

Hall Ticket Number :

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**R-20**

**Code: 20A343T (SS)**

III B.Tech. I Semester Regular Examinations Dec 2022/Jan 2023

**Design of Machine Elements-I**  
(Mechanical Engineering)

Max. Marks: 70

Time: 3 Hours

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- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)  
2. In Part-A, each question carries **Two mark**.  
3. Answer **ALL** the questions in **Part-A** and **Part-B**

**PART-A**

(Compulsory question)

- |   | CO | BL |
|---|----|----|
| 1. Answer <b>all</b> the following short answer questions ( 5 X 2 = 10M )     |    |    |
| a) What are the uses of preferred numbers?                                    | 1  | L1 |
| b) Explain about endurance limit.   | 2  | L2 |
| c) Explain stresses in lab welded joint.                                      | 3  | L1 |
| d) What are the types of cotter joints?                                       | 4  | L1 |
| e) What are the stresses induced in shafts subjected to bending and twisting. | 5  | L1 |

**PART-B**

Answer **five** questions by choosing one question from each unit ( 5 x 12 = 60 Marks )

Marks CO BL

**UNIT-I**

- |  |    |   |    |
|--|----|---|----|
| 2. a) Discuss the steps involved in design of machine elements.  | 6M | 1 | L2 |
| b) Classify the different types of loads and explain corresponding stresses induced in machine members in brief. | 6M | 1 | L2 |

**OR**

- |   |    |   |    |
|---|----|---|----|
| 3. a) Explain any two theories of failures.   | 6M | 1 | L2 |
| b) Find the diameter of a round rod subjected to a combined bending moment of 2 kNm and a torque of 1.2 kNm? The allowable normal and shear stresses for the material are 120 MPa and 75 MPa respectively | 6M | 1 | L4 |

**UNIT-II**

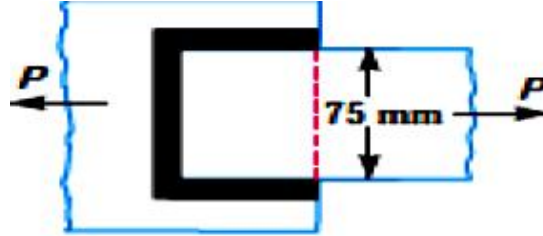
- |   |    |   |    |
|---|----|---|----|
| 4. a) Describe Goodman's criteria.  | 6M | 2 | L1 |
| b) A Connecting rod of a steam engine is subjected to an axial load of 70kN which is completely reversed. Determine the required diameter of rod using a factor of safety 2.6. For material of the rod yield strength: 310MPa, ultimate strength: 580MPa, surface finish factor: 0.78, size factor: 0.81. | 6M | 2 | L4 |

**OR**

- |   |    |   |    |
|---|----|---|----|
| 5. a) Explain the following terms: (i) Stress concentration (ii) Endurance limit  | 4M | 2 | L2 |
| b) A forged steel bar, 50 mm in diameter, is subjected to a reversed bending stress of 250 N/mm <sup>2</sup> . The bar is made of steel 40C8 ( $S_{ut} = 600 \text{ N/mm}^2$ ). Calculate the life of the bar for a reliability of 90%. | 8M | 2 | L4 |

|          |
|----------|
| UNIT-III |
|----------|

6. A plate 75mm wide and 12.5mm thick is joined with another plate by a single transverse weld and a double parallel fillet weld as shown in fig. The maximum tensile and shear stresses are 70 MPa and 56 MPa respectively. Find the length of each parallel fillet weld, if the joint is subjected to both static and fatigue loading.



12M 3 L5

OR

7. The cylinder head of effective diameter 300mm for a steam engine is subjected to 1.2 MPa. It is held in position by means of 12 studs. A soft copper gasket is used to make joint leak proof. Determine the size of bolts or studs, so that the stress should not exceed 100 MPa.

12M 3 L4

|         |
|---------|
| UNIT-IV |
|---------|

8. Design a knuckle joint to transmit 150 kN. The design stresses may be taken as 75 MPa in tension, 60 MPa in shear and 150 MPa in compression.

