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R-19

Code: 19A342T

II B.Tech. II Semester Supplementary Examinations December 2022

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)

UNIT-I

- | | | Marks | CO | BL |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-----|----|
| 1. | Calculate the specific weight, specific mass, specific volume and specific gravity of a liquid having a volume of 6 m ³ and weight of 44 KN. | 14M | CO1 | L3 |
| OR | | | | |
| 2. | What are the different types of fluid flow? Explain. | 14M | CO1 | L1 |

UNIT-II

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|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|----|
| 3. | State the assumptions made in the derivation of Bernoulli's equation and hence derive the Bernoulli's equation. | 14M | CO2 | L2 |
| OR | | | | |
| 4. | A pipe of diameter 40 cm carries water at a velocity of 25 m/s. The pressures at the point A and B are given as 29.4 N/cm ² and 22.56N/cm ² respectively while the datum head at A and B are 28 m and 30 m. Find the loss of head between A and B. | 14M | CO2 | L3 |

UNIT-III

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|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|----|
| 5. | Derive the expressions for force and work done per second by the jet when it strikes a flat plate, inclined Plate, curved plate moving in the direction of the jet. | 14M | CO3 | L2 |
| OR | | | | |
| 6. | What are the radial vanes? What are the velocity triangles? What are the uses of their drawing for a typical case of a jet striking a moving plate? | 14M | CO3 | L2 |

UNIT-IV

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|-----------|-------------------------------------------------------------------|-----|-----|----|
| 7. | Explain the different types of the Efficiencies of a turbine. | 14M | CO4 | L2 |
| OR | | | | |
| 8. | With a neat sketch explain the working principle of Pelton wheel. | 14M | CO4 | L2 |

UNIT-V

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|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|----|
| 9. | A single acting reciprocating pump has a plunger of diameter 0.3m and stroke of length 0.4m. If the speed of the pump is 60 rpm and coefficient of discharge is 0.97, determine the percentage slip and actual discharge of the pump. | 14M | CO5 | L3 |
| OR | | | | |
| 10. | Explain following
i) Main characteristic curves ii) Operating characteristic curves iii) Muschel curves | 14M | CO5 | L2 |

Code: 19AE41T

II B.Tech. II Semester Supplementary Examinations December 2022

Managerial Economics and Financial Accounting

(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)

UNIT-I

- | | Marks | CO | Blooms Level |
|--------------------------------------------------------------------------------------------------------|-------|-----|--------------|
| 1. Deliberate the importance and scope of Managerial Economics? | 14M | CO1 | L2 |
| OR | | | |
| 2. Determine the concept of cross elasticity of demand. Discuss the method to measure such elasticity? | 14M | CO1 | L3 |

UNIT-II

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|------------------------------------------------------------------------------------------|-----|-----|----|
| 3. Define Cost. Explain the different cost concepts used in the process of Cost Analysis | 14M | CO2 | L2 |
| OR | | | |
| 4. Discuss the following | | | |
| a) Economies of scale | 7M | | L2 |
| b) Least Cost Combination of Inputs | 7M | CO2 | L2 |

UNIT-III

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|---------------------------------------------------------------------------------------------|-----|-----|----|
| 5. Describe the features, advantages and disadvantages of Sole trader form of Organization? | 14M | CO3 | L2 |
| OR | | | |
| 6. Briefly discuss the price-output determination in monopolistic competition. | 14M | CO3 | L2 |

UNIT-IV

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|------------------------------------------------------------------------------------------|----|-----|----|
| 7. Discuss the following | | | |
| a) Working Capital & Its Affecting Factors | 7M | CO4 | L2 |
| b) NPV Method advantages and disadvantages | 7M | CO4 | L2 |
| OR | | | |
| 8. Calculate Net Present Value (NPV) and Profitability Index (PI) for both the projects. | | | |

Years	Project-A Cash in flows	Project-B Cash in flows	PV@10%
1	2,50,000	3,50,000	0,909
2	1,80,000	1,50,000	0,826
3	1,20,000	1,80,000	0,751
4	1,10,000	80,000	0.683
5	75,000	60,000	0.621
5 (scrap)	50,000	40,000	0.621

Initial investment for the project-A; Rs.4,80,000 and project-B; Rs.6,00,000 and cost of capital assumed to be 10%.

