H.T No: | | | | | | | | | | | **R18** **Course Code: A30336**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech VI Semester Supplementary Examinations June-2025

Course Name: Engineering Metrology & Measurements

(Mechanical Engineering)

Date: 21.06.2025 AN **Time: 3 hours** **Max.Marks: 70**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries TWO marks. **10x2=20M**

1.	Give two examples for primary measurement.	2 M
2.	State principle of interference.	2 M
3.	Define i) Allowance ii) Tolerance.	2 M
4.	What is the use of spirit level?	2 M
5.	Define i) Roughness ii) Waviness.	2 M
6.	Name the instruments used for the measurement of cylindricity.	2 M
7.	Name the various pitch errors found in screw.	2 M
8.	State the advantages of CMM.	2 M
9.	What are the common materials used for thermistors?	2 M
10.	Why is flow measurement important?	2 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A).	Discuss the need for inspection. Describe two methods of measurement.	10M
	OR	
11. B).	Explain the phenomenon of interference with suitable diagram.	10M
12. A).	Define fit? Describe the various types of fits with neat sketches?	10M
	OR	
12. B).	Explain with the help of neat sketch the taper measurement using rollers and slip gauges.	10M
13. A).	Explain the following methods of quantifying surface roughness: (i) Rz value (ii) RMS value, and (iii) Ra value.	10M
	OR	
13. B).	Describe the parallelism measurement using dial gauge with neat sketch.	10M
14. A).	Classify the comparators and distinguish between mechanical and electrical comparator.	10M
	OR	
14. B).	Explain with neat sketch two-wire method of measuring the effective diameter of a screw thread.	10M
15. A).	Explain the working of the thermistor with neat sketch and list its advantages and limitations.	10M
	OR	
15. B).	Explain the working of load cells and give their usages.	10M

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H.T No: | | | | | | | | | | | **R18** **Course Code: A30338**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech VI Semester Supplementary Examinations June-2025

Course Name: Heat Transfer

(Mechanical Engineering)

Date: 24.06.2025 AN **Time: 3 hours** **Max.Marks: 70**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries TWO marks. **10x2=20M**

1. State the Fourier's law of heat conduction and also write its equation. 2 M
2. Illustrate the unsteady state of heat transfer. 2 M
3. Define the fin effectiveness. 2 M
4. What is critical thickness of insulation? Write an equation for critical thickness of insulation in case of sphere. 2 M
5. Explain how convective heat transfer occurs in fluids. 2 M
6. Discuss the significance of Reynolds number and Grashof number. 2 M
7. State the Kirchoff law with respect radiation. 2 M
8. Define emissivity and transmissivity. 2 M
9. How do you define counter flow heat exchanger and draw its temperature distribution diagram. 2 M
10. Distinguish between pool boiling an film boiling. 2 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). Derive the general three-dimensional heat conduction equation in cylindrical co-ordinate system. 10M

OR

11. B). What are boundary and initial conditions? How many boundary conditions are needed to solve a second order differential equation for heat conduction. 10M

12. A). An aluminum sphere weighing 5.5 kg and initially at a temperature of 290^0 C is suddenly immersed in a fluid at 15^0 C. The convective heat transfer coefficient is 58 W/ m^2 K. Estimate the time required to cool the aluminum sphere to 95^0 C using the lumped capacity method of analysis. 10M

OR

12. B). The inner surface of the brick wall of a plane brick wall is at 60^0 C and the outer surface is at 35^0 C. Calculate the rate of heat transfer per m^2 of the surface area of the wall, which is 220 mm thick. The thermal conductivity of the brick is 0.51 W/m ^{0}C. 10M

13. A). Apply the dimensional analysis for forced convection. 10M

OR

13. B). A vertical plate is at 96^0 C in an atmosphere of air at 20^0 C. Estimate the local heat transfer co-efficient at a distance of 20m from the lower edge and the average value over the 20cm length. 10M

(P.T.O..)

14. A). Determine the net radiation heat exchange between the two parallel black plates 0.5m by 1.0m are separated by 0.5m distance. One plate is at 1100^0 C and the other at 600^0 C. 10M

OR

14. B). Two concentric cylinders having diameters of 10cm and 20cm have a length of 20cm. Calculate the shape factor between the open ends of the cylinders. 10M

15. A). Hot oil with capacity rate of 2500 W/K flows through a double pipe heat exchanger. It enters at 360^0 C and leaves at 300^0 C. Cold fluid enters at 30^0 C and leaves at 200^0 C. If the overall heat transfer coefficient is 800 W/m^2 K, determine the heat exchanger area required for a parallel flow. 10M

OR

15. B). Describe the regimes of pool boiling of water with neat sketch. 10M

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H.T No: | | | | | | | | | | | R18 | Course Code: A30343

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech VI Semester Supplementary Examinations June-2025

Course Name: Automation in Manufacturing

(Mechanical Engineering)

