II B.Tech. II Semester Supplementary Examinations July/August 2022
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	Blooms Level

UNIT–I

1.	a)	Explain the Limiting angle of Friction	07M	CO1	L2
	b)	Describe the friction circle and friction axis.	07M	CO1	L1

OR

2.		A 150 mm diameter valve, against which a steam pressure of 2 MN/m^2 is acting, is closed by means of a square threaded screw 50 mm in external diameter with 6 mm pitch. If the coefficient of friction is 0.12, Find the torque required to turn the handle.	14M	CO1	L3

UNIT–II

3.		Explain the differential band brake with neat sketch and also discuss the self-locking condition of it.	14M	CO2	L2

OR

4.		The turbine rotor of a ship has a mass of 8 tonnes and a radius of gyration 0.6 m. It rotates at 1800 r.p.m. clockwise, when looking from the stern. Determine the gyroscopic couple, if the ship travels at 100 km/hr and steer to the left in a curve of 75 m radius.	14M	CO2	L3

UNIT–III

5.		Describe the following briefly: 1. Sensitiveness, 2. Isochronism, and 3. Hunting.	14M	CO3	L1

OR

6.	a)	Describe the turning moment diagram of a four stroke cycle internal combustion engine.	07M	CO3	L1
	b)	A horizontal cross compound steam engine develops 300 kW at 90 r.p.m. The coefficient of fluctuation of energy as found from the turning moment diagram is to be 0.1 and the fluctuation of speed is to be kept within ± 0.5% of the mean speed. Find the weight of the flywheel required, if the radius of gyration is 2 meters.	07M	CO3	L3

UNIT–IV

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

OR

8.		A, B, C and D are four masses carried by a rotating shaft at radii 100, 125, 200 and 150 mm respectively. The planes in which the masses revolve are spaced 600 mm apart and the mass of B, C and D are 10 kg, 5 kg, and 4 kg respectively. Find the required mass A and the relative angular settings of the four masses so that the shaft shall be in complete balance	14M	CO4	L3

UNIT–V

9.		Develop an expression for the natural frequency of free longitudinal vibrations by equilibrium method.	14M	CO5	L5

OR

10.		Evaluate the whirling speed of a shaft 20 mm diameter and 0.6 m long carrying a mass of 1 kg at its mid-point. The density of the shaft material is 40 Mg/m^3, and Young's modulus is 200 GN/m^2. Assume the shaft to be freely supported.	14M	CO5	L6

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Code: 19A342T

II B.Tech. II Semester Supplementary Examinations July/August 2022

Fluid Mechanics and Hydraulic Machines

(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	Blooms Level
	UNIT–I				
1.	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
		OR			
2.	a)	What is the principle on which a piezometer works? Draw a neat sketch and explain	7M	CO1	L1
	b)	Explain the terms: i). Path line ii) Stream line iii). Streak line.	7M	CO1	L2
		UNIT–II			
3.		Derive the Euler's equation of motion along a streamline	14M	CO2	L2
		OR			
4.		Discuss the following energies associated with application of Bernoulli's equation in a fluid flow: i). Potential energy ii). Kinetic energy iii). Pressure energy.	14M	CO2	L2
		UNIT–III			
5.		What is a runoff river plant? What are the different parts and arrangements of such plants? Draw a neat sketch and explain.	14M	CO3	L2
		OR			
6.		A jet of water of 60mm diameter strikes a curved vane at its Centre with a velocity if 18 m/s. The curved vane is moving with a velocity of 6 m/s in the directions of jet. The jet is deflected through an angle of 1650. Assuming the plate to be smooth jet i) Thrust in the plate in the direction if jet ii) Power of the jet iii) Efficiency of the jet	14M	CO3	L3
		UNIT–IV			
7.		A Pelton wheel has a mean bucket speed of 12m /sec and is supplied with water at a rate of 750 lit/sec under a head of 35m. If the bucket deflects the jet through an angle of 160^0, find the power developed by the turbine and its hydraulic efficiency. Take the Cv as 0.98.Neglect the friction in the bucket.	14M	CO4	L3
		OR			
8.		What are the operating characteristic curves of hydraulic turbines? Sketch them and explain their features and applications.	14M	CO4	L2
		UNIT–V			
9.		Define a centrifugal pump. Explain the working of a single-stage centrifugal pump with sketches	14M	CO5	L2
		OR			
10.		What do you mean by manometric efficiency, mechanical efficiency and overall efficiency of a centrifugal pump?	14M	CO5	L2

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Code: 19A341T

II B.Tech. II Semester Supplementary Examinations July/August 2022

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	Blooms Level

UNIT–I

			Marks	CO	Blooms Level
1.		Explain the steps involved in making a casting?	14M	CO1	L2
		OR			
2.	a)	What is the gating ratio? What are pressurized and non pressurized gating systems?	08M	CO1	L2
	b)	Define the terms (i) Chaplets (ii) Chills (iii) Core	06M	CO1	L1

UNIT–II

			Marks	CO	Blooms Level
3.		Describe with neat sketch the various components of Oxy Acetylene gas welding equipment and explain the welding process?	14M	CO2	L2
		OR			
4.		Sketch and explain 'plasma arc welding process'. Give its advantages and applications in detail?	14M	CO2	L2

UNIT–III

			Marks	CO	Blooms Level
5.	a)	What are specific merits of cold working over hot working?	06M	CO3	L2
	b)	Differentiate blanking and piercing with reference to press working processes?	08M	CO3	L4
		OR			
6.	a)	Explain the tube drawing process with neat sketch?	06M	CO3	L4
	b)	Describe wire drawing and cup drawing processes	08M	CO3	L2