14M CO4 L3

UNIT-V

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|--------------------------------------------------------------------------------------------|-----|-----|----|
| 9. Briefly discuss various types of Accounts (Golden Rules of Accounting) with examples? | 14M | CO5 | L2 |
| OR | | | |
| 10. Define Capital Budgeting. Explain the Nature, Scope and Features of Capital Budgeting? | 14M | CO5 | L2 |

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Code: 19A341T

II B.Tech. II Semester Supplementary Examinations December 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)

		Marks	CO	Blooms Level
UNIT-I				
1.	Define the pattern? Sketch and Explain different types of patterns used in foundry?	14M	CO1	L1
OR				
2. a)	Explain the solidification process of metals and alloys?	8M	CO1	L2
b)	Differentiate between progressive and directional solidification?	6M	CO1	L4
UNIT-II				
3. a)	Classify 'welding processes' and explain different types of 'weld joints'?	8M	CO2	L2
b)	How do you classify different weld positions? Draw at least four positions?	6M	CO2	L2
OR				
4.	What is Thermit welding? Explain the process. Also list any three advantages and limitations	14M	CO2	L2
UNIT-III				
5. a)	Briefly explain the principle of rolling with neat sketches?	6M	CO3	L4
b)	Describe two high, four high roll mills?	8M	CO3	L2
OR				
6. a)	Explain the process of 'coining' in detail with the help of a sketch.	6M	CO3	L4
b)	Explain in brief the defects in 'rolled products'	8M	CO3	L4
UNIT-IV				
7.	Explain extrusion process and discuss forward, backward, impact extrusion processes.	14M	CO4	L4
OR				
8.	Explain open and closed die forging processes? Distinguish between them?	14M	CO4	L4
UNIT-V				
9.	How components are manufactures in transferred molding process? Explain?	14M	CO5	L4
OR				
10. a)	Classify plastics and state their applications?	8M	CO5	L4
b)	Identify various methods available for processing of plastics?	6M	CO5	L2

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R-19

Code: 19AC41T

II B.Tech. II Semester Supplementary Examinations December 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)

Marks CO BL

UNIT-I

1. Find a root of the equation $x^3 - 4x - 9 = 0$ using the Bisection method correct to three decimal places. 14M 1 3

OR

2. Evaluate the following(correct to four decimal places) by Newton Raphson method:
 (i) $\sqrt{5}$ (ii) $\sqrt[3]{24}$ 14M 1 2

UNIT-II

3. Given that

x	1.00	1.05	1.10	1.15	1.20	1.25	1.30
y	1.000	1.025	1.049	1.072	1.095	1.118	1.140

- find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ at (a) $x=1.05$ (b) $x=1.25$ 14M 2 1

OR

4. Evaluate $y(0.2)$ and $y(0.4)$ correct to four decimal places by Taylor's series method if $y(x)$ satisfies $\frac{dy}{dx} = 1 - 2xy$ and $y(0) = 0$. 14M 2 2

UNIT-III

5. A continuous random variable has the Probability density function

$$f(x) = \begin{cases} k x e^{-x}, & \text{for } x \geq 0, \\ 0, & \text{otherwise} \end{cases} > 0. \text{ Determine (i) } k \text{ (ii) Mean (iii) Variance}$$
14M 3 1

OR

6. Out of 800 families with 5 children each, how many would you expect to have (a) 3 boys, (b) 5 girls, (c) either 2 or 3 boys (d) at least one boy? (Assume equal probabilities for boys and girls.) 14M 3 2

UNIT-IV

7. In a big city 325 men out of 600 men were found to be smokers. Does this information support the conclusion that the majority of men in this city are smokers? (Assume that the number of smokers and non-smokers are equal in the city) 14M 4 1

OR

8. An ambulance service claims that it takes on the average less than 10 minutes to reach its destination in emergency calls. A Sample of 36 calls has a mean of 11 minutes and the variance of 16 minutes. Test the claim at 0.05 level of significance. 14M 4 4

UNIT-V

9. The average breaking strength of the steel rods is specified to be 18.5 thousand pounds .To test this sample of 14 rods were tested. The mean and standard deviations obtained were 17.85 and 1.955 respectively. Is the result of experiment significant? 14M 5 1

OR

10. From the following data, find whether there is any significant liking in the habit of taking soft drinks among the categories of employees.

Soft Drinks	Clerks	Teachers	Officers
Pepsi	10	25	65
Thumsup	15	30	65
Fanta	50	60	30

14M 5 4

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R-19

Code: 19A344T

II B.Tech. II Semester Supplementary Examinations December 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)

