

Hall Ticket Number :

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R-19

Code: 19A343T

II B.Tech. II Semester Supplementary Examinations April 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)

Marks CO BL

UNIT-I

1. Explain the working of multiple plate clutch with sketch. 14M CO1 L2

OR

2. The pitch of 50 mm mean diameter threaded screw of a screw jack is 12.5 mm. The coefficient of friction between the screw and the nut is 0.13. Determine the torque required on the screw to raise a load of 25 kN, assuming the load to rotate with the screw. Determine the ratio of the torque required to raise the load to the torque required to lower the load and also the efficiency of the machine. 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 3500 kg. It has a radius of gyration of 0.45 m and a speed of 3000 r.p.m. clockwise when looking from stern. Determine the gyroscopic couple and its effect upon the ship, when the ship is steering to the left on a curve of 100 m radius at a speed of 36 km/h. 14M CO2 L3

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. A Proell governor has equal arms of length 300 mm. The upper and lower ends of the arms are pivoted on the axis of the governor. The extension arms of the lower links are each 80 mm long and parallel to the axis when the radii of rotation of the balls are 150 mm and 200 mm. The mass of each ball is 10 kg and the mass of the central load is 100 kg. Determine the range of speed of the governor. 14M CO3 L3

UNIT-IV

7. Describe the balancing of a several masses rotating in the same plane. 14M CO4 L3

OR

8. Describe the primary and secondary unbalanced forces of reciprocating masses. 14M CO4 L1

UNIT-V

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

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/m³, and Young's modulus is 200 GN/m². Assume the shaft to be freely supported. 14M CO5 L6

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II B.Tech. II Semester Supplementary Examinations April 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)

Marks CO BL

UNIT-I

1. A U-tube differential manometer has been arranged to measure the pressure difference between two points A and B in a sloping pipeline conveying water. The point B lies 20 cm higher than point A. If the difference in the level of mercury in limbs of U-tube is 60 cm, calculate the pressure difference ($P_A - P_B$).

14M CO1 L2

OR

2. Derive the equation of continuity for one dimensional flow of an incompressible fluid

14M CO1 L2

UNIT-II

3. Water flows through a horizontal conical pipe, with diameter at the larger end as 1.3 m and that at the smaller end as 0.70 m. the pressure head at the smaller head is 5 m of water, and the discharge is 3.5 m³/sec. Calculate the velocities at the two ends and the pressure head at the larger end. Neglect losses.

14M CO2 L3

OR

4. State the momentum equation. How will you apply momentum equation for determining the force exerted by a flowing fluid on a pipe bend?

14M CO2 L2

UNIT-III

5. What do you understand by pumped storage type of power station? What are its merits and demerits when compared with other types? Use sketches if necessary.

14M CO3 L2

OR

6. A jet of water of diameter 50mm, having a velocity of 20 m/s strikes a curved vane which is moving with a velocity of 10 m/s in the direction of jet. The jet leaves the vane at an angle of 60° to the direction of motion of vane at outlet. Determine
i) Force exerted by the jet on the vane in the direction of motion
ii) Work done per second by the jet.

14M CO3 L3

UNIT-IV

7. Define a turbine and bring out the differences between reaction turbine and impulse turbine.

14M CO4 L2

OR

8. Explain what you understand by governing of a hydraulic turbine with neat sketches.

14M CO4 L2

UNIT-V

9. Define and explain how manometric head of a centrifugal pump is measured. Compare this with total head, suction head and delivery head of a centrifugal pump.

14M CO5 L2

OR

10. The impeller of a centrifugal pump has 1.2 m outside diameter. It is used to lift 1800 litres of water per second against a head of 6 m. Its vanes make an angle of 150° with the direction of motion at outlet and runs at 200 rpm. If the radial velocity of flow at outlet is 2.5 m/s, find the manometric efficiency. Also find the lowest speed to start the pump, if the diameter of the impeller at inlet is equal to half the diameter at exit.

