R-19

Code: 19A353T

III B.Tech. I Semester Supplementary Examinations Nov/Dec 2022

Design of Machine Elements-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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UNIT–I

1. a) What are the manufacturing considerations to be considered by design? **7M**

   b) An unknown weight falls through 10 mm on a collar rigidly attached to the lower end of a vertical bar 3 m long and 600 mm^2 in section. If the maximum instantaneous extension is known to be 2 mm, what is the corresponding stress and the value of unknown weight? Take E = 200 kN/mm^2. **7M**

OR

2. a) Enumerate any four most commonly used engineering materials and state at least one important property and one application of each. **7M**

   b) Find out the numbers of R10 basic series from 1 to 10. **7M**

UNIT–II

3. a) Define endurance limit? Discuss the factors which affect the endurance limit of the material. **7M**

   b) Determine the size of a piston rod subjected to a total load having cyclic fluctuation from 150 kN (tension) to 25 kN (compression). The endurance limit is 360 MPa and yield strength is 400 MPa. Take factor of safety = 1.5; surface finish factor = 0.88 and stress concentration factor = 2.25. **7M**

OR

4. a) Describe Soderberg's criteria And derive the equation for designing of machine members subjected to dynamic load. **7M**

   b) Determine the diameter of a circular rod made of ductile material with a fatigue strength (complete stress reversal), $_e$ =265MPa and a tensile yield strength of 350MPa. The member is subjected to a varying axial load from W_{min}=– 300 × 10^{3}N to W_{max}=700×10^{3}N and has a stress concentration factor = 1.8. Use factor of safety as 2.0. **7M**

UNIT–III

5. a) List out the advantages and disadvantages of screw joints. **7M**

b) An electric motor weighing 10 kN is lifted by means of an eye bolt. The eye bolt is screwed into the frame of the motor. The eye bolt has coarse threads. It is made of plain carbon steel 30C8 (S_{yt}=400 N/mm^2) and the factor of safety is 6. Determine the size of the bolt. 7M

OR

6. a) A bracket is bolted to a column by 6 bolts of equal size as shown in Fig. It carries a load of 50 kN at a distance of 150 mm from the centre of column. If the maximum stress in the bolts is to be limited to 150MPa, determine the diameter of bolt.

14M
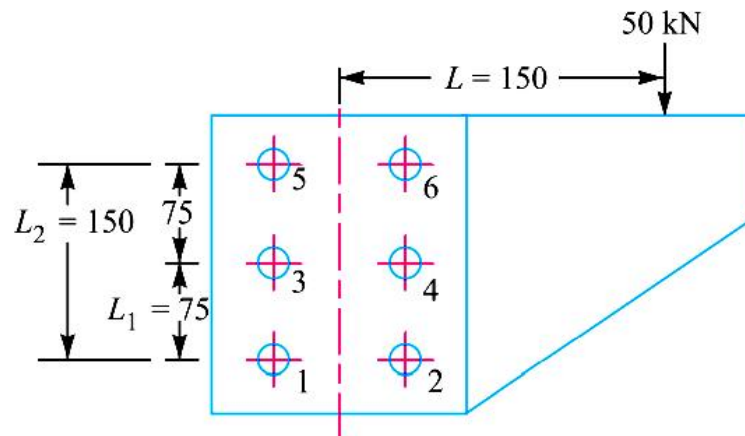
UNIT–IV

7. a) Design a sleeve and cotter joint to resist a tensile load of 60 kN. All parts of the joint are made of the same material with the following allowable stresses: $_t$ = 60 MPa ; = 70 MPa ; and $_c$ = 125 MPa 14M

OR

8. a) What are the applications of knuckle joint? 4M

b) Design a knuckle joint to transmit 140 kN, with permissible stresses in tension; shear and compression are 75 Mpa; 60 Mpa and 150 Mpa respectively. 10M

UNIT–V

9. a) How the shaft is designed when it is subjected to twisting moment and bending moment? 6M

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° in a length of 3 m. Take C = 80 GPa. 8M