12M 4 L4

OR

9. A 15 kW, 960 r.p.m. motor has a mild steel shaft of 40 mm diameter and the extension being 75 mm. The permissible shear and crushing stresses for the mild steel key are 56 MPa and 112 MPa. Design the keyway in the motor shaft extension. Check the shear strength of the key against the normal strength of the shaft.

12M 4 L4

|        |
|--------|
| UNIT-V |
|--------|

10. a) How the shaft is designed when it is subjected to twisting moment and bending moment?  
 b) A shaft is transmitting 100 kW at 180 r.p.m. If the allowable shear stress in the material is 60 MPa, find the suitable diameter for the shaft. The shaft is not to twist more than  $1^\circ$  in a length of 3 m. Take  $C = 80$  GPa.

6M 5 L2

6M 5 L4

OR

11. Design and draw a cast iron flange coupling for a mild steel shaft transmitting 90 kW at 250 r.p.m. The allowable shear stress in the shaft is 40 MPa and the angle of twist is not to exceed  $1^\circ$  in a length of 20 diameters. The allowable shear stress in the coupling bolts is 30 MPa.

12M 5 L4

\*\*\* End \*\*\*

Hall Ticket Number :

R-20

Code: 20A353T

III B.Tech. I Semester Regular Examinations Dec 2022/Jan 2023

**Design of Machine Elements - II**

(Mechanical Engineering)

Max. Marks: 70

Time: 3 Hours

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- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)  
2. In Part-A, each question carries **Two mark**.  
3. Answer **ALL** the questions in **Part-A** and **Part-B**

**PART-A**

(Compulsory question)

1. Answer **all** the following short answer questions ( 5 X 2 = 10M )
- |  |     |    |
|--|-----|----|
|  | CO  | BL |
| a) Define creep & slip in belts.                                   | CO1 | L1 |
| b) Define bearing characteristic number.                           | CO2 | L1 |
| c) Why are the ball & roller bearing called anti-friction bearing? | CO3 | L2 |
| d) Define module and circular pitch.                               | CO4 | L1 |
| e) What are the commonly used materials for piston?                | CO5 | L2 |

**PART-B**

Answer **five** questions by choosing one question from each unit ( 5 x 12 = 60 Marks )

Marks CO BL

**UNIT-I**

2. A leather belt 9mm x 250mm is used to drive a CI pulley 900 mm in diameter at 336 rpm. If the arc of contact on smaller pulley is 120° and the stress in the tight side is 2 MPa, find the power capacity of the belt. The density of the leather may be taken as 980 kg/m<sup>3</sup> and coefficient of friction of leather on CI as 0.35.
- |     |     |    |
|-----|-----|----|
| 12M | CO1 | L4 |
|-----|-----|----|

**OR**

3. A safety valve of 60 mm diameter is to blow off at a pressure of 1.2 N/mm<sup>2</sup>. It is held on its seat by a close coiled helical spring. The maximum lift of the valve is 10 mm. Design a suitable compression spring of spring index 5 and providing an initial compression of 35 mm. The maximum shear stress in the material of the wire is limited to 500 MPa. The modulus of rigidity for the spring material is 80 kN/mm<sup>2</sup>. Calculate : 1. Diameter of the spring wire, 2. Mean coil diameter, 3. Number of active turns, and 4. Pitch of the coil.
- |     |     |    |
|-----|-----|----|
| 12M | CO1 | L4 |
|-----|-----|----|

**UNIT-II**

4. a) Define Bearing modulus. 

|     |     |    |
|-----|-----|----|
| 02M | CO1 | L2 |
|-----|-----|----|

  
b) Design a journal bearing for a 10kW, 15RPS compressor. Load rating on the Journal is 20kN. Shaft material is C40. Length of journal is 90mm. 

|     |     |    |
|-----|-----|----|
| 10M | CO2 | L6 |
|-----|-----|----|

**OR**

5. A 49.9 mm diameter hardened and ground steel journal rotates uniformly at 1500 rpm in a lathe turned stationary bronze journal bearing, which is 50 mm in length. The temperature of the oil is 65°C. Determine
- |     |  |     |        |
|-----|--|-----|--------|
| i.  | Max. Radial load that the journal can carry. |     |        |
| ii. | Power loss in bearing.                       | 12M | CO2 L6 |

|                 |
|-----------------|
| <b>UNIT-III</b> |
|-----------------|

6. Specify a suitable deep groove ball bearing for radial load of 2.5kN, and thrust load of 0.9kN. The operating speed is 3000 rpm. Assume steady load and life of 15000 hours at 95% reliability. Recommend the bearing with the maximum, possible bore size.

