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

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech VI Semester Supplementary Examinations January-2025

Course Name: Engineering Metrology & Measurements

(Mechanical Engineering)

Date: 08.01.2025 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 uses of measurement? 2 M
2. Define the term sensitivity of Instrument. 2 M
3. Name any four instruments used measuring internal diameters in components. 2 M
4. What is the use of slip gauges? 2 M
5. List out the methods of measuring flatness. 2 M
6. Define straightness. 2 M
7. What are the types of gear? 2 M
8. Define a) Lead and b) Pitch. 2 M
9. How force, torque and power are measured? 2 M
10. What is the working principle of thermocouple? 2 M

PART-B

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

11.A). What are the various possible sources of Errors in measurements? What do you understand by systematic error and random errors? 10M

OR

11. B). Explain the classification of various measuring methods. 10M

12. A). List out Linear measuring Instruments? And explain about Vernier Height gauge. 10M

OR

12. B). Explain bevel protractor, angle gauges and spirit level with neat sketches. 10M

13. A). What are the factors affecting surface roughness? Explain them. 10M

OR

13. B). What are the surface roughness parameters and roughness measurement methods? 10M

14. A). How are CMMs classified with respect to constructional features? Sketch and state their main applications, merits and demerits. 10M

OR

14. B). What is the function of comparator? explain about its types. 10M

15. A). Explain the construction and working of Venturimeter and Rota meter. 10M

OR

15. B). Explain the construction and working of Bimetallic strip and Thermocouple. 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 January-2025

Course Name: Heat Transfer

(Mechanical Engineering)

Date: 10.01.2025 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. Write the various application of heat transfer? 2 M
2. List the various modes of heat transfer. 2 M
3. What is composite wall? 2 M
4. What is the significance of Biot Number? 2 M
5. List any two conditions which help the flow to be laminar. 2 M
6. What is hydrodynamic boundary layer? 2 M
7. Is Ice a black body? Explain. 2 M
8. State Kirchhoff's law. 2 M
9. What is film wise condensation? 2 M
10. Classify heat exchangers. 2 M

PART-B

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

11.A). Derive general heat conduction equation in Cartesian coordinates for homogeneous and isotropic materials. 10M

OR

11. B). i) The mode of heat transfer by which fishes survives when the atmospheric temperature falls below 0^0C. Comment. 5M

ii) Classify the different kind of boundary conditions. 5M

12. A). Derive expressions for temperature distribution, rate of heat flow and efficiency for infinitely long fin. 10M

OR

12. B). A 50 cm x 50 cm copper slab 6.25 mm thick has a uniform temperature of 300^0C. Its temperature is suddenly lowered to 36^0C. Calculate the time required for the plate to reach the temperature of 108^0C. Take ρ = 9000 kg/m^3, c =0.38 kJ/kg^{0}C, k= 370 W/m^{0}C and h=90W/m^{2}C. 10M

13. A). Air at 20°C and at a pressure of 1 bar is flowing over a flat plate at a velocity of 3m/s. If the plate is 280 mm wide and at 56°C, Calculate the following quantities at x= 280mm, Take properties of air at 38^0C, ρ = 1.1374 kg/m^3, Cp =1.005 kJ/kg^{0}C, υ = 16.768 x10^{-6} m^2/s, k= 0.02732 W/mK, Pr = 0.7. 10M

i) Boundary layer thickness and Thermal boundary layer thickness

ii) Local & Average friction coefficient

iii) Local convective heat transfer coefficient

iv) Average convective heat transfer coefficient,

v) Rate of heat transfer by convection.

(P.T.O..)

OR

13. B). A vertical cylinder 1.5 m high and 180 mm in diameter is maintained at 100^0C in an atmosphere environment of 20^0C. Calculate heat loss by free convection from the surface of the cylinder. Take properties of air at mean temperature as $\rho = 1.06$ kg/m^3, $\upsilon = 18.97 \times 10^{-6}$ m^2/s, k= 0.1042 kJ/mh^{0}C, Pr = 0.697. 10M

14. A). A thermos flask has a double walled bottle and the space between the walls is evacuated so as to reduce the heat flow. The bottle surfaces are silver plated and the emissivity of each surface is 0.025. If the contents of the bottle are at 375 K, find the rate of heat loss from the thermos bottle to the ambient air at 300 K. What thickness of cork (k=0.03 W/mK) would be required if the same insulating effect is to be achieved by the use of cork? 10M

