| Hall | Ticket Number : | R-20 | | |
|------------|--|----------|-------|----|
| Code | 2: 20A363T | | | |
| | III B.Tech. II Semester Supplementary Examinations Nov/Dec CAD/CAM | 2023 | | |
| | (Mechanical Engineering) | | | |
| Max. | Marks: 70 | ime: 3 H | 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) | | | |
| | | | | |
| Answer | all the following short answer questions $(5 \times 2 = 10M)$ | | CO | В |
| Write a | iny two reasons for implementing CAD. | | CO1 | В |
| Define | Geometric Modeling. | | CO2 | В |
| | re M03, M30 codes stands for in NC Programming? | | CO3 | В |
| | he need of Group Technology? | | CO4 | В |
| Mentio | n the difference between contact and noncontact inspection met | :hods? | CO5 | В |
| | PART-B | | | |
| Ans | wer <i>five</i> questions by choosing one question from each unit (5 x 12 = $\frac{1}{100}$ | = 60 Mar | ks) | |
| | | Marks | CO | В |
| o \ | UNIT-I | | | |
| 2. a) | Briefly explain the conventional process of the product cycle in conventional manufacturing environment. | N/IQ | CO1 | ы |
| b) | Write short notes on i) Stroke writing ii) Raster Scan | | CO1 | Bl |
| D) | OR | 4171 | COT | ВІ |
| 3. | What is meant by Concatenation Matrix? Demonstrate | | | |
| Ο. | how translation; scaling and rotation operations can be | | | |
| | performed simultaneously on a graphic element using | | | |
| | Concatenation Matrix. | 12M | CO1 | В |
| | UNIT-II | | | |
| 4. a) | Differentiate between solid modeling and surface | | | |
| | modelling methods. | 6M | CO2 | В |
| b) | With the help of neat sketches, describe the most | O 1. 4 | | |
| | commonly used solid entities. | бIVI | CO2 | BI |
| | OR | | | |

Code: 20A363T

| 5. | a) | What do you mean by blending function? Explain reparameterization of a surface. | 6M | CO2 | BL3 |
|-----|----|--|------|-----|------|
| | b) | Why the sweep representations are useful in creating solid models of 2D objects? | | CO2 | |
| | | UNIT-III | O.V. | 002 | DLO |
| 6. | a) | List and give the meaning of any five G and M codes | | | |
| | | functions. | 6M | CO3 | BL2 |
| | b) | Explain the principle of CNC system with a block diagram. | 6M | CO3 | BL2 |
| | | OR | | | |
| 7. | a) | Write the procedure for writing computer assisted part | | | |
| | | programming? | 6M | CO3 | BL2 |
| | b) | Discuss any two types of statements used in APT part | 61/1 | 000 | DI 0 |
| | | programming UNIT-IV | OIVI | CO3 | BL3 |
| 8. | a) | | | | |
| | , | Resource Planning)? Explain them briefly. | 6M | CO4 | BL3 |
| | b) | Write a short note on Retrieval type and Generative type | | | |
| | | of CAPP. | 6M | CO4 | BL2 |
| | | OR | | | |
| 9. | a) | Discuss how part classification is done in the context of | | | |
| | | GT. What are the essential attributes such a coding | 61/1 | 004 | DI O |
| | h) | system should take care of? Elaborate briefly the MICLASS system of codification. | | CO4 | |
| | D) | UNIT-V | Olvi | CO4 | DLZ |
| 10. | | Describe any two methods of non-contact type of | | | |
| | | computer aided testing. | 12M | CO5 | BL3 |
| | | OR | | | |
| 11. | a) | Mention the objectives of CAQC. Explain the different | | | |
| | | computer aided inspection methods. | 6M | CO5 | BL2 |
| | b) | Summarize the enterprise resource planning and | | | |
| | | capacity requirements planning? | 6M | CO5 | BL3 |
| | | *** End *** | | | |