	Marks	CO	BL
UNIT-I			
1. With the help of P-V and T-S diagrams explain OTTO cycle and derive an expression for air standard efficiency.	14M	CO1	L2
OR			
2. a) Elaborate the following.			
i) Exhaust blow down loss ii) Loss due to rubbing friction	6M	CO1	L2
b) Explain about Time loss factor and Heat loss factor with suitable diagrams.	8M	CO1	L2
UNIT-II			
3. a) Discuss with a neat sketch, the working principle of carburetor and explain its Components.	7M	CO2	L2
b) What are different fuel injection systems for C.I engines? Explain any one?	7M	CO2	L1
OR			
4. a) Discuss about thermostat cooling system with a neat diagram.	6M	CO2	L2
b) Write short notes on			
(i) Solid Injection System, (ii) Wet sump Lubrication System	8M	CO2	L2
UNIT-III			
5. Describe with suitable sketches the combustion phenomenon in S.I engines and explain the two phases of combustion.	14M	CO3	L2
OR			
6. a) Write notes on (i) fuel rating and (ii) anti-know additives.	7M	CO3	L2
b) List out the requirements of good combustion chamber in SI engines.	7M	CO3	L2
UNIT-IV			
7. A rope brake was used to measure the brake power of a single cylinder 4-stroke petrol engine. It was found that the torque due to brake load is 175 N-m and the engine runs at 500 rpm. Determine the brake power developed by the engine?	14M	CO4	L3
OR			
8. List out various methods for measurement of friction power and explain Morse method of determination of friction power.	14M	CO4	L1
UNIT-V			
9. Derive an expression for the isothermal efficiencies of a reciprocating compressor in terms of the pressure ratio.	14M	CO5	L6
OR			
10. a) List the various types of rotary compressors?	7M	CO5	L1
b) Discuss with a neat sketch, the working of a roots blower.	7M	CO5	L2

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R-19

Code: 19A343T

II B.Tech. II Semester Supplementary Examinations December 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)

UNIT-I

- | | Marks | CO | BL |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-----|----|
| 1. An effort of 1500 N is required to just move a certain body up an inclined plane of angle 12° , force acting parallel to the plane. If the angle of inclination is increased to 15° , then the effort required is 1720 N. Find the weight of the body and the coefficient of friction. | 14M | CO1 | L3 |

OR

- | | | | |
|------------------------------------------------------------------------------------------------------------------------|-----|-----|----|
| 2. Develop an expression for frictional torque required for conical pivot bearing considering uniform pressure theory. | 14M | CO1 | L5 |
|------------------------------------------------------------------------------------------------------------------------|-----|-----|----|

UNIT-II

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|----------------------------------------------------------------------------------|----|-----|----|
| 3. a) Define the Brake and list the important characteristics of brake material. | 7M | CO2 | L1 |
| b) List out the various types of brakes. | 7M | CO2 | L1 |

OR

- | | | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|-----|----|
| 4. a) Describe the construction and operation of a rope brake dynamometer | 7M | CO2 | L1 |
| b) A torsion dynamometer is fitted to a propeller shaft of a marine engine. It is found that the shaft twists 2° in a length of 20 meters at 120 r.p.m. If the shaft is hollow with 400 mm external diameter and 300 mm internal diameter, find the power of the engine. Take modulus of rigidity for the shaft material as 80 GPa. | 7M | CO2 | L3 |

UNIT-III

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|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|----|
| 5. The turning moment diagram for a petrol engine is drawn to the following scales: Turning moment, 1 mm = 5 N-m; crank angle, 1 mm = 1° . The turning moment diagram repeats itself at every half revolution of the engine and the areas above and below the mean turning moment line taken in order are 295, 685, 40, 340, 960, 270 mm ² . The rotating parts are equivalent to a mass of 36 kg at a radius of gyration of 150 mm. Determine the coefficient of fluctuation of speed when the engine runs at 1800 r.p.m. | 14M | CO3 | L3 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|----|

OR

- | | | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|----|
| 6. State the term height of the governor. Develop an expression for the height in the case of a Watt governor. What are the limitations of a Watt governor? | 14M | CO3 | L1 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|----|

UNIT-IV

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|--------------------------------------------------------------------------------------------------|-----|-----|----|
| 7. Explain the following:
(a) Variation is tractive force (b) Swaying couple (c) Hammer blow. | 14M | CO4 | L2 |
|--------------------------------------------------------------------------------------------------|-----|-----|----|

OR

- | | | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|----|
| 8. A single cylinder reciprocating engine has speed 240 r.p.m., stroke 300 mm, mass of reciprocating parts 50 kg, mass of revolving parts at 150 mm radius 37 kg. If two third of the reciprocating parts and all the revolving parts are to be balanced, find : 1. The balance mass required at a radius of 400 mm, and 2. The residual unbalanced force when the crank has rotated 60° from top dead center. | 14M | CO4 | L3 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|----|

UNIT-V

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|--------------------------------------------------------------|-----|-----|----|
| 9. Describe the types of free vibrations with neat sketches. | 14M | CO5 | L1 |
|--------------------------------------------------------------|-----|-----|----|

OR

- | | | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|----|
| 10. A cantilever shaft 50 mm diameter and 300 mm long has a disc of mass 100 kg at its free end. The Young's modulus for the shaft material is 200 GN/m ² . Determine the frequency of longitudinal and transverse vibrations of the shaft. | 14M | CO5 | L3 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|----|
