R22 Regulation *Subject code:4E4BA*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech IV Semester Regular/Supplementary Examinations, June 2026

SOLID MECHANICS AND HYDRAULIC MACHINES

(EEE)

Maximum Marks: 60 Date: 08.06.2026 Duration: 3 hours

Note: **1.This question paper contains two parts A and B.**
2. Part A is compulsory which carries 10 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10X1M=10 Marks)		Marks	CO	Bloom Tx
1.a)	Define resultant force.	1M	1	L1
b)	State Hooke's law.	1M	1	L1
c)	What is centroid?	1M	2	L1
d)	Define Poisson's ratio.	1M	2	L1
e)	What is rectilinear motion?	1M	3	L2
f)	State the principle of conservation of energy.	1M	3	L2
g)	Define hydraulic efficiency.	1M	4	L1
h)	Name any two types of hydraulic turbines.	1M	4	L1
i)	Define manometric head	1M	5	L1
j)	What is the function of a draft tube?	1M	5	L2

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	Bloom Tx
2	a) Explain the different types of forces acting on a body with neat sketches. b) A simply supported beam of span 6 m carries a uniformly distributed load of 4 kN/m over the entire span. Determine the support reactions.	5M 5M	1	L2 L3
	OR			
3	a) Explain the laws of friction. b) A force of 100 N acts at an angle of 30° to the horizontal. Determine its horizontal and vertical components.	5M 5M	1	L2 L3
4	a) Define centre of gravity and centroid. Explain their engineering significance. b) Determine the centroid of a rectangular lamina of dimensions 120 mm × 80 mm.	5M 5M	2	L2 L3
	OR			

5	a) Explain stress and strain with suitable examples. b) A steel rod of 20 mm diameter is subjected to a tensile load of 40 kN. Determine the stress induced in the rod.	5M 5M	2	L2 L3
6	a) Differentiate between kinematics and kinetics. b) A car accelerates uniformly from rest to 20 m/s in 10 seconds. Find the acceleration.	5M 5M	3	L2 L3
	OR			
7	a) State and explain D'Alembert's principle. b) A body of mass 10 kg is moving with a velocity of 5 m/s. Determine its kinetic energy.	5M 5M	3	L2 L3
8	a) Explain the working principle of a hydroelectric power plant. b) A jet of water strikes a stationary flat plate normally with a velocity of 15 m/s. Explain the force developed on the plate.	5M 5M	4	L2 L3
	OR			
9	a) Explain the construction and working of curved vanes. b) Define head and efficiencies of hydraulic machines.	5M 5M	4	L2 L1
10	a) Explain the working of a Pelton wheel turbine with a neat sketch. b) Explain the classification of pumps.	5M 5M	5	L2 L2
	OR			
11	a) Explain the working principle of a centrifugal pump b) Define specific speed and mention its significance in turbines and pumps.	5M 5M	5	L2 L2