

Hall Ticket Number :										
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R-20

Code: 20A5M05

III B.Tech. II Semester Minors Regular Examinations May/June 2024

Computer Organization

(Common to CE, EEE, ME and ECE)

Max. Marks: 70

Time: 3 Hours

- 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) Differentiate between combinational and sequential circuits. | 1 | L2 |
| b) What is register transfer language? | 2 | L1 |
| c) What are the functions of control memory? | 3 | L1 |
| d) What is cache memory? | 4 | L1 |
| e) What is the need of I/O interface module | 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) Explain the floating point representation with an example. | 6M | 1 | L2 |
| b) Explain about the error detection codes. | 6M | 1 | L2 |

OR

- | | | | |
|--|----|---|----|
| 3. a) Perform and explain arithmetic addition, subtraction, and overflow detection using fixed point representation. | 6M | 1 | L2 |
| b) Describe the different types of computers. | 6M | 1 | L2 |

UNIT-II

- | | | | |
|--|----|---|----|
| 4. a) Discuss about the arithmetic logic shift unit with examples. | 6M | 2 | L3 |
| b) Describe the memory reference instructions with an example. | 6M | 2 | L2 |

OR

- | | | | |
|--|----|---|----|
| 5. a) Explain about the arithmetic micro operations. | 6M | 2 | L2 |
| b) Explain about the RISC architecture. | 6M | 2 | L2 |

UNIT-III

- | | | | |
|---|-----|---|----|
| 6. Explain in detail about micro programmed Address sequencing with block diagram | 12M | 3 | L2 |
|---|-----|---|----|

OR

7. a) Compare the hard wired control unit and micro programmed control unit 6M 3 L3
b) Explain the operation of a Micro programmed control unit using a diagram 6M 3 L2

UNIT-IV

8. Explain how multiplication is done for floating point numbers with flow chart. 12M 4 L2

OR

9. With a neat block diagram explain the virtual memory address translation 12M 4 L2

UNIT-V

10. a) Discuss about Input-Output Interface 6M 5 L2
b) What is priority interrupt? Discuss about daisy chaining priority interrupt. 6M 5 L2

OR

11. a) Explain about DMA 6M 5 L2
b) Explain the five stage Instruction pipeline with timing diagram. 6M 5 L2

*** End ***

Hall Ticket Number :

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R-20 (SS)

Code: 20A353T

III B.Tech. II Semester Regular Examinations May/June 2024

Design of Machine Elements - II

(Mechanical Engineering)

Max. Marks: 70

Time: 3 Hours

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) State the different types of pulleys used in belt drives. | CO1 | 4 |
| b) List the difference between thick-film and thin-film lubrication? | CO2 | 2 |
| c) What do you mean by static load and dynamic load for a ball bearing? | CO3 | 2 |
| d) What are merits and demerits of helical gears over spur gears? | CO4 | 1 |
| e) Under what force, the big end bolts and caps are designed? | CO5 | 1 |

PART-B

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

Marks CO BL

UNIT-I

2. Design a V-belt drive to connect a 7.5 kW, 1440 rpm induction motor to a fan, running at approximately 480 rpm, for a service of 24 h per day. Space is available for a Centre distance of about 1 m.
- 12M CO1 L4

OR

3. A torsional window shade spring is made from No.17 music wire. The mean diameter of helix is 22 mm and number of coils is 400. Assume $\sigma_{yp} = 0.6\sigma_{ut}$ and factor of safety = 2 based on the yield point. Compute stresses on inside of helix, considering the stress concentration due to curvature. Find the torque that the roller can exert after unwinding 12 revolutions from the most highly stressed conditions.
- 12M CO1 L4

UNIT-II

4. A 100 mm diameter by 150 mm long 120° central partial bearing has a minimum film thickness of 0.0254 mm. Radial clearance is 0.0508 mm. SAE 10 oil is used. The bearing carries a load of 0.57 N/mm² of projected journal area at 900 rpm. Find the temperature of the film and the friction power.
- 12M CO2 L6

OR

5. The following data is given for a 360° hydrodynamic bearing:

Radial load = 6 kN

Journal speed = 1260 rpm

Journal diameter = 60 mm

Bearing length = 60 mm

Minimum oil thickness = 0.008 mm

Radial clearance = 0.04 mm

Specify the viscosity of the lubricating oil you will recommend for bearing.

