

--	--	--	--	--	--	--	--	--	--

Code: 5G539

II B.Tech. I Semester Supplementary Examinations Nov/Dec 2022

Fluid Mechanics & 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)

Marks

UNIT-I

1. a) Write briefly about different types of Pressure measuring devices 5M
 b) A U-tube containing mercury has its right limb open to atmosphere. The left limb is full of water and is connected to a pipe containing water under pressure, the center of which is in level with the free surface of mercury. Find the pressure of water in the pipe above atmosphere, if the difference of mercury level in the limbs is 5.08 cm. 9M

OR

2. a) Explain Centre of Buoyancy? Lake, has a maximum depth of 60m, and the mean atmospheric pressure is 91 kpa. Determine the absolute and gauge pressure in kpa at this maximum depth. 6M
 b) An incompressible fluid flows steadily through two pipes of diameter 0.15 m and 0.2 m, which combine to discharge in a pipe of 0.3 m diameter. If the average velocities in the 0.15m and 0.2 m diameter pipes are 2 m/s and 3 m/s respectively, find the average velocity in the 0.3 m diameter pipe 8M

UNIT-II

3. a) Explain the TEL and HGL with neat sketch. 7M
 b) Define the following with suitable examples. 7M
 i) Body forces ii) Surface forces iii) Line forces.

OR

4. a) Derive an expression for rate of flow through orifice meter 7M
 b) An orifice meter with orifice diameter 10cm is inserted in a pipe of 20 cm diameter. The pressure gauges fitted upstream and downstream of the orifice meter gives the readings of 19.62 N/cm² and 9.81 N/cm² respectively. Coefficient of discharge for the orifice metre is given as 0.6. Find the discharge of water through pipe. 7M

UNIT-III

5. a) What do you mean Hydroelectric power plant? Give the basis of selection and classification of these plants. Give the detailed construction and working principle of the Hydroelectric plant 7M
 b) A free jet moving with a velocity V strikes normally on a series of flat plates moving with a velocity of u and mounted radially on the periphery of a wheel. Determine the efficiency of the plates. 7M

OR

6. a) What is pumped storage power plant and explain its concept. 7M
 b) Describe the various storage requirements of hydroelectric power station. 7M

UNIT-IV

7. a) Define the various types of efficiencies of hydraulic turbines. 7M
 b) Explain the various parts of Pelton turbine and its working with the neat sketch. 7M

OR

8. a) Describe the cavitation in hydraulic turbines 7M
 b) Explain the governing of the hydraulic turbine with neat sketch. 7M

UNIT-V

9. What is indicator diagram of a reciprocating pump? Explain the working of a reciprocating pump with a neat sketches. 14M

OR

10. The outer diameter of the impeller of a Centrifugal pump is 400 mm and the outlet width is 50 mm. The pump is running at 800 rpm and working against a head of 15 m. The vane angle at the outlet is 40° and the manometry efficiency is 75%. Determine the following. (i) Flow velocity at the outlet (ii) The velocity of water leaving the vane (iii) Angle made by the absolute velocity with the direction of motion at the outlet (iv) Discharge of pump 14M

Hall Ticket Number :

--	--	--	--	--	--	--	--	--	--

R-15

Code: 5G234

II B.Tech. I Semester Supplementary Examinations Nov/Dec 2022

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)

UNIT-I

1. a) Derive and explain Maxwell's second equation?
b) Define Potential and Potential difference?

OR

2. a) State and explain Gauss law in Integral form.
b) Derive the expression for energy density in an electrostatic field.

UNIT-II

3. a) Explain Polarization of dielectric materials?
b) Compute the torque for a dipole consisting of 1 micro coulomb charges in an electric field $E=10^3[a_x - a_y - a_z]$ separated by 1 mm and located on the Z-axis at origin.

OR

4. a) Derive Laplace Equation from fundamentals.
b) State the properties of Dielectric materials

UNIT-III

5. a) State and explain Biot-savart's law?
b) Obtain an expression for Magnetic field intensity due to an infinitely long current carrying conductor?

OR

6. a) A solenoid has 3000 turns, a length of $l=150$ cm, a radius of $a= 2$ cm and carries a current of 100 mA. Find H at (0,0,20) cm and (0,0,150) cm.
b) State and explain Amperes circuital law.

UNIT-IV

7. a) Derive Lorentz Force Equation.
b) Derive the expression for Torque on a current loop placed in a magnetic field.

OR

8. a) Derive the expression for inductance of a solenoid using Amperes circuital law.
b) Derive the self-inductance of a solenoid

UNIT-V

9. a) Derive the equation for modified Amperes circuital law for time varying fields.
b) Distinguish between Conduction Convection and Displacement Currents.

OR

10. a) Find the displacement current within a parallel plate capacitor where $\epsilon = 100 \epsilon_0$, $A=0.1\text{m}^2$, $d=0.05\text{mm}$ and the capacitor voltage is $100 \sin 2000 t$ volts.
b) Compare and Contrast Electric and Magnetic Fields?