12M CO3 L6

OR

7. Specify a suitable single row deep groove ball bearing with bore size of 40 mm, and is required to resist a radial load of 4 kN and axial load of 3 kN. The shaft rotates at 1400 rpm. The bearing is required to be in operation for 12000 hours with 90% reliability.

12M CO3 L6

|                |
|----------------|
| <b>UNIT-IV</b> |
|----------------|

8. Design a straight spur gear to transmit power of 8 kW. The pinion speed is 720 rpm and the speed ratio is of 2. Both the gears are made up of same surface hardened carbon steel with 55 RC and core hardness less than 350BHN. Ultimate strength is 720 N/mm<sup>2</sup> and yield strength is 360 N/mm<sup>2</sup>.

12M CO4 L6

OR

9. Design a pair of helical gears to transmit 30kW power at a speed reduction of 4:1. The input shaft rotates at 2000 rpm. Take helix angle and normal pressure angle equal to 25° and 20° respectively. Both pinion and gear are made up of steel. The number of teeth on the pinion may be taken as 30.

| Name of the part | permissible stress | BHN |
|------------------|--------------------|-----|
| Pinion           | 55MPa              | 340 |
| Gear             | 40MPa              | 300 |

12M CO4 L6

|               |
|---------------|
| <b>UNIT-V</b> |
|---------------|

10. Design a connecting rod for a single acting 4-S diesel engine that runs at 600 rpm and develops a maximum pressure of 3.4 MPa. Other particulars of the engine are 140 mm bore, 190mm stroke and length of the connecting rod 380 mm. The weights of the reciprocating parts may be taken as 4 kg. Use suitable values of the stresses. The connecting rod is made up of alloy steel 37Mn2. Take l/d ratio for the crank pin and wrist pin as 1.5 and the corresponding allowable bearing pressure as 10MPa and 50MPa. Take  $\rho = 0.008\text{kg/m}^3$  and allowable stress in bolts as 60MPa and in cap as 80MPa. Draw a neat sketch of the connecting rod designed.

12M CO5 L6

OR

11. Design a C.I trunk type piston for a single acting four stroke petrol engine developing 5kW at 600 rpm.  
Diameter of piston is 120 mm and the maximum explosion pressure is 4.5MPa. Heat supplied to the engine is 19000KJ/kWh. About 6% of heat is conducted through the piston crown. The heat conduction factor for C.I engine may be taken as 46 W/m<sup>2</sup>/°C. The temperature difference between the centre and edge of the crown may be taken as 250°C.

12M CO5 L6

\*\*\* End \*\*\*

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| <b>R-20</b> |
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**Code: 20A55FT**

III B.Tech. I Semester Regular Examinations Dec 2022/Jan 2023

**Data Structures using Python**  
( Mechanical Engineering )

Max. Marks: 70

Time: 3 Hours

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- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)  
 2. In Part-A, each question carries **Two mark**.  
 3. Answer **ALL** the questions in **Part-A** and **Part-B**

**PART-A**

(Compulsory question)

- |   |    |    |
|---|----|----|
| 1. Answer <b>all</b> the following short answer questions ( 5 X 2 = 10M ) | CO | BL |
| a) Discuss Built-in Data Structures in python.                            | 1  | L2 |
| b) Explain the functionality of stack ADT with real-time example.         | 2  | L2 |
| c) List the advantages of recursion.                                      | 3  | L1 |
| d) Explain the functionality of priority queue.                           | 3  | L2 |
| e) List out the pattern matching algorithms.                              | 4  | L1 |

**PART-B**

Answer *five* questions by choosing one question from each unit ( 5 x 12 = 60 Marks )