12M CO2 L6

UNIT-III

6. A ball bearing, subjected to a radial load of 5 kN, is expected to have a life of 8000 h at 1450 rpm with a reliability of 99%. Calculate the dynamic load capacity of the bearing, so that it can be selected from the manufacturer's catalogue based on a reliability of 90%.

12M CO3 L6

OR

7. A ball-bearing running at 900 rpm is subjected to a radial load of 2 kN and a thrust load of 1.2 kN. The bearing is in use for 10 hours/day, 6 days/week for 3 years at 95% reliability. Determine the size of medium series ball bearing to be used.

12M CO3 L6

UNIT-IV

8. A pair of parallel helical gears is shown in Fig. 1. A 5-kW power at 720 rpm is supplied to the pinion A through its shaft. The normal module is 5 mm and the normal pressure angle is 20° . The pinion has right-hand teeth, while the gear has left-hand teeth. The helix angle is 30° . The pinion rotates in the clockwise direction when seen from the left side of the page. Determine the components of the tooth force and draw a free-body diagram showing the forces acting on the pinion and the gear.

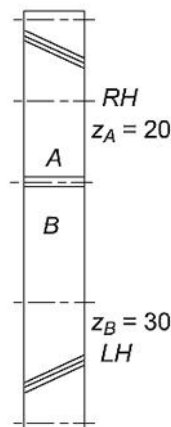


Figure 1

12M CO4 L6

OR

9. Design a pair of steel spur gears required to transmit 12 kW at 2000 rpm of pinion. The velocity ratio received is 2.5:1. The allowable static stress for both may be taken as 120 MPa. Not less than 24 teeth are to be used on either gear. The teeth are 20° stub involute. 12M CO4 L6

UNIT-V

10. a) Discuss the design of piston for an internal combustion engine. 6M CO5 L1
 b) Explain the various stresses induced in the connecting rod. 6M CO5 L1

OR

11. A four-stroke diesel engine has the following specifications:
 Brake power = 5 kW;
 Speed = 1200 r.p.m.;
 Indicated mean effective pressure = 0.35 N / mm²;
 Mechanical efficiency = 80 %.
 Determine:
 a) Bore and length of the cylinder;
 b) Thickness of the cylinder head; and
 c) Size of studs for the cylinder head. 12M CO5 L4

*** End ***

Hall Ticket Number :										
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R-20

Code: 20A361T

III B.Tech. II Semester Regular & Supplementary Examinations May/June 2024

Heat Transfer

(Mechanical Engineering)

Max. Marks: 70

Time: 3 Hours

- 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) Define Heat transfer? Mention its applications. | | 01 | L1 |
| b) What is the difference between fin effectiveness and fin efficiency? | | 02 | L1 |
| c) Define the terms hydrodynamic and thermal boundary layer. | | 03 | L1 |
| d) How film wise differ from drop wise condensation. | | 04 | L1 |
| e) Define fouling. What is its effect on heat exchanger? | | 05 | 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) What are different modes of heat transfer? | | 3M | 01 | L2 |
| b) Derive general heat conduction equation in cartesian coordinate system. | | 9M | 01 | L3 |
| OR | | | | |
| 3. a) Explain thermal conductivity. | | 3M | 01 | L2 |
| b) Derive general heat conduction equation in cylindrical coordinate system. | | 9M | 01 | L3 |
| UNIT-II | | | | |
| 4. a) What are Fourier and Biot numbers? Explain its physical significance. | | 4M | 02 | L2 |
| b) An aluminium sphere weighing 6 kg and initially at temperature of 350°C is suddenly immersed in a fluid at 30°C with convection coefficient of 60 W/m ² K. Estimate the time required to cool the sphere to 100°C. Take thermophysical properties as C=900 J/kg.K, ρ = 2700 kg/m ³ , k = 205 W/mK. | | 8M | 02 | L3 |
| OR | | | | |
| 5. a) What do you mean by critical radius of insulation? Derive critical radius of insulation, r _c = k / h _o . | | 6M | 02 | L3 |
| b) A steel pipe line (K = 50 W/mk) of inner dia 100 mm and outer dia 110mm is to be covered with two layers of insulation each having a thickness of 50mm. The thermal conductivity of the first insulation material is 0.06 W/mK and that of the second is 0.12 W/mK. Calculate the loss of heat per meter length of pipe and the interface temperature between the two layers of insulation when the temperature of the inside tube surface is 250°C and the outside surface of the insulation is 50°C. | | 6M | 02 | L3 |