Date: 26.06.2025 AN **Time: 3 hours** **Max.Marks: 70**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries TWO marks. **10x2=20M**

1.	Why do companies automate their operations?	2 M
2.	What is the role of CAD software in the design process?	2 M
3.	Name two common strategies used in automation to improve efficiency.	2 M
4.	What role does automation play in assembly processes?	2 M
5.	Name two methods of part transport used in automated flow lines.	2 M
6.	What are flexible assembly lines, and how do they differ from traditional assembly lines?	2 M
7.	Classify equipment used in automated material handling systems.	2 M
8.	What are the advantages of using automated conveyor systems over manual material handling?	2 M
9.	What is the purpose of adaptive control systems, and how do they differ from traditional control systems?	2 M
10.	How does automated inspection differ from the manual inspection method?	2 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A).	What is the role of collaborative platforms in CAD, CAM, and CIM? How do cloud-based collaboration and real-time data sharing improve product development workflows?	10M
	OR	
11. B).	How does geometric modeling facilitate the integration of design and manufacturing in a Computer Integrated Manufacturing (CIM) system?	10M
12. A).	Classify types and strategies of automation. How does the choice of types of automation impact production efficiency and adaptability in a manufacturing environment?	10M
	OR	
12. B).	Explain the concept of flexible fixturing and its significance in adaptable manufacturing processes. Discuss the advantages of using flexible fixturing in production environments, providing relevant examples.	10M
13. A).	Explain the importance of buffer storage in automated flow lines and how it affects the overall workflow. Analyze the differences in performance and efficiency between transfer lines with and without buffer storage.	10M

(P.T.O..)

OR

13. B). An eight-station automatic assembly machine has an ideal cycle time of 10 sec. Downtime is caused by defective parts jamming at the individual assembly stations. The average downtime per occurrence is 3.0 min. The fraction defect rate is 1.0%, and the probability that a defective part will jam at a given station is 0.6 for alt stations. Estimate: (a) yield of good assemblies, (b) average production rate of good assemblies, (c) proportion of assemblies with at least one defective component, (d) production rate of all assemblies, and e) uptime efficiency (E). 10M

14. A). Discuss the various types of equipment used in automated material handling and storage systems, elaborating on their functions and applications in modern manufacturing environments. 10M

OR

14. B). Differentiate randomized storage with dedicated storage. 10M

Suppose that a total of 50 SKUs must be stored in a storage system. For each SKU, the average order quantity = 100 cartons, average depletion rate = 2 cartons/day, and safety stock level = 10 cartons. Each carton requires one storage location in the system. Based on this data, each SKU has an inventory cycle that lasts 50 days. Since there are 50 SKUs in all, management has scheduled incoming orders so that a different SKU arrives each day. Determine the number of storage locations required in the system under two alternative strategies: (a) randomized storage and (b) dedicated storage.

15. A). Describe the fundamental principles of adaptive control systems and their significance in dynamic manufacturing environments. 10M

OR

15. B). Explain the coordinate measuring machine with a neat diagram. Mention advantages, Disadvantage and its applications in automated manufacturing. 10M

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H.T No: | | | | | | | | | | | R18 | Course Code: A30372

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech VI Semester Supplementary Examinations June-2025

Course Name: Automobile Engineering

(Mechanical Engineering)

Date: 28.06.2025 AN **Time: 3 hours** **Max.Marks: 70**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries TWO marks. **10x2=20M**

1. What are the requirements of automobile body? 2 M
2. What are the factors to be considered to reduce aerodynamics resistance? 2 M
3. Define common rail direct injection system. 2 M
4. Write the purpose of catalytic converter. 2 M
5. State the requirements of an automotive clutch. 2 M
6. What is a universal joint? What are its types? 2 M
7. What is wishbone and its purpose in automotive? 2 M
8. What are the functions of the shock absorber? 2 M
9. What are the different production methods for hydrogen? 2 M
10. State the advantages of fuel cell. 2 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). Draw schematic diagrams showing the layout of the transmission system of a rear wheel driven car and of a four wheel drive vehicle. Explain it. 10M

OR

11. B). List at least six IC engine components and mention their functioning, material they are made up of and a schematic of the same. 10M

12. A). Explain with a suitable sketch the working of a electronically controlled diesel injection system. What are the advantages and disadvantages? 10M

OR

12. B). Discuss exhaust emission control from automobiles in detail. 10M

13. A). i) Write overdrive troubles and their causes. 5M

ii) Comparison between the fluid fly wheel and torque converter 5M

OR

13. B). Explain briefly, with neat sketches of the following: 10M

i) Torque tube drive

ii) Hotchkiss drive.

14. A). Describe the construction and operation of power steering with neat sketch. 10M

OR

14. B). What is anti-lock braking system? Explain the need and functioning of ABS with a sketch. 10M

15. A). Explain the construction of LPG system in petrol engine and describe the salient features of using LPG as alternate fuel. 10M

OR

15. B). What is fuel cell? Explain the components and working principle of a Fuel Cell. 10M

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