- |   | Marks | CO | BL |
|---|-------|----|----|
| <b>UNIT-I</b>   |       |    |    |
| 2. a) Write a short note on low level arrays. And Referential arrays..  | 6M    | 1  | L2 |
| b) Explain the concept of compact array in python   | 6M    | 1  | L2 |
| <b>OR</b>   |       |    |    |
| 3. Discuss the efficiency of python sequence types.   | 12M   | 1  | L2 |
| <b>UNIT-II</b>  |       |    |    |
| 4. a) Implement Stack ADT using single linked list.   | 8M    | 2  | L4 |
| b) Write a program for traversing the nodes in single linked list.  | 4M    | 2  | L4 |
| <b>OR</b>   |       |    |    |
| 5. a) Define and explain queue ADT.   | 4M    | 2  | L2 |
| b) Write a program to remove the node from single linked list using tail reference.   | 8M    | 2  | L4 |
| <b>UNIT-III</b>   |       |    |    |
| 6. a) Write a program for factorial using recursion.  | 6M    | 3  | L3 |
| b) Interpret the working of recursive program with suitable example with flowchart.   | 6M    | 3  | L2 |
| <b>OR</b>   |       |    |    |
| 7. Write the program for merge sort to sort the list of elements shown below in ascending order 23 11 34 77 8 66 50 43                        | 12M   | 3  | L3 |
| <b>UNIT-IV</b>  |       |    |    |
| 8. Write a program to implement the heap sort.  | 12M   | 3  | L3 |
| <b>OR</b>   |       |    |    |
| 9. a) Write an algorithm to insert an element in binary search tree.  | 6M    | 4  | L3 |
| b) Explain in order traversal of a binary tree with example.  | 6M    | 4  | L2 |
| <b>UNIT-V</b>   |       |    |    |
| 10. a) Differentiate standard and compressed tries.   | 6M    | 2  | L2 |
| b) Draw the simple undirected graph with 18 edges, 12 vertices and 3 connected components. What is the largest number of edges it might have? | 6M    | 3  | L4 |
| <b>OR</b>   |       |    |    |
| 11. a) Explain graph ADT with suitable examples.  | 10M   | 3  | L2 |
| b) Draw standard trie for following set of strings { abab, baba, ccccc, bbaaaa }  | 2M    | 4  | L4 |

\*\*\* End \*\*\*

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| <b>R-20</b> |
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**Code: 20A35CT**

III B.Tech. I Semester Regular Examinations Dec 2022/Jan 2023

**Industrial Management**  
(Mechanical Engineering)

Max. Marks: 70

Time: 3 Hours

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- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)  
2. In Part-A, each question carries **Two mark**.  
3. Answer **ALL** the questions in **Part-A** and **Part-B**

**PART-A**

(Compulsory question)

- |   |    |    |
|---|----|----|
| 1. Answer <b>all</b> the following short answer questions (5 X 2 = 10M) | CO | BL |
| a) Difference between Line and Staff Organizations                      | 1  | L2 |
| b) How plant location is different from the plant layout?               | 2  | L1 |
| c) What are the various method study chart symbols?                     | 3  | L1 |
| d) Differentiate PERT and CPM.  | 4  | L2 |
| e) List various types of wage incentive schemes.                        | 5  | L1 |

**PART-B**

Answer **five** questions by choosing **one** question from each unit (5 x 12 = 60 Marks)

- |   | Marks | CO | BL |
|---|-------|----|----|
| <b>UNIT-I</b>   |       |    |    |
| 2. a) Discuss the Taylor's principles of scientific management.   | 6M    | 1  | L2 |
| b) Explain theory x and theory y and show as a manager how you would apply them to motivate your staff. | 6M    | 1  | L2 |
| <b>OR</b>   |       |    |    |
| 3. a) Write about departmentation. State its aims and advantages.                                       | 6M    | 1  | L2 |
| b) Explain features of "functional organization" with suitable example.                                 | 6M    | 1  | L2 |
| <b>UNIT-II</b>  |       |    |    |
| 4. a) What are the factors affecting the plant location. Explain with any one specific industry.        | 7M    | 2  | L3 |
| b) Differentiate between process layout and product layout.   | 5M    | 2  | L2 |
| <b>OR</b>   |       |    |    |
| 5. a) Name various purchasing procedures and explain any two in detail.                                 | 6M    | 2  | L2 |
| b) Describe various types of Inventories with suitable examples.  | 6M    | 2  | L1 |
| <b>UNIT-III</b>   |       |    |    |
| 6. a) Define Work Study. State its objectives. Differentiate between Method Study and Work Measurement  | 8M    | 3  | L2 |