UNIT-III

6. a) Differentiate between mechanisms of heat transfer by free and forced convection. 5M 03 L2
- b) Calculate the convective heat transfer from a radiator 0.5m wide and 1m high at 84°C in a room at 20°C. Treat the radiator as a vertical plate. 7M 03 L3

OR

7. a) By dimensional analysis show that for forced convection heat transfer the Nusselt number (Nu) can be expressed as a function of Prandtl number (Pr) and Reynolds number (Re). 6M 03 L3
- b) Atmospheric air at 150°C with a velocity of 1.25 m/s over a 2m long flat plate whose temperature is 25°C. Determine the average heat transfer coefficient and the rate of heat transfer for a plate width of 0.5 m. 6M 03 L3

UNIT-IV

8. a) Explain filmwise and dropwise condensations. 5M 04 L2
- b) A copper kettle possessing a flat bottom of diameter 25 cm contains water at atmospheric pressure that is being heated electrically from its bottom. Calculate the rate of boiling of water if bottom surface of the kettle is maintained at a temperature of 110°C? 7M 04 L3

OR

9. a) What is meant by the radiation shape factor? What are radiation shields and give their applications. 5M 04 L3
- b) Calculate the heat exchange by radiation between the surfaces of two long cylinders having radii 120mm and 60mm respectively. The axis of the cylinder is parallel to each other. The inner cylinder is maintained at a temperature of 130°C and emissivity of 0.6. Outer cylinder is maintained at a temperature of 30°C and emissivity of 0.5. 7M 04 L3

UNIT-V

10. a) Explain shell and tube type heat exchanger with a neat sketch. Why baffles are used? 5M 05 L2
- b) In a counter flow double pipe heat exchanger, water is heated from 40°C to 80°C with an oil entering at 105°C and leaving at 70°C. Taking the overall heat transfer coefficient as 300 W/m²K and the water flow rate as 0.1 kg/s. Calculate the heat exchanger area. 7M 05 L3

OR

11. a) How do you develop an expression for LMTD for counter flow heat exchangers? 6M 05 L3
- b) In a food processing plant, a brine solution is heated from -12°C to -6.5°C in a double pipe parallel flow heat exchanger by water entering at 35°C and leaving at 20.5°C at the rate of 9 kg/min. Determine the heat exchanger area for overall heat transfer coefficient of 860 W/m²K. Take specific heat of water 4186 J/kg K. 6M 05 L3

*** End ***

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R-20

Code: 20A362T

III B.Tech. II Semester Regular & Supplementary Examinations May / June 2024

Metrology & Measurements
(Mechanical Engineering)

Max. Marks: 70

Time: 3 Hours

- 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 uses of plug gauges? | CO1 | L1 |
| b) Define least count of vernier height guage. | CO2 | L1 |
| c) List out the various methods of measuring the gear tooth thickness. | CO3 | L1 |
| d) Define transducer. | CO4 | L1 |
| e) Name the different thermal expansion methods for temperature measurement. | CO5 | L1 |