14M CO5 L3

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R-19

Code: 19AE41T

II B.Tech. II Semester Supplementary Examinations April 2023

Managerial Economics and Financial Analysis

(Common to CE and 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. Deliberate the importance and scope of Managerial Economics? 14M CO1 L2

OR

2. Explain the following 14M CO1 L2

- a) Types of Demand b) Determinants of Demand

UNIT-II

3. Define Cost. Explain the different cost concepts used in the process of Cost Analysis 14M CO2 L2

OR

4. Outline the Cobb-Douglas production function. What are the properties of this function? 14M CO2 L4

UNIT-III

5. Explain the following 14M CO3 L2

- a) Partnership Deed b) Formation of Company

OR

6. Define Company, what are the characteristics of Company and Explain the contrast between public company and private company? 14M CO3 L3

UNIT-IV

7. Compare merits & demerits of Pay Back Period & Accounting Rate of Return Methods of capital budgeting. 14M CO4 L5

OR

8. Kumar & Co Ltd is contemplating the purchase of machinery. Two machines A and B are available each at Rs. 2,50,000. Net cash inflows (Amt, in Rs.)

Year	Machine A	Machine B
1	75,000	25,000
2	1,00,000	50,000
3	1,25,000	1,00,000
4	75,000	1,50,000
5	50,000	1,00,000

14M CO4 L3

Calculate NPV @10%

UNIT-V

9. Define accounting. What do you understand by Double Entry System of book-keeping? Explain 14M CO5 L1

OR

10. Journalize the following transactions and prepare a cash ledger.
Jan 1st 2021(Jan1st, Jan2nd.)

1. Ram invests Rs. 10, 000 in cash.
2. He bought goods worth Rs. 2000 from shyam.
3. He bought a machine for Rs. 5000 from Lakshman on account.
4. He paid to Lakshman Rs. 2000
5. He sold goods for cash Rs.3000
6. He sold goods to A on account Rs. 4000
7. He paid to Shyam Rs. 1000
8. He received amount from A Rs. 2000

14M CO5 L4

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R-19

Code: 19A341T

II B.Tech. II Semester Supplementary Examinations April 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)

Marks CO BL

UNIT-I

1. What types of allowances are generally incorporated into a casting pattern? Explain with neat sketches? 14M CO1 L2

OR

2. Describe the working of centrifugal casting and explain its advantages and disadvantages? 14M CO1 L2

UNIT-II

3. a) Describe the principle of Oxy-Fuel gas welding process? 6M CO2 L2
b) Explain its construction with various types of gas welding flames? 8M CO2 L2

OR

4. a) What are the differences between TIG and MIG welding processes? 6M CO2 L4
b) Compare Soldering, Brazing, and Welding? 8M CO2 L4

UNIT-III

5. Describe bending & forming operation with neat sketches? 14M CO3 L2

OR

6. Define the terms cold working and hot working. Discuss the effects of cold working and hot working on the properties of materials. Explain their advantages and disadvantages? 14M CO3 L2

UNIT-IV

7. Explain the hydrostatic extrusion process with neat sketch? Mention its advantages over other extrusion processes? 14M CO4 L4

OR

8. List and describe various types of 'dies'? 14M CO4 L2

UNIT-V

9. Explain injection moulding process and applications? 14M CO5 L4

OR

10. Give a broad classification of 'plastic materials'. State their properties and applications? 14M CO5 L2

Important Note: 1. On completing your answers. Compulsorily draw diagonal cross line on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written eg. 42+8=50, will be treated as malpractice.

Code: 19AC41T

II B.Tech. II Semester Supplementary Examinations April 2023

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 real root of the equation $x^3 - 2x - 5 = 0$ by the method of false position correct to three decimal places.

14M CO1 L3

OR

2. Using Lagrange's formula, calculate $f(9)$ from the following table:

x	5	7	11	13	17
f(x)	150	392	1492	2366	5202

14M CO1 L3

UNIT-II

3. Evaluate $\int_0^6 \frac{dx}{1+x^2}$ by using

(i) Trapezoidal rule (ii) Simpson's 1/3 rule and (iii) Simpson's 3/8 rule.