| | Н | all Ticket Number : | | | ı | |
|----------|-----|---|---------|-----|---------|----|
| | | do: 20A 261T | R-20 | | | |
| | Co | de: 20A361T III B.Tech. II Semester Supplementary Examinations Nov/Dec 20 | 023 | | | |
| | | Heat Transfer | 320 | | | |
| | | (Mechanical Engineering) | | | | |
| | Ma | ıx. Marks: 70 *********************************** | e: 3 Ho | urs | | |
| | Not | te: 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 | | | | |
| | | <u>PART-A</u> | | | | |
| 4 | Δ | (Compulsory question) | _ | | Б. | |
| | | wer all the following short answer questions $(5 \times 2 = 10 \text{M})$ | C | 20 | BL 1 | |
| | | efine (i) thermal conductivity and (ii) convection heat transfer coefficient. | | 1 | 1 1 | |
| b) c) | | hat is the significance of Reynold's number and Nusselt number? | | 3 | 1 | |
| d) | | efine (i) Stefan-Boltzmann law and (ii) Kirchoff's law. | | 4 | 1 | |
| , | | hat is the impact of fouling in heat exchangers? | | 5 | 1 | |
| -, | | $\frac{\text{PART-B}}{\text{Answer } \text{five } \text{questions by choosing one question from each unit } (5 \times 12 = 60 \text{ M})$ | [arks) | | | |
| | | | Marks | C | O | BL |
| | | UNIT-I | | | | |
| 2. | a) | Write the basic assumptions required to use Fourier's law for one dimensional steady state heat conduction. | 4M | | 1 | 1 |
| | b) | Derive the general 3D heat conduction equation in Cylindrical coordinates and reduce it different forms. | 8M | | 1 | 2 |
| | | OR | | | | |
| 3. | a) | What is initial boundary condition? Where it is applicable? Whe | 4M | | 1 | 1 |
| | b) | One dimensional heat conduction through a slab is represented with $\frac{\partial^2 T}{\partial x^2} = 0$. | | | | |
| | | If one end of the slab is insulated ($q^{"}=0$) and other end subjected to constant temperature (T = constant), obtain expression for temperature distribution within | : | | | |
| | | the slab | 8M | | 1 | 3 |
| | , | UNIT-II | ī | | | |
| 4. | a) | Derive the governing equation in non-dimensional form for one-dimensional heat transfer from a rectangular fin. | 4M | | 2 | 2 |
| | b) | A plane wall ($k = 68 \text{ W/mK}$) of thickness 10 cm is maintained with constant wall temperature equal to 50°C on its both sides. Convection coefficient at the end surfaces is equal to 25 W/m ² K. If it is having internal heat generation equal to 10^5 W/m^3 , calculate (i) Centerline temperature of the wall and (ii) Heat transfer from the wall. | | | 2 | 3 |
| | | OR | | | | |
| 5. | a) | What is lumped heat capacity analysis (LHCA)? Derive an expression for temperature distribution using LHCA in case of transient heat conduction from a rectangular slab. | | | 2 | 1 |