OR

14. B). A black body of total area 0.045 m^2 is completely enclosed in a space bounded by 5 cm thick walls. The walls have a surface area 0.5m^2 and k= 1.07 W/m^{0}C. If the inner surface of the enveloping wall is to be maintained at 215^0C and the outer wall surface is at 30^0C, calculate the temperature of the black body. Neglect the difference between inner and outer surface areas of enveloping material. 10M

15. A). In a certain double pipe heat exchanger hot water flows at a rate of 5000 kg/h and gets cooled from 95° C to 65^0C. At the same time 50000kg/h of cooling water at 30^0C enters the heat exchanger. The flow conditions are such that overall heat transfer coefficient remains constant at 2270 W/m2K. Determine the heat transfer area required and the effectiveness, assuming two streams are in parallel flow. Take for both streams Cp= 4.2 kJ/kgK. 10M

OR

15. B). Explain the various regimes of the saturated pool boiling. 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 January-2025

Course Name: Automation Manufacturing

(Mechanical Engineering)

Date: 16.01.2025 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 basic components of automated systems?	2 M
2.	How mechanical feeding is replaced by automation?	2 M
3.	What is partial automation?	2 M
4.	List the components of NC system.	2 M
5.	What are the four automated assembly system configurations?	2 M
6.	Name some line balancing methods.	2 M
7.	List various conveyor systems	2 M
8.	List different types of storage systems.	2 M
9.	What is the difference between off-line inspection and on-line inspection?	2 M
10.	List any 4 functions of CMM	2 M

PART-B

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

11.A).	Discuss some of the reasons used to justify automation system.	10M
	OR	
11. B).	What are the principles of automation?	10M
12. A).	Discuss application and advantages of NC	10M
	OR	
12. B).	Differentiate between flexible automation and fixed automation and mention their advantages and laminations.	10M
13. A).	Make use of the given data and compute, i) Production rate ii) Line efficiency and iii) Cost per unit piece produced on the line. For a 20-station transfer line, it will operate at a production rate of 50 pieces per hour at 100% efficiency, probability of station breakdown per cycle is equal to p = 0.005 breakdowns/cycle for all stations. Average down time per line stop is 8 minutes. Machining cost is Rs.3 per component. The line operates at a cost of Rs.75/hr. One cutting to per station lasts for 50 parts and average cost per tool is Rs.2 per cutting edge.	10M
	OR	
13. B).	Explain the other ways to improve line balancing in flexible assembly lines.	10M
14. A).	Explain any two-material handling equipment with neat sketches.	10M
	OR	
14. B).	Write down the principles of material handling system.	10M
15. A).	List out the various operation parameters that can be measured in turning operation to use in adaptive control systems.	10M
	OR	
15. B).	Explain any three CMM mechanical configurations.	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 January-2025

Course Name: Automobile Engineering

(Mechanical Engineering)

Date: 18.01.2025 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 does the lower end of the connecting rod have to be spilt?	2 M
2.	Explain the application of gear box.	2 M
3.	What is super charging?	2 M
4.	Define electronic ignition system.	2 M
5.	What are the three active members of a planetary gear box?	2 M
6.	Why does some torque convertors use lock up clutch?	2 M
7.	What are the objectives of vehicle suspension?	2 M
8.	List the differences between disc brake and drum brake.	2 M
9.	How bio diesel is generated?	2 M
10.	What is a fuel cell ? State its advantages.	2 M

PART-B

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

11.A).	Describe with neat sketch the different types of automobile engines used automobiles.	10M
	OR	
11. B).	Describe with neat sketch the important components and functions of automobile chassis.	10M
12. A).	Explain about Electronically Controlled gasoline injection system for SI engine.	10M
	OR	
12. B).	Explain briefly about common rail direct injection system.	10M
13. A).	Draw and explain with a simple sketch, working of a constant mesh gear box.	10M
	OR	
13. B).	Explain the working principle of differential with neat diagram.	10M
14. A).	Discuss in detail the basic considerations of suspension system with neat sketch.	10M
	OR	
14. B).	Draw a simple diagram to show the layout of a pneumatic operated four wheel brake system and explain its working in detail.	10M
15. A).	List & explain briefly about alternate fuels available for automobiles.	10M
	OR	
15. B).	Explain about performance, combustion and emission characteristics of alternative fuels.	10M

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