14M CO2 L2

OR

4. Using Runge-Kutta method of fourth order, solve $\frac{dy}{dx} = \frac{y^2 - x^2}{y^2 + x^2}$ with $y(0)=1$ at $x=0.2, 0.4$

14M CO2 L3

UNIT-III

5. A random variable X has the following Probability function:

X	0	1	2	3	4	5	6	7
P(x)	0	K	2K	2K	3K	K^2	$2K^2$	$7K^2+K$

- (i) Determine K (ii) Mean (iii) Variance and
(iv) Evaluate $P(X < 6)$, $P(X \geq 6)$, $P(0 < X < 5)$ and $P(0 \leq X \leq 4)$.

14M CO3 L1

OR

6. If the masses of 300 students are normally distributed with mean 68 kgs and standard deviation 3 kgs, how many students have masses
(i) Greater than 72 kg (ii) less than or equal to 64 kg
(iii) Between 65kg and 71 kg inclusive.

14M CO3 L1

UNIT-IV

7. Experience had shown that 20% of a manufactured product is of the top quality. In one day's production of 400 articles only 50 are of top quality. Test the hypothesis at 0.05 levels.

14M CO4 L4

OR

8. In two large populations, there are 30%, and 25% respectively of fair haired people. Is this difference likely to be hidden in samples of 1200 and 900 respectively from the two populations?

14M CO4 L1

UNIT-V

9. A random sample of six steel beams has a mean compressive strength of 58,392 pounds per square inch with a standard deviation of 648 pounds per square inch. Use this information and the level of significance $\alpha = 0.05$ to test whether the true average compressive strength of the steel from which this sample came is 58,000 pounds per square inch, Assume normality.

14M CO5 L4

OR

10. In one sample of 8 observations from a normal population, the sum of the squares of deviations of the sample values from the sample mean is 84.4 and in another sample of 10 observations it was 102.6. Test at 5% level whether the populations have the same variance.

14M CO5 L4

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II B.Tech. II Semester Supplementary Examinations April 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)

Marks CO BL

UNIT-I

1. An air standard Otto cycle has a compression ratio of 8. At the start of the compression process, the temperature is 27^o C and the pressure is 1 bar. If the maximum temperature of the cycle is 1080^o C. Calculate i) The heat supplied per kg of air, ii) The network done per kg of air, iii) The thermal efficiency of the cycle. 14M CO1 L3

OR

2. a) List any three principle factors that influence engine performances? And explain them. 7M CO1 L1
b) What are Air standard cycles? What are the assumptions for Air standard cycles? 7M CO1 L1

UNIT-II

3. a) Draw the neat sketch of fuel pump for C.I Engine? 7M CO2 L2
b) How the internal combustion engines are classified? 7M CO2 L1

OR

4. a) Sketch and explain Mist type lubrication system. 7M CO2 L2
b) Describe about air injection system. 7M CO2 L2

UNIT-III

5. What causes the knock in a C.I engine? In which part of the combustion processes (beginning or the end) does it occur? 14M CO3 L1

OR

6. a) Define pre ignition? Explain with diagram. 7M CO3 L1
b) Discuss the need for air movement in CI engines. 7M CO3 L2

UNIT-IV

7. A single cylinder 4-stroke cycle engine is fitted with a rope brake. The dia of the brake wheel is 600mm and rope dia is 26mm. the dead load on the brake is 200N and the spring balance reads 30N. If the engine runs at 450rpm what will be the brake power of the engine? 14M CO4 L3

OR

8. a) Explain the measurement of brake power by using Rope Brake Dynamometer. 7M CO4 L2
b) How do you determine frictional losses and indicated horse power? 7M CO4 L2

UNIT-V

9. An air compressor has a piston displacement of 2200 cm³ with a clearance of 5%. It receives air at 110 kPa. There is a pressure drop of 3.5 kPa through the suction valves. The discharge valves also leaks and a drop of 5% occurs in delivery pressure. Using $n = 1.35$, calculate and plot the volumetric efficiency for the discharge pressure of 350, 700, 1000, 1500, 2000 and 2500 kPa. 14M CO5 L3

OR

10. a) List out the advantages and disadvantages of use of centrifugal air compressor. 7M CO5 L1
b) Derive the condition for minimum work required in reciprocating compressor? 7M CO5 L6