PART-B

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

- | | Marks | CO | BL |
|---|-------|-----|----|
| UNIT-I | | | |
| 2. In an assembly of two parts of 50 mm nominal diameter the lower deviation of the hole is zero and upper deviation is 5 microns, while that of shaft is -8 and -4 microns respectively. Estimate the allowance and type of fit. | 12M | CO1 | L3 |
| OR | | | |
| 3. Enumerate the types of plug gauges and draw neat sketches of any three of them by stating their applications. | 12M | CO1 | L2 |
| UNIT-II | | | |
| 4. Explain the use of sine bar for setting a component for a given angle. | 12M | CO2 | L2 |
| OR | | | |
| 5. With the help of a line diagram explain the construction and working of a micrometer. | 12M | CO2 | L2 |
| UNIT-III | | | |
| 6. With the help of a neat diagram describe the construction and working of the Talysurf instrument. | 12M | CO3 | L2 |
| OR | | | |
| 7. Explain how effective diameter of a thread can be measured with help of neat sketch. | 12M | CO3 | L2 |
| UNIT-IV | | | |
| 8. Explain the working of LVDT with neat diagram. Write its applications. | 12M | CO4 | L2 |
| OR | | | |
| 9. Classify tachometers. Explain the working of mechanical tachometer with neat sketch | 12M | CO4 | L2 |
| UNIT-V | | | |
| 10. a) Explain thermocouple with a neat sketch. | 6M | CO5 | L2 |
| b) Explain the working of Mcleod pressure gauge with neat diagram. | 6M | CO5 | L2 |
| OR | | | |
| 11. Explain the working of dead weight pressure gauge with neat sketch. Write its advantages. | 12M | CO5 | L2 |

*** End ***

Hall Ticket Number :										
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R-20

Code: 20A33M02

III B.Tech. II Semester Minors Regular Examinations May/June 2024

Fundamentals of Machine Learning

(Common to CE, EEE, ME and ECE)

Max. Marks: 70

Time: 3 Hours

- 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) Define supervised learning. | | CO1 | L1 |
| b) What is loss function? | | CO2 | L2 |
| c) Define conditional probability. | | CO3 | L1 |
| d) What is the metric to measure the uniformity of target function? | | CO4 | L2 |
| e) Define Agent. | | CO5 | 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) Summarize the issues in machine learning? | 6M | CO1 | L1 |
| | b) Define the perspectives in machine learning. How does hypothesis space represented in machine learning? | 6M | CO1 | L2 |

OR

3. Apply the Candidate Elimination algorithm for the given set of training examples. Placed is the target value. Find the general and specific boundary hypothesis for the given dataset.

verbal	technical	aptitude	test1	test2	CGPA	Placed
Better	Good	Medium	High	High	Excellent	Yes
Better	Good	High	High	High	Excellent	Yes
Normal	Medium	High	High	Medium	Medium	No
Better	Good	High	High	High	Medium	Yes

12M CO1 L3

UNIT-II

- | | | | | |
|----|--|----|-----|----|
| 4. | a) Illustrate the artificial neural network with 3 inputs, 5 nodes in hidden layer and binary class output layer. Explain the forward propagation. | 6M | CO2 | L3 |
| | b) Explain the various activation functions in machine learning. | 6M | CO2 | L2 |

OR

5. Apply the ID3 decision tree algorithm to classify the given dataset. All leaf nodes should be classified as approved **Yes** or **No** in a tree. It states that advertisement is broadcasting proposal is approved or not.

Price	Newspaper	Youtube	FB	TV	Approved
30-40L	Yes	Yes	No	No	Yes
30-40L	Yes	No	Yes	Yes	Yes
40-50L	Yes	No	No	Yes	No
30-40L	Yes	Yes	Yes	Yes	Yes
20-30L	No	No	No	No	No
30-40L	Yes	No	No	Yes	No
50-60L	Yes	No	No	No	Yes
40-50L	No	No	No	Yes	No
30-40L	Yes	Yes	No	No	Yes
20-30L	No	Yes	No	Yes	No