UNIT–IV

			Marks	CO	Blooms Level
7.	a)	How does extrusion different from rolling? Comment.	06M	CO4	L4
	b)	Classify 'forging defects' and give the necessary remedies.	08M	CO4	L4
		OR			
8.		Explain with neat sketches the process of 'smith forging' and 'drop forging'?	14M	CO4	L4

UNIT–V

			Marks	CO	Blooms Level
9.	a)	Distinguish between the thermoplastics and thermosetting plastics?	08M	CO5	L4
	b)	Identify various properties of plastics?	06M	CO5	L2
		OR			
10.		Explain transfer moulding. Discuss its advantages and limitations?	14M	CO5	L4

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R-19

Code: 19AC41T

II B.Tech. II Semester Supplementary Examinations July/August 2022
Numerical Methods & Probability and Statistics
(Common to CE & ME)

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	Blooms Level

UNIT–I

1. Estimate the value of f(22) and f(42) from the following available data

x	20	25	30	35	40	45
f(x)	354	332	291	260	231	204

14M   CO1   L2

OR

2. Find a positive root of $x^3 - x - 1 = 0$ correct to two decimal places by Bisection method.

14M   CO1   L3

UNIT–II

3. Given that

x	1.0	1.1	1.2	1.3	1.4	1.5	1.6
y	7.989	8.403	8.781	9.129	9.451	9.750	10.031

find $\dfrac{dy}{dx}$ and $\dfrac{d^2 y}{dx^2}$ at (a) x=1.1 (b) x=1.6

14M   CO2   L1

OR

4. Using Taylor series method, find an approximate values of y(1.1) and y(1.2) for the differential equation $\dfrac{dy}{dx} = x + y, \ y(1) = 0.$

14M   CO2   L3

UNIT–III

5. Two dice are thrown, let X assign to each point (a, b) in S the maximum of its numbers i.e., X (a, b) = max (a, b). Find the probability distribution and also find the mean and variance of the distribution.

14M   CO3   L1

OR

6. If a random variable has a Poisson distribution such that
P(1) = P(2), find (i) Mean, (ii) P(4), (iii) P(x 1), and (iv) p(1<x<4).

14M   CO3   L3

UNIT–IV

7. A die was thrown 9000 times and of these 3220 yielded a 3 or 4. Is this consistent with the hypothesis that the die was unbiased?

14M   CO4   L1

OR

8. A sample of 400 items is taken from a population whose standard deviation is 10. The mean of the sample is 40. Test whether the sample has come from a population with mean 38. Also calculate 95% confidence interval for the population.

14M   CO4   L3

UNIT–V

9. A group of 5 patients treated with medicine A weight 42,39,48,60 and 41 kgs. Second group of 7 patients from the same hospital treated with medicine B weight 38, 42, 56, 64, 68, 69 and 62kgs. Do you agree with the claim that the medicine B increases the weight significantly?

14M   CO5   L1

OR

10. The number of automobiles accidents per week in a certain community are as follows : 12,8,20,2,14,10,15,6,9,4. Are these frequencies in agreement with the belief that accident conditions were the same during this 10 week period?

14M   CO5   L1

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R-19

Code: 19A344T

II B.Tech. II Semester Supplementary Examinations July/August 2022
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	Blooms Level
	UNIT–I			
1.	Sketch p-V and T-S diagrams of Diesel cycle and explain different processes.	14M	CO1	L2
	OR			
2.	In a Diesel cycle the compression ratio is 15. Compression begins at 0.1MPa & 40^0C. The heat added is 1.675 MJ/Kg. Find			
	i) Maximum temperature of the cycle ii) Temperature at the end of expansion iii) Work done /kg of air iv) Cycle efficiency.	14M	CO1	L3
	UNIT–II			
3. a)	Why is ignition required in an I.C. engine and how does it take place in diesel engines.	7M	CO2	L2
b)	Explain ideal and actual port timing diagrams of a 2-stroke S.I engine.	7M	CO2	L2
	OR			
4. a)	List the parts that require lubrication in an IC Engine? Explain.	7M	CO2	L2
b)	Why the lubrication and cooling systems are provided in an I.C. engine.	7M	CO2	L2
	UNIT–III			
5. a)	What are different ill effects of knocking?	7M	CO3	L1
b)	Suggest the methods to minimize knocking in SI engines?	7M	CO3	L2
	OR			
6.	Draw the schematic diagrams of I-type, L-type and F-type combustion chamber and compare the silent features among them.	14M	CO3	L2
	UNIT–IV			
7.	Explain the various engine performance parameters in detail.	14M	CO4	L2
	OR			
8. a)	Define Heat Balance sheet and list out parameters considered in it.	6M	CO4	L1
b)	Derive the basic performance parameters such as mechanical efficiency, mean effective pressure, torque and volumetric efficiency.	8M	CO4	L6
	UNIT–V			
9. a)	Illustrate the effects of clearance volume on the performance of reciprocating air compressor?	8M	CO5	L3
b)	Define brake power and indicated power of an air compressor?	6M	CO5	L1
	OR			
10.	A double acting compressor takes in air at 100 kPa and delivers it to the receiver at 1000 kPa. The speed is 200 rpm, diameter is 150 mm and stroke length is 220 mm. calculate the capacity of the motor required.	14M	CO5	L3

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