- b) Explain the steps involved in method study procedure. 4M 3 L2

**OR**

7. a) Explain different methods of performance rating in conducting time study. 6M 3 L2
- b) Discuss briefly the functions of marketing. 6M 3 L2

**UNIT-IV**

8. A project consists of nine jobs (A, B, C ...I) with the following precedence relations and time estimates.

|         |    |    |     |     |   |     |     |     |     |
|---------|----|----|-----|-----|---|-----|-----|-----|-----|
| Job :   | A  | B  | C   | D   | E | F   | G   | H   | I   |
| Pred :  | -  | -  | A,B | A,B | B | D,E | C,F | D,E | G,H |
| Ecessor |    |    |     |     |   |     |     |     |     |
| Time :  | 15 | 10 | 10  | 10  | 5 | 5   | 18  | 9   | 15  |

(days)

- (i) Draw the project network ; (ii) identify the critical path 12M 4 L3

**OR**

9. A small project is composed of 7 activities whose time estimates are listed in the table below.

| Activity | Estimated duration (weeks) |             |             |
|----------|----------------------------|-------------|-------------|
|          | Optimistic                 | Most likely | Pessimistic |
| 1-2      | 1                          | 1           | 7           |
| 1-3      | 1                          | 4           | 7           |
| 1-4      | 2                          | 2           | 8           |
| 2-5      | 1                          | 1           | 1           |
| 3-5      | 2                          | 5           | 14          |
| 4-6      | 2                          | 5           | 8           |
| 5-6      | 3                          | 6           | 15          |

- a) Find the expected duration and variance for each activity.

- b) Calculate the project duration time 12M 4 L3

**UNIT-V**

10. a) Explain the functions of HRM. 8M 5 L2
- b) Discuss the need and significance of merit rating to a modern industrial enterprise. 4M 5 L3

**OR**

11. What is Corporate Strategy Planning Process? Why is this important for long term success of any business organization? 12M 5 L2

\*\*\* End \*\*\*

Hall Ticket Number :

R-20

Code: 20A352T

III B.Tech. I Semester Regular Examinations Dec 2022/Jan 2023

**Machining Processes**  
(Mechanical Engineering)

Max. Marks: 70

Time: 3 Hours

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- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)  
2. In Part-A, each question carries **Two mark**.  
3. Answer **ALL** the questions in **Part-A** and **Part-B**

**PART-A**

(Compulsory question)

- |   | CO | BL |
|---|----|----|
| 1. Answer <b>all</b> the following short answer questions ( 5 X 2 = 10M ) |    |    |
| a) What do you understand by "Tool Signature"?                            | 1  | L1 |
| b) Differentiate semi-automatic and automatic lathe                       | 2  | L2 |
| c) Write any one operation on shaper with neat diagram.                   | 3  | L1 |
| d) How do you Specify a Grinding Wheel                                    | 4  | L1 |
| e) Why should jigs and fixtures be rigid?                                 | 5  | L1 |

**PART-B**

Answer **five** questions by choosing one question from each unit ( 5 x 12 = 60 Marks )

Marks CO BL

**UNIT-I**

- |   |     |   |    |
|---|-----|---|----|
| 1. Draw Merchants force diagram. State the assumptions made in the development of such a diagram. | 12M | 1 | L2 |
|---|-----|---|----|

**OR**

- |   |    |   |    |
|---|----|---|----|
| 2 a) A carbide-cutting tool lasted for 150 min while machining M.S at 35 m/min. If a similar tool is used at 30% higher speed to machine M.S. Calculate the tool life. Also calculate the value of cutting speed if the tool is to machine for 2 hours. Assume $n=0.3$ in Taylors tool life equation $VT^n=C$ . | 6M | 1 | L3 |
| b) Write the various functions of cutting fluids  | 6M | 1 | L1 |

**UNIT-II**

- |   |    |   |    |
|---|----|---|----|
| 3. a) How Lathe is specified explain briefly the operations that are performed on Lathe | 6M | 2 | L1 |
| b) Diagrammatically explain the thread cutting on the lathe machine.                    | 6M | 2 | L2 |