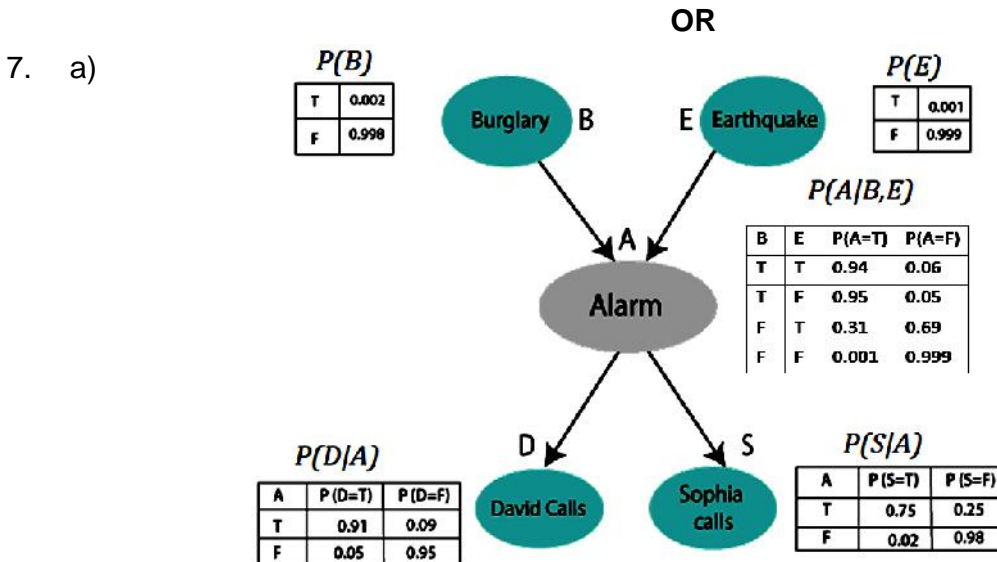
12M CO2 L3

UNIT-III

6. a) Apply Bayes theorem to find Maximally A Posteriori hypothesis from hypotheses space.
 b) Describe the Minimum Description Length principle.

6M CO3 L3

6M CO3 L2



Apply the BBN to calculate the probability that alarm has sounded, but there is neither a burglary, nor an earthquake occurred, and David and Sophia presumed that they heard the alarm sound.

6M CO3 L3

- b) Describe all the necessary steps of fitness function evaluation using genetic algorithm.

6M CO3 L2

UNIT-IV

8. a) Discuss the sequential covering algorithm in learning rules.
 b) Summarize the PROLOG-EBG properties.

6M CO4 L2

6M CO4 L2

OR

9. a) Explain the first order inductive learning rule.
 b) Discuss the inverted resolution rule learning.

6M CO4 L2

6M CO4 L2

UNIT-V

10. a) Illustrate the markov-decision process in learning the environment.
 b) Differentiate the inductive and analytical learning.

6M CO5 L2

6M CO5 L2

OR

11. a) Summarize the components and its features of reinforcement learning.
 b) How does the knowledge used to alter the search objective?

6M CO5 L2

6M CO5 L2

*** End ***

Hall Ticket Number :

R-20

Code: 20A36DT

III B.Tech. II Semester Regular & Supplementary Examinations May/June 2024

Automation & Robotics

(Mechanical Engineering)

Max. Marks: 70

Time: 3 Hours

- 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) Briefly discuss about Simultaneous Operations | CO1 | L1 |
| b) How do you measure Line Balance Efficiency? | CO2 | L1 |
| c) What are the problems associated with magnetic gripper? | CO3 | L2 |
| d) Compare direct kinematics and inverse kinematics. | CO4 | L2 |
| e) What is meant by Proximity and Range sensing? | CO5 | L2 |

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

Marks CO BL

UNIT-I

2. a) Illustrate the following types of Automation:
 (i) Programmable Automation (ii) Fixed Automation 6M CO1 L2
 b) Discuss methods of transport work piece on automated flow lines? Explain them 6M CO1 L2

OR

3. Describe ten strategies for automation and process improvement. 12M CO1 L2

UNIT-II

4. a) Discuss in detail about Manual Assembly Lines. 6M CO2 L2
 b) A proposal has been submitted to replace a group of assembly workers, each working individually, with an assembly line. The following table gives the individual work elements using Kill bridge westers method.

