II B.Tech. II Semester Supplementary Examinations November 2023
Fluid Mechanics and Hydraulic Machinery
(Mechanical 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	CO	BL

UNIT–I

1. A pipe containing an oil of specific gravity 0.9. A differential manometer connected at the two points A and B shows a difference in mercury level as 15cm. Find the difference of pressure at the two points.   14M   CO1   L2

OR

2. a) What are the important fluid properties? Write their units?   7M   CO1   L1

   b) Distinguish between simple manometer and a differential manometer.   7M   CO1   L2

UNIT–II

3. A horizontal venturimeter with inlet and throat diameters 30 cm and 15 cm respectively is used to measure the flow of water. The reading of differential manometer connected to the inlet and throat is 20 cm of mercury. Determine the rate of flow. Take Cd=0.98.   14M   CO2   L3

OR

4. Derive the Euler's equation of motion along a streamline   14M   CO2   L2

UNIT–III

5. Derive an expression for the force exerted by a jet striking the curved plate at one end tangentially when the plate is symmetrical.   14M   CO3   L2

OR

6. A jet of water if diameter 75mm moving with a velocity 25m/s strikes a fixed plate in such a wat that the angle between the jet and plate is 60^0. Find the force exerted by the jet on the plate i) In the direction normal to the plate and ii) In the direction of the jet.   14M   CO3   L3

UNIT–IV

7. A Pelton wheel turbine develops 9000 Kw under a head of 300m. The turbine speed is 550 rpm and ratio of jet dia to wheel dia is 1/10. The hydraulic, volumetric and mechanical efficiencies are 0.98, 0.95 and 0.92 respectively. The speed ratio is 0.46 and coefficient of velocity is 0.98. Calculate the no of jets.   14M   CO4   L3

OR

8. Explain the different types of the Efficiencies of a turbine.   14M   CO4   L2

UNIT–V

9. The following details refer to working of a single acting reciprocating pump. Find the slip, coefficient of discharge and theoretical power required to drive the pump. Piston diameter = 15 cm, Crank radius = 15 cm, Diameter of delivery pipe = 10 cm, Discharge of the pump = 0.31 m3 /min. Total lift=15m, Speed of the pump = 60 rpm.   14M   CO5   L3

OR

10. What are the equations for work done and discharge of a reciprocating pump? Define the slip and coefficient of discharge of a reciprocating pump.   14M   CO5   L2

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Code: 19A341T

II B.Tech. II Semester Supplementary Examinations November 2023
Manufacturing Processes
(Mechanical 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	CO	BL
UNIT–I				
1.	Draw the schematic sketch of Gating system for casting. Mention the working function of each gating system elements?	14M	CO1	L2
	OR			
2.	Classify special casting processes and explain 'Investment casting' process?	14M	CO1	L2
UNIT–II				
3.	Briefly describe the 'shield metal arc welding process'. Give its advantages and limitations over gas welding?	14M	CO2	L2
	OR			
4.	Classify different weld defects and explain any five weld defects with regard to their causes and effects?	14M	CO2	L2
UNIT–III				
5.	Describe embossing, coining process and differentiate them?	14M	CO3	L2
	OR			
6.	What is the significance of recrystallization temperature in metal working? Explain how it effects the grain growth?	14M	CO3	L2
UNIT–IV				
7. a)	Differentiate between hot extrusion and cold extrusion processes?	6M	CO4	L4
b)	Describe few defects of rolled products and state their remedies.	8M	CO4	L2
	OR			
8.	Explain rotary forging and state its applications and advantages?	14M	CO4	L4
UNIT–V				
9.	Explain blow moulding process and applications?	14M	CO5	L4
	OR			
10.	How do you classify polymeric materials? Explain the properties of thermoplastic materials?	14M	CO5	L4

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II B.Tech. II Semester Supplementary Examinations November 2023
Applied Thermodynamics-I
(Mechanical 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	CO	BL

