stored in a magnetic field.   7M

   b) State and derive Lorentz force equation.   7M

UNIT–V

9. a) State and explain faradays laws of electromagnetic induction?   7M

   b) Derive the modified Ampere's circuital law for time varying fields.   7M

OR

10. A copper wire carries a conduction current of 1A.Determine the displacement current in the wire at 1 MHz. For copper $= _o$ and $= 5.8 \times 10^7$ S/m.   14M

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Code: 5G539

II B.Tech. I Semester Supplementary Examinations March/April 2023

Fluid Mechanics and Hydraulic Machinery

(Electrical and Electronics Engineering)

Max. Marks: 70   Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)

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Marks

UNIT–I

1. a) Calculate the Density, Specific weight and Specific gravity of One liter of liquid, which weighs 7N.   7M
   b) Define the following i) Steam Line ii) Streak Line iii) stream Tube   7M

OR

2. a) Explain the property viscosity of a fluid. Also describe its variation with temperature.   7M
   b) Explain the various types of fluid flows.   7M

UNIT–II

3. a) Describe the Reynolds's experiment with neat sketch   7M
   b) Explain the minor losses in pipes briefly.   7M

OR

4. a) A horizontal venturimeter with inlet and throat diameters 30cm and 15cm respectively is used to measure the flow of water. The reading of differential manometer connected to the inlet and the throat is 20 cm of mercury. Determine the rate of flow. Tale C_d=0.98.   7M
   b) State the momentum equation and derive an expression for the force exerted by a flowing fluid on a pipe bend.   7M

UNIT–III

5. A jet of water having a velocity of 35 m/sec impinges on a series of vanes moving with a velocity of 20 m/sec. The jet makes an angle of 30^0 to the direction of motion of vanes when entering and leaves at an angle of 120^0. Draw the triangles of velocities at inlet and outlet and find i) the angles of vane tips so that water enters and leaves without shock ii) the work done per unit weight of water entering the vanes iii) the efficiency.   14M

OR

6. Explain the elements of hydroelectric power station with neat sketch.   14M

UNIT–IV

7. a) Explain the various parts of Kaplan turbine and its working with the neat sketch   7M
   b) Define the unit quantities and describe them with expressions   7M

OR

8. a) Define specific speed of the turbine and derive an expression for it.   7M
   b) Explain the classification of turbines.   7M

UNIT–V

9. a) Define centrifugal pump. Explain the working of single stage centrifugal pump with neat sketch.   7M
   b) Define slip, percentage of slip and negative slip of the reciprocating pump   7M

OR

10. a) Derive an expression for the work done by the impellor of a centrifugal pump.   7M
    b) Explain the characteristic curves of the centrifugal pumps.   7M

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