Element	1	2	3	4	5	6	7	8
Time(min)	1.0	0.5	0.8	0.63	1.2	0.2	0.5	1.5
Preceded by	-	-	1,2	2	3	3,4	4	5,6,7

6M CO2 L3

OR

5. a) Name the other ways to improve line balancing in flexible assembly lines. 6M CO2 L2
 b) Toy assemblies should be done as per the information given in the table below and cycle time is 1minute to balance the line. Determine the efficiency of the line. Use Largest Candidate Rule Method

Element	1	2	3	4	5	6	7	8	9	10
Time(min)	0.5	0.3	0.8	0.2	0.1	0.6	0.4	0.5	0.3	0.6
Preceded by	-	1	1	2	2	3	4,5	3,5	7,8	6,9

6M CO2 L3

UNIT-III

- | | | | |
|--|----|-----|----|
| 6. a) What is work envelope? Draw work envelope for Cartesian coordinate, cylindrical coordinate and spherical coordinate. | 6M | CO3 | L2 |
| b) What are end effectors? Sketch various grippers and show the degrees of freedom. | 6M | CO3 | L2 |

OR

- | | | | |
|---|----|-----|----|
| 7. a) Define a Robot? Explain robot components and advantages of a robot? | 6M | CO3 | L2 |
| b) List out the socio-economic issues, in using robot to replace human workers from workplace? Explain. | 6M | CO3 | L2 |

UNIT-IV

- | | | | |
|--|----|-----|----|
| 8. a) Discuss the following
i) Skew motion ii) Joint integrated motion iii) Straight line motion | 6M | CO4 | L2 |
| b) A point to point robot with a revolute joint moving with velocity of 15deg/sec, traverses from an initial position of 12° to a final position of 60deg/sec. Determine the position and velocity at the end of 1,2 and 3 seconds. The range of initial and final position is covered in 6 seconds with a finite acceleration of 8 deg/sec ² . | 6M | CO4 | L3 |

OR

- | | | | |
|---|----|-----|----|
| 9. a) With an example differentiate forward and inverse kinematics. | 6M | CO4 | L2 |
| b) Write down about Jacobians differential transformation | 6M | CO4 | L1 |

UNIT-V

- | | | | |
|---|----|-----|----|
| 10. a) Classify the types of sensors used in robots and discuss them in detail. | 6M | CO5 | L2 |
| b) Discuss in detail about Force sensors with neat sketch. | 6M | CO5 | L2 |
- OR**
- | | | | |
|---|----|-----|----|
| 11. a) Write short notes on “Applications of robot in manufacturing system”. | 6M | CO5 | L2 |
| b) Discuss the relative merits and demerits of different textual robot languages. Explain different program instructions. | 6M | CO5 | L2 |

*** End ***

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R-20

Code: 20A36AT

III B.Tech. II Semester Regular & Supplementary Examinations May/June 2024

Automobile Engineering
(Mechanical Engineering)

Max. Marks: 70

Time: 3 Hours

- 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) Write the function of a wiper in a vehicle | CO1 | L1 |
| b) What is the purpose of clutch in an automobile. | CO2 | L1 |
| c) Define the primary objectives of a suspension system in vehicles. | CO3 | L2 |
| d) What does ABS stand for, and what is its primary function? | CO4 | L2 |
| e) What are two social benefits of hybrid and electric vehicles? | 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) Describe different types of automobile engines and their construction. | 6M | CO1 | L2 |
| b) What is the purpose of turbocharging and supercharging in engines? | 6M | CO1 | L2 |

OR

- | | | | |
|--|----|-----|----|
| 3. a) Explain the mechanism of a Bendix drive in the starting system of a vehicle. | 6M | CO1 | L1 |
| b) Describe how a solenoid switch works in the starting system of a vehicle. | 6M | CO1 | L2 |

UNIT-II

- | | | | |
|---|----|-----|----|
| 4. a) Explain the operation of a sliding mesh gearbox and its advantages and disadvantages. | 6M | CO2 | L2 |
| b) How does a constant mesh gearbox work, and what are its benefits? | 6M | CO2 | L1 |

OR

5. a) Explain how a torque converter operates and its role in automatic transmissions. 6M CO2 L2
- b) Discuss the role of a differential in a vehicle's transmission system. 6M CO2 L1

UNIT-III

6. Define steering geometry and explain the significance of camber, caster, kingpin rake, and combined angle toe-in in vehicle handling. 12M CO3 L2