OR

10. a) Classify the shaft coupling. 6M

b) Design of a muff coupling which is used to connect two steel shafts transmitting 40 kW at 350 r.p.m. The material for the shafts and key is plain carbon steel for which allowable shear and crushing stresses may be taken as 40 MPa and 80 MPa respectively. The material for the muff is cast iron for which the allowable shear stress may be assumed as 15 MPa. 8M

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ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES, RAJAMPET (AUTONOMOUS)

III B.Tech I Semester **ME Supplementary** Examination
19AC53T-Universal Human Values-II

H.T. No:-										

Date:-26-12-2022   **Duration: 3Hrs.**

Answer all of the following.   **5X10=50 Marks**

		Marks	Course Outcomes	Bloom's Level
1	Distinguish between Animal consciousness and Human Consciousness.	10M	1	2
	(OR)			
2	What is the qualitative difference between the activities of the Self and those of the Body? Illustrate with few examples.	10M	2	2
3	What are the basic Human aspirations and what are the requirements to fulfil them? Indicate their correct priority with examples.	10M	2	2
	(OR)			
4	Why is right understanding required in relationship for mutual happiness? Illustrate with the help of two examples from your life.	10M	5	2
5	How is behaviour and work decided? Is it decided by the Body or by the Self?	10M	3	2
	(OR)			
6	What is imagination? Is it taking place continuously or is it a temporary activity that you can start and stop at will? Justify your answer with some examples.	10M	5	2
7	How is trust the foundational value of relationship?	10M	4	3
	(OR)			
8	How is behaviour and work decided? Is it decided by the Body or by the Self?	10M	3	2
9	Distinguish between units and space.	10M	5	2
	(OR)			
10	What do you mean by definitiveness in Ethical Human conduct? Support your answer with an example.	10M	2	2

Code: 19A35CT

III B.Tech. I Semester Supplementary Examinations Nov/Dec 2022

Industrial Management

(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)	Explain the concept, and applications of committee organization	7M	CO1	L1
	b)	Describe the functional organization and applications of functional organization	7M	CO1	L1
		OR			
2.	a)	Explain the concept, advantages, disadvantages and applications of line and staff organization	7M	CO1	L1
	b)	Describe matrix organization.	7M	CO1	L1
		UNIT–II			
3.		Define plant layout. Explain the types of Plant layout in detail	14M	CO2	L1
		OR			
4.	a)	Discuss the factors affecting plant location	7M	CO2	L1
	b)	Suggest suitable layout to establish a cement industry	7M	CO2	L2
		UNIT–III			
5.	a)	Define time study and explain its objectives	7M	CO3	L1
	b)	Explain various steps involved in time study	7M	CO3	L2
		OR			
6.	a)	Describe the various methods involved for Performance rating in Work study.	7M	CO3	L1
	b)	Discuss the procedure of Method study	7M	CO3	L1
		UNIT–IV			
7.	a)	Explain the periodical review inventory control system	7M	CO4	L1
	b)	A manufacturer has to supply his customers 3600 units of its products per year. Inventory carrying cost amounts Rs 1.2 per unit per annum. The set up cost per run is Rs 80. Determine i)Economic order quantity ii)Number of orders per year	7M	CO4	L1
		OR			
8.	a)	Describe the costs associated with the inventories	7M	CO4	L2
	b)	A manufacturing company places a annual order of 48,000 units at a price of Rs 20 per unit. Its carrying cost is 15% of unit price and the order cost is Rs 12 per order. Determine i)Economic order quantity ii)Number of orders per year iii)Time between orders	7M	CO4	L2
		UNIT–V			
9.	a)	Describe job analysis	7M	CO5	L2
	b)	How do you determine the labour turnover rate?	7M	CO5	L2
		OR			
10.	a)	Is personnel manager is Line or staff manager? support your answer with an example	7M	CO5	L2
	b)	Explain off the job training and on the job training methods	7M	CO5	L2

END

Code: 19A35JT

III B.Tech. I Semester Supplementary Examinations Nov/Dec 2022

Industrial Robotics

(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. Define Robotics? Explain robot configuration systems with neat sketches. — 14M — 1 — 2

OR

2. Define Robot? Write a short note on advantages and disadvantages of robots in human endeavor? — 14M — 1 — 2

UNIT–II

3. Define forward and reverse kinematics of robot and differentiate between forward and reverse kinematics of robots. — 14M — 2 — 2