**OR**

- |       |  |    |   |    |
|-------|--|----|---|----|
| 4. a) | Compare automatic and semi-automatic Lathes                    | 6M | 2 | L2 |
| b)    | Explain the working of a multi spindle lathes and applications | 6M | 2 | L2 |

**UNIT-III**

- |   |  |     |   |    |
|---|--|-----|---|----|
| 5 | Explain the working of a quick return mechanism of a shaper and various operations performed on it | 12M | 3 | L2 |
|---|--|-----|---|----|

**OR**

- |    |  |     |   |    |
|----|--|-----|---|----|
| 6. | What is the principle of working of milling machines? How do you classify the milling machine? Explain | 12M | 3 | L1 |
|----|--|-----|---|----|

**UNIT-IV**

- |   |  |     |   |    |
|---|--|-----|---|----|
| 7 | What are surface grinding machine, explain various surface grinding machines | 12M | 4 | L2 |
|---|--|-----|---|----|

**OR**

- |    |   |     |   |    |
|----|---|-----|---|----|
| 8. | How broaching machine specified? Discuss about push and pull broach | 12M | 4 | L2 |
|----|---|-----|---|----|

**UNIT-V**

- |   |   |     |   |    |
|---|---|-----|---|----|
| 9 | What are the common types of drill jigs? How does a template jig differ from a plate jig? | 12M | 5 | L1 |
|---|---|-----|---|----|

**OR**

- |     |  |     |   |    |
|-----|--|-----|---|----|
| 10. | Explain with neat sketch any two types of clamping device. | 12M | 5 | L2 |
|-----|--|-----|---|----|

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| <b>R-20</b> |
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**Code: 20A351T**

III B.Tech. I Semester Regular Examinations Dec 2022 / Jan 2023

**Applied Thermodynamics**  
(Mechanical Engineering)

Max. Marks: 70

Time: 3 Hours

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- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)  
2. In Part-A, each question carries **Two marks**.  
3. Answer **ALL** the questions in **Part-A** and **Part-B**

**PART-A**

( **Compulsory question** )

- |   |    |    |
|---|----|----|
| 1. Answer all the following short answer questions ( 5 X 2 = 10M )  | CO | BL |
| a) List the advantages of high pressure boilers                     | 1  | L1 |
| b) State the effect of friction on the flow through a steam nozzle. | 2  | L2 |
| c) How would you calculate stage efficiency of turbine?             | 3  | L2 |
| d) State the merits of gas turbines over steam engines              | 4  | L1 |
| e) Define tonne of refrigeration                                    | 5  | L2 |

**PART-B**

Answer **five** questions by choosing one question from each unit ( 5 x 12 = 60 Marks )

Marks CO BL

**UNIT-I**

- |   |     |   |    |
|---|-----|---|----|
| 2. What is meant by fire tube boiler? Explain any one of the fire tube boiler with a neat sketch. | 12M | 1 | L4 |
|---|-----|---|----|

**OR**

- |   |     |   |    |
|---|-----|---|----|
| 3. A simple Rankine cycle works between pressures 28 bar and 0.06 bar, the initial condition of steam being dry saturated, calculate the cycle efficiency, work ratio and specific steam consumption. | 12M | 1 | L2 |
|---|-----|---|----|

**UNIT-II**

- |  |     |   |    |
|--|-----|---|----|
| 4. A surface condenser deals with 13625 kg of steam per hour at a pressure of 0.09 bar. The steam enters 0.85 dry and the temperature at the condensate and air extraction pipe is 36°C. The air leakage amount s to 7.26 kg/hour. Determine (i) the surface required if the average heat transmission rate is 3.97 kJ/m <sup>2</sup> per second; (ii) the cylinder diameter for the dry air pump, if it is to be single acting at 60 rpm with a stroke to bore ratio of 1.25 and volumetric efficiency of 0.85. | 12M | 2 | L4 |
|--|-----|---|----|