OR

7. Differentiate between mechanical brake systems, hydraulic brake systems, and pneumatic brake systems. 12M CO3 L1

UNIT-IV

8. Explain the principle of operation of an Antilock Braking System (ABS) in vehicles. 12M CO4 L3

OR

9. a) What is an airbag restraint system, and how does it contribute to occupant safety in vehicles? 6M CO4 L3
- b) Discuss the different types of anti-theft systems, such as immobilizers, alarm systems, and tracking devices. 6M CO4 L2

UNIT-V

10. a) Discuss the role of government incentives and regulations in promoting the adoption of hybrid and electric vehicles. 6M CO5 L3
- b) Sketch the layout of electrical vehicle and define each component in detail. 6M CO5 L2

OR

11. What are the social and environmental benefits of hybrid and electric vehicles compared to traditional internal combustion engine vehicles? 12M CO5 L3

*** End ***

Hall Ticket Number :										
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R-20

Code: 20A363T

III B.Tech. II Semester Regular & Supplementary Examinations May / June 2024

CAD/CAM

(Mechanical Engineering)

Max. Marks: 70

Time: 3 Hours

- 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) Draw a neat sketch of CRT device with labels. | | CO1 | L2 |
| b) Express the parametric equation of a Bezier curve. | | CO2 | L3 |
| c) Mention the use of G03 and M30 functions in CNC programming | | CO3 | L2 |
| d) Define FMS. | | CO4 | L2 |
| e) List the non-contact inspection methods used in Computer Aided Inspection. | | CO5 | 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) Justify the use of computers in today's design and manufacturing industry sector. | 6M | CO1 | L2 |
| b) What are the elements of a CAD/CAM system? Explain the basic structure of a CPU with neat sketch, | 6M | CO1 | L2 |

OR

- | | | | |
|--|----|-----|----|
| 3. a) Explain 2D rotation transformation with an example. | 6M | CO1 | L2 |
| b) Distinguish between stroke writing and raster scan approach with neat sketches. | 6M | CO1 | L2 |

UNIT-II

- | | | | |
|---|----|-----|----|
| 4. a) Represent a line and circle parametrically. | 6M | CO2 | L3 |
| b) Discuss the characteristics of Bezier surface. | 6M | CO2 | L2 |

OR

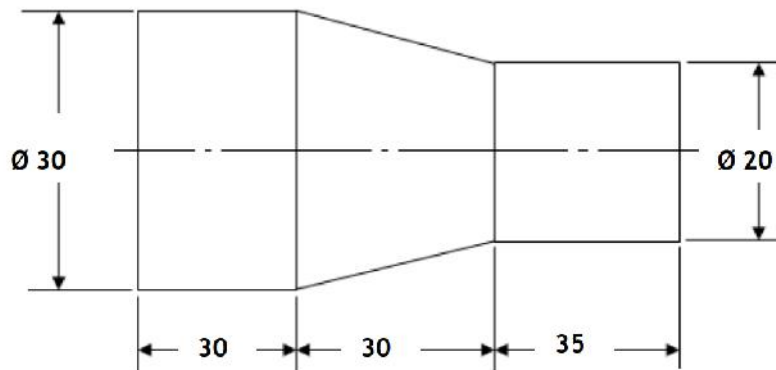
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|--|-----|-----|----|
| 5. Compare B-rep and CSG solid modeling representation techniques. | 12M | CO2 | L2 |
|--|-----|-----|----|

UNIT-III

6. Write a part program for the object shown in the figure below.

12M CO3 L3

(All dimensions are in mm).



OR

7. a) What are the requirements of structure in the case of CNC machine tools?
b) What are NC machines? Explain their working with neat sketch.

6M CO3 L2

6M CO3 L2

UNIT-IV

8. Describe retrieval and generative process planning system.

12M CO4 L2

OR

9. a) Explain the material handling systems
b) What are the components of FMS? Explain their characteristics.

6M CO4 L2

6M CO4 L2

UNIT-V

10. a) Distinguish between MRP-I and MRP-II.
b) Explain with the help of neat sketch an optical inspection method.

6M CO5 L2

6M CO5 L2

OR

11. a) Illustrate the integration of CAQC with CAD/CAM.
b) Describe JIT approach.

6M CO5 L4

6M CO5 L2

*** End ***