OR

4. Derive Lagrangian robot equations for a two degree of freedom system? — 14M — 2 — 2

UNIT–III

5. Define path planning? Explain path planning with its block diagram. — 14M — 3 — 2

OR

6. Explain briefly about the following terms:
   (i) Skew motion — 7M — 3 — 2
   (ii) Joint integrated motion — 7M — 3 — 2

UNIT–IV

7. Briefly explain the working principle of ANY TWO types of non-contact type sensors with a neat sketch. — 14M — 4 — 2

OR

8. a) Explain Pneumatic actuators system with neat sketch. — 7M — 4 — 2
   b) Explain the working of a stepper motor with neat sketch. — 7M — 4 — 2

UNIT–V

9. a) Distinguish between online programming and offline programming. — 7M — 5 — 2
   b) Explain briefly about industrial robot application. — 7M — 5 — 2

OR

10. Explain briefly about the following terms:
    (i) Teach pendant robot programming — 7M — 5 — 2
    (ii) Packaging and palletizing of products — 7M — 5 — 2

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Code: 19A352T

III B.Tech. I Semester Supplementary Examinations Nov/Dec 2022
Machine Tools
(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) | With a neat sketch explain the geometry of a single point cutting tool? | 10M | CO1 | L1 |
| | b) | Explain about ASA system in detail. | 4M | CO1 | L1 |

OR

| 2. | a) | Why chip breakers are used? List various types of chip breakers and explain their significance. | 7M | CO1 | L3 |
| | b) | Explain tool wear and flank wear with neat sketches? | 7M | CO1 | L2 |

UNIT–II

| 3. | | Classify the lathe machines. Draw the Lathe machine with neat sketch and show its parts? | 14M | CO2 | L4 |

OR

| 4. | a) | Describe any two work holding devices used in Lathe. With neat sketches? | 7M | CO2 | L1 |
| | b) | List out the various types of Dead centers in Lathe machine? Explain any two with neat sketches. | 7M | CO2 | L1 |

UNIT–III

| 5. | | Explain with a neat sketch the construction and working principle of a Radial Drilling machine. | 14M | CO3 | L2 |

OR

| 6. | | Show with neat sketch a Twist Drill and label the important elements. | 14M | CO3 | L2 |

UNIT–IV

| 7. | a) | Explain different types of Grinding process in detail. | 7M | CO4 | L2 |
| | b) | Write short notes on Abrasive types & usage | 7M | CO4 | L2 |

OR

| 8. | | Clearly indicate the difference between Push and Pull type of Broaches. | 14M | CO4 | L1 |

UNIT–V

| 9. | | What is the general function of Locators? List out the various types of Locators and explain any two with neat sketches | 14M | CO5 | L1 |

OR

| 10. | | Define a Jig? List out the various types of Drill Jigs and explain any two with neat sketches | 14M | CO5 | L2 |

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Code: 19A35IT

III B.Tech. I Semester Supplementary Examinations Nov/Dec 2022

Rapid Prototyping
(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)	Compare rapid prototyping technology with CNC technology	7M	1	2
	b)	With example explain the historical development of rapid prototyping technology	7M	1	3
		OR			
2.	a)	With example, explain the historical development of rapid prototyping technology	7M	1	2
	b)	List out the usage of RP parts in different fields	7M	1	3
		UNIT–II			
3.		Compare LOM with FDM with suitable reasons	14M	2	5
		OR			
4.	a)	Explain about pre-build, part build and post-build process of SLA	7M	2	2
	b)	How to perform post-processing in SLA technology	7M	2	5
		UNIT–III			
5.	a)	What are the different types of materials available for SLS system and give their applications.	7M	3	2
	b)	Differentiate indirect and direct SLS process	7M	3	2
		OR			
6.		Is it possible to use electron beam melting technology (EBM) technology to produce metal products, explain it?	14M	3	5
		UNIT–IV			
7.		List out different phases in reverse engineering (RE). Explain each phase.	14M	4	3
		OR			
8.		Define rapid tooling and classify it with suitable examples	14M	4	1
		UNIT–V			
9.		Differentiate rapid prototyping and rapid manufacturing	14M	5	2
		OR			
10.	a)	List the applications of RP technology in manufacturing	7M	5	3
	b)	Explain the applications of AM in various fields	7M	5	2