UNIT–I

1. Define the following terms with respect to Diesel cycle.
i) Compression ratio ii) Cut off ratio iii) Expansion ratio iv) Net work of the
cycle v) mean effective pressure.   14M CO1 L1

OR

2. a) Differentiate between the actual and ideal cycle and the factors responsible.   6M CO1 L2
   b) Sketch and explain Stirling cycle.   8M CO1 L2

UNIT–II

3. a) Sketch and explain the valve timing diagram for 4 stroke CI engine.   7M CO2 L2
   b) Summarize the important basic components of an IC engine? Explain them briefly.   7M CO2 L2

OR

4. Illustrate the principle of working of a Magneto ignition system with a neat sketch.   14M CO2 L4

UNIT–III

5. a) "C.I engines can accept very lean overall mixture ratios but S.I engines
   cannot". Explain and discuss.   7M CO3 L2
   b) Explain the various factors that influence the flame speed in S.I engine
   combustion.   7M CO3 L2

OR

6. Explain the four stages of combustion in CI engine with suitable diagrams.   14M CO3 L2

UNIT–IV

7. Following observations were made during the test on a single cylinder oil
engine. Bore = 300mm, I.M.E.P = 6bar, brake rope dia = 2cm, Stroke=450mm,
Net brake load = 1.5 KN, speed = 300 rpm, Brake drum dia = 1.8m Calculate
a) Indicated Power b) Brake Power c) Mechanical Efficiency   14M CO4 L3

OR

8. Explain the various engine performance parameters in detail.   14M CO4 L2

UNIT–V

9. Explain the operation of single stage centrifugal air compressor with help of
inlet and outlet velocity triangles on the compressor vane.   14M CO5 L2

OR

10. a) Write notes on
    (i) degree of reaction (ii) isentropic efficiency (iii) polytropic efficiency.   9M CO5 L1
    b) What is meant by positive displacement?   5M CO5 L1

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II B.Tech. II Semester Supplementary Examinations November 2023
Dynamics of Machinery
(Mechanical 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	CO	BL

UNIT–I

1.	Develop an expression for torque required to lift the load by a screw jack.	14M	CO1	L5

OR

2.	Determine the maximum, minimum and average pressure in plate clutch when the axial force is 4 kN. The inside radius of the contact surface is 50 mm and the outside radius is 100 mm. Assume uniform wear.	14M	CO1	L3

UNIT–II

3.	Develop the ratio for belt tensions in band and block brake	14M	CO2	L5

OR

4.	Describe the various planes and axes of gyroscopic couple with sketch	14M	CO2	L1

UNIT–III

5. a)	Classify the governors.	7M	CO3	L4
b)	Evaluate the vertical height of a Watt governor when it rotates at 60 r.p.m. Also find the change in vertical height when its speed increases to 61 r.p.m.	7M	CO3	L6

OR

6.	The arms of a Porter governor are each 250 mm long and pivoted on the governor axis. The mass of each ball is 5 kg and the mass of the central sleeve is 30 kg. The radius of rotation of the balls is 150 mm when the sleeve begins to rise and reaches a value of 200 mm for maximum speed. Determine the speed range of the governor.	14M	CO3	L3

UNIT–IV

7.	Explain the 'static balancing' and 'dynamic balancing'. State the necessary conditions to achieve them.	14M	CO4	L2

OR

8.	Describe the balancing of a single rotating mass by two masses rotating in different plane.	14M	CO4	L1

UNIT–V

9.	Develop an expression for Natural Frequency of Free Transverse Vibrations of a Shaft Subjected to a Number of Point Loads by Dunkerly's method.	14M	CO5	L5

OR

10.	A shaft 50 mm diameter and 3 meters long is simply supported at the ends and carries three loads of 1000 N, 1500 N and 750 N at 1 m, 2 m and 2.5 m from the left support. The Young's modulus for shaft material is 200 GN/m^2. Find the frequency of transverse vibration.	14M	CO5	L3

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