Code: 20A361T

| | b) | A 60 x 60 cm ² copper slab 7 mm thick has a uniform temperature of 320°C. If it is suddenly placed in a liquid at 45°C, calculate the time required for the plate to reach the temperature of 110°C Consider = 8800 kg/m ³ , C = 384 J/kgK, k=325W/mK and h = 25 W/m ² K. UNIT-III | 8M | 2 | 3 |
|-----|----------|---|----|---|---|
| 6. | a) | Explain the concept of velocity and thermal boundary for external flow over a horizontal flat plate. | 4M | 3 | 1 |
| | b) | Water enters into a circular pipe of 15 mm diameter at a temperature of 34°C. The circular pipe outer surface is maintained to a constant temperature equal to 200 °C. If the water velocity is 8 m/s, determine (i) the loss of heat from the pipe and (ii) exit temperature of water. | 8M | 3 | 3 |
| | | OR | | | |
| 7. | a) b) | What are the differences between heat transfer by forced and natural convection. Consider free convection from a vertical wall of length 'L'. Using Buckingham's | 4M | 3 | 1 |
| | · | theorem, obtain an expression for Nusselt number in terms of <i>Gr</i> and <i>Pr</i> | 8M | 3 | 2 |
| | | UNIT-IV | | | |
| 8. | a) | Describe various stages of poll boiling heat transfer. | 6M | 4 | 2 |
| | b) | A copper pan of 42 cm diameter contains water and its bottom surface is maintained at 125°C by an electric heater. Calculate the rate at which water | | | |
| | | evaporates from the pan due to the boiling process. OR | 6M | 4 | 3 |
| 9. | a) | Explain the concept of blackbody radiation. | 4M | 4 | 1 |
| | b) | Two large concentric cylinders with radii equal to 25 mm and 50 mm are exchanging radiation heat between their common interface. Emissivities of the two cylinders are 0.35 and 0.72. If the cylinders are maintained at constant temperature equal to 870°C and 525°C, Calculate (i) Mean emissivity and (ii) Net radiation heat exchange between the two cylinders. | 8M | 4 | 3 |
| 40 | - \ | UNIT-V | | | |
| 10. | a) | Why is a counter flow heat exchanger more effective than a parallel flow heat exchanger? | 4M | 5 | 1 |
| | b) | A pipe ($k = 60 \text{ W/mK}$) with an I.D. of 3.2 cm and wall thickness 0.32 cm is externally heated by steam at a temperature of 200°C. The water flows through the pipe with a velocity of 1.23 m/s. Calculate the length of the pipe required to heat water from 35°C to 85°C assuming the heat transfer coefficient on the steam side to be 11 kW/m²K. | 8M | 5 | 4 |
| | | OR | | | |
| 11. | a) | What are the fouling factors? Explain their effect in heat exchanger design. | 4M | 5 | 1 |
| | b) | A shell-and-tube type of heat exchanger is designed to cool 1.64 kg/s of oil ($C_p = 2910 \text{ J/kgK}$) from 66°C to 44°C by using 1.1 kg/s of water at an inlet temperature of 26°C. Assuming an overall heat transfer coefficient of 680 W/m ² K and a single-shell, 4-tube pass type of heat exchanger determine the required | | | |
| | | heat transfer area. Use the effectiveness method. *** End *** | 8M | 5 | 3 |

| Hall 1 | Ficket Number : | | | |
|--------------|--|---------|----------------------|----|
| Code | : 20A362T | R-20 | | |
| | III B.Tech. II Semester Supplementary Examinations Nov/Dec | 2023 | | |
| | Metrology & Measurements | | | |
| Max. | (Mechanical Engineering) Marks: 70 | me: 3 H | ours | |
| | ***** | | | |
| | Question Paper consists of two parts (Part-A and Part-B) In Part-A, each question carries Two marks. Answer ALL the questions in Part-A and Part-B | | | |
| | PART-A (Compulsory question) | | | |
| 1 Answ | ver all the following short answer questions (5 X 2 = 10M) | С | о в | ı |
| | escribe Taylor's Principle for gauge design. | | 0 | |
| | ifferentiate line and end standards. | | 02 L | |
| , | ompare surface roughness and waviness. | | 02 L | |
| , | /hat is a resistance transducer? | | 03 L 04 L | |
| , | | | | • |
| <i>e)</i> Li | st out the methods for pressure measurements. PART-B | CC | O5 L | I |
| Ans | swer <i>five</i> questions by choosing one question from each unit (5 x 12 = | 60 Mark | s) | |
| | | Marks | СО | BL |
| | UNIT-I | | | |
| 2. a) | With neat sketches differentiate between hole base | | | |
| | system and shaft basis system. | 6M | CO1 | L2 |
| b) | Illustrate the terms "Interchangeability" and "Selective | | | |
| | Assembly". | 6M | CO1 | L2 |
| | OR | | | |
| 3. a) | What are GO and No-Go gauges? Differentiate them with | | | |
| | neat sketches. | 6M | CO1 | L2 |
| b) | Write short notes on ring gauges and plug gauges. Also, | 21.4 | | |
| | mention their applications. | 6M | CO1 | L2 |
| | UNIT-II | | | |
| 4. a) | Why is sine bar not suitable for measuring angles above | CN 4 | | |
| 1- \ | 45 ⁰ ? | OIVI | CO2 | L3 |
| D) | With the help of a neat diagram explain the construction | 61/1 | 000 | |
| | and working of bevel protractor. | OIVI | CO2 | L2 |
| - \ | OR | | | |
| 5. a) | • | SN/I | 000 | |
| | various stages of using slip gauges. | OIVI | CO2 | L3 |
| | | Page 1 | L of 2 | |