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R-19

Code: 19A35HT

III B.Tech. I Semester Supplementary Examinations Nov/Dec 2022

Automation & Robotics

(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 automation. Describe the types of automation with neat graph.	14M	1	L2
		OR			
2.	a)	What is an Automated flow line? Discuss the objectives of flow line automation.	7M	1	L2
	b)	Explain the methods of work part transfer.	7M	1	L2

UNIT–II

3.		Discuss about the elements of parts feeding devices.	14M	2	L2
		OR			
4.	a)	What is an Assembly process? Discuss the various types of assembly processes with suitable examples.	7M	2	L2
	b)	What are the various types of assembly systems? Explain them.	7M	2	L2

UNIT–III

5.	a)	Discuss the laws of Robotics	7M	3	L2
	b)	Write in brief the applications of Robots in various fields.	7M	3	L2
		OR			
6.	a)	Explain the need of Robots in present customization	7M	3	L2
	b)	With neat diagrams explain about Robot joints	7M	3	L2

UNIT–IV

7.	a)	With an example differentiate forward and inverse kinematics.	7M	4	L2
	b)	Write down about Jacobians differential transformation	7M	4	L1
		OR			
8.		With a relevant schematic diagram describe the concept and relevance of pitch, yaw and roll motions of a robot wrist.	14M	4	L4

UNIT–V

9.	a)	Compare Pneumatic, Hydraulic and electric actuators	7M	5	L3
	b)	Describe the working of Encoders with neat diagrams.	7M	5	L2
		OR			
10.	a)	Explain about Touch and Tactile sensors.	7M	5	L2
	b)	Write about Robot Textual Languages	7M	5	L2

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Code: 19A351T

III B.Tech. I Semester Supplementary Examinations Nov/Dec 2022

Applied Thermodynamics-II
(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.	Discuss Reheat Rankine cycle with a neat sketch.	14M	CO1	L2
	OR			
2.	Explain the working construction of steam engines.	14M	CO1	L2
	UNIT–II			
3. a)	Sketch Babcock and Wilcox boiler and explain its working.	10M	CO2	L2
b)	Illustrate about fusible plug.	4M	CO2	L3
	OR			
4.	Derive an expression for natural draught and maximum discharge rate of gases through the chimney for a given height of chimney, clearly stating the assumptions made.	14M	CO2	L6
	UNIT–III			
5. a)	Describe the function of nozzle & discuss various types of nozzles.	7M	CO3	L1
b)	Discuss about super saturation flow of steam in nozzles.	7M	CO3	L2
	OR			
6. a)	In a steam nozzle, steam expands from 4 bar to 1 bar. The initial velocity of steam is 60 m/s and the initial temperature is 200^0C. Determine the exit velocity if the nozzle efficiency is 92%.	10M	CO3	L3
b)	Define metastable state.	4M	CO3	L1
	UNIT–IV			
7. a)	With the help of a neat sketch explain the working principle of Barometric jet condenser.	8M	CO4	L2
b)	Differentiate jet condensers with surface condensers.	6M	CO4	L4
	OR			
8. a)	Steam enters a condenser at 36^0C and with barometer reading 760 mm of Hg. If vacuum of 695 mm of Hg. is produced, find the vacuum efficiency?	8M	CO4	L3
b)	Explain parallel flow jet condenser and explain its working principle.	6M	CO4	L2
	UNIT–V			
9. a)	Explain velocity compounding in steam turbines with neat sketch	8M	CO5	L2
b)	Compare impulse turbine with reaction turbine.	6M	CO5	L5
	OR			
10.	Steam leaves the nozzle of a single stage impulse turbine at 850 m/s. The nozzle angle is 18^0 and the blade angles are 29^0 at the inlet and outlet. The friction coefficient is 0.9. Calculate blade velocity and steam mass flow rate in kg/hr to develop 300 W power.	14M	CO5	L3

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