**OR**

5. Derive the general relationship between area, velocity and pressure in nozzle flow. 12M 2 L2

**UNIT-III**

6. Explain the impulse turbine with a velocity profile diagram. 12M 3 L4

**OR**

7. In an impulse turbine (with a single row wheel) the mean diameter of the blades is 1.05 m and the speed is 3000 rpm. The nozzle angle is  $18^\circ$ , the ratio of blade speed to steam speed is 0.42 and the ratio of the relative velocity at outlet from the blades to that at inlet is 0.84. The outlet angle of the blade is to be made  $3^\circ$  less than the inlet angle. The steam flow is 10 kg/sec. Draw the velocity diagram for the blades and derive the following: (i) tangential thrust on the blades (ii) axial thrust on the blades (iii) resultant thrust on the blades (iv) power developed in the blades (v) blading efficiency. 12M 3 L4

**UNIT-IV**

8. A gas turbine unit has a pressure ratio of 6:1 and maximum cycle temperature of  $610^\circ\text{C}$ . The isentropic efficiencies of the compressor and turbine are 0.80 and 0.82 respectively. Calculate the power output in kW of an electric generator geared to the turbine when the air enters the compressor at  $15^\circ\text{C}$  at the rate of 16 kg/s. Take  $c_p = 1.0005 \text{ kJ/kg K}$  and  $\gamma = 1.4$  for the compression process, and take  $c_p = 1.11 \text{ kJ/kg K}$  and  $\gamma = 1.333$  for the expansion process. 12M 4 L5

**OR**

9. Explain the working principle, advantages and limitations of ram jet and pulse-jet engine with neat sketch 12M 4 L2

**UNIT-V**

10. Derive an expression for COP for air refrigeration system working on reversed Brayton cycle. 12M 5 L3

**OR**

11. Describe briefly with a neat sketch a winter type air conditioner. 12M 5 L3

\*\*\* End \*\*\*

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**Code: 20A15FT**

III B.Tech. I Semester Regular Examinations Dec 2022/Jan 2023

**Disaster Management**  
( Mechanical Engineering )

Max. Marks: 70

Time: 3 Hours

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- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)  
2. In Part-A, each question carries **Two mark**.  
3. Answer **ALL** the questions in **Part-A** and **Part-B**

**PART-A**

**(Compulsory question)**

- |   | CO  | BL |
|---|-----|----|
| 1. Answer <b>all</b> the following short answer questions ( 5 X 2 = 10M ) |     |    |
| a) List the different types of environmental disasters?                   | CO1 | L1 |
| b) Show the causes of environmental pollution.                            | CO2 | L1 |
| c) Discuss the emergency stage in disaster management?                    | CO3 | L2 |
| d) List DRR programs.   | CO4 | L2 |
| e) Define post-disaster stages.   | CO5 | L1 |

**PART-B**

**Answer five questions by choosing one question from each unit ( 5 x 12 = 60 Marks )**

- |  | Marks | CO  | BL |
|--|-------|-----|----|
| <b>UNIT-I</b>  |       |     |    |
| 2. Discuss the various types of natural disasters and highlight the specific efforts to mitigate disasters in India. | 12M   | CO1 | L2 |
| <b>OR</b>  |       |     |    |
| 3. Define vulnerability and describe its relationship with capacity  | 12M   | CO1 | L2 |
| <b>UNIT-II</b>   |       |     |    |
| 4. Summarize a note on manmade hazards in detail.  | 12M   | CO2 | L2 |
| <b>OR</b>  |       |     |    |
| 5. Explain the necessity of disaster warning systems in Industries.  | 12M   | CO2 | L2 |
| <b>UNIT-III</b>  |       |     |    |
| 6. Explain in detail about Methods of crisis management.   | 12M   | CO3 | L1 |
| <b>OR</b>  |       |     |    |
| 7. Explain in detail about methods of emergency management.  | 12M   | CO3 | L2 |
| <b>UNIT-IV</b>   |       |     |    |
| 8. Define Total Disaster Risk Management Approach and examine its pertinence to Disaster Management cycle            | 12M   | CO4 | L1 |
| <b>OR</b>  |       |     |    |
| 9. Discuss about state and national level disaster management programmers?   | 12M   | CO4 | L1 |
| <b>UNIT-V</b>  |       |     |    |
| 10. Describe the various management guidelines for temporary shelter provision during disasters.                     | 12M   | CO5 | L1 |
| <b>OR</b>  |       |     |    |
| 11. India has witnessed a shift from relief to mitigation and preparedness planning'. Discuss.                       | 12M   | CO5 | L2 |

\*\*\* End \*\*\*