Code: 20A362T

b) Illustrate the measurement of internal taper of a shaft by using rollers/spheres. 6M CO2 L2 **UNIT-III** 6. a) The heights of peaks and valleys of 20 successive points on a surface are 45, 25, 23, 22, 24, 53, 15, 22,64, 32, 63, 12, 23, 34, 55, 23, 11, 12, 17, 15 microns respectively, measured over a length 20 mm. Determine CLA and RMS values of roughness surface. 6M CO3 L3 b) With a line diagram explain the working principle of Talysurf method. Also, Taylor Hobson write advantages of it. 6M CO3 L2 **OR** 7. a) Draw and explain the measurement of effective diameter of a screw thread using two and three wires. 6M CO3 L2 b) What are the methods employed for gear tooth measurement? Explain anyone in detail. 6M CO3 L2 UNIT-IV 8. a) What is a transducer? Explain the working of piezoelectric transducer. 6M CO4 L2 b) Describe the working of any one speed measuring device with a neat sketch. 6M CO4 L2 OR 9. a) Differentiate mechanical tachometers and electrical tachometers. 6M CO4 L3 b) Write short notes transducers on inductive and 6M CO4 L2 capacitance transducers. **UNIT-V** 10. a) What are the Methods of measuring temperature? 6M CO5 L2 Explain in detail about Thermopiles. b) With a neat sketch explain how pressure can be measured with bourdon tube pressure gauge. 6M CO5 L2 OR 11. a) List out various force measuring methods and explain any one in detail. 6M CO5 L2 b) Explain the principle of measuring shaft torque using strain gauge torsion meter. 6M CO5 L2 *** End ***

| Code: 20A36AT III B.Tech. II Semester Supplementary Examinations Nov/Dec 2023 Automobile Engineering (Mechanical Engineering) Max. Marks: 70 Itime: 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) a) What are the uses of Wiper? b) Explain the use of propeller shaft. c) What is the function of brake? d) List any two advantages of ABS. e) What are the limitations of Electrical Vehicles? FART-B Answer five questions by choosing one question from each unit (5 x 12 = 60 Marks) PART-B Answer five questions by choosing one question from each unit (5 x 12 = 60 Marks) OR a) Explain with neat sketch about the constructional details of spark ignition (SI) engine. b) Explain the concept of Crank case ventilation. OR a) Explain the concept of Crank case ventilation. OR Illustrate the working principle of single plate clutch and multi plate with neat sketch. UNIT-II Discuss in detail the Ackermann steering mechanism. OR 1 Compare the mechanical and hydraulic braking systems. OR 3) Compare the mechanical and hydraulic braking systems. OR 4) List and explain the objectives of suspension system. OR With a neat sketch explain the working of air bag restraint system OR With a neat sketch explain the working of air bag restraint system 12M 4 3 OR With a neat sketch explain the working of air bag restraint system 12M 5 2 Discuss the social and environmental importance of hybrid and electric vehicles "End"" | Н | all Ticket Number : | | | | | | | | | | | | | | |
|--|-------------|---|---------|--------|--------|---------|--------|----------|---------|------------|---------|------------|-------------------|------------------|------------|----|
| Note: 1. Question Paper consists of two parts (Part-A and Part-B) 2. In Part-A, each questions in Part-A and Part-B 2. In Part-A, each questions in Part-A and Part-B 2. In Part-A, each questions in Part-A and Part-B 2. In Part-A, each questions in Part-A and Part-B 2. In Part-A, each questions in Part-A and Part-B 2. In Part-A, each questions in Part-A and Part-B 2. In Part-A, each questions in Part-A and Part-B 2. In Part-A 2. In | | | | | | | | | | | | | | R-20 | | |
| Max. Marks: 70 Imme: 3 Hours Marks: 70 Imme: 3 Hours Max. Max. Max. Max. Max. Max. Max. Max. | Co | | actor | Sun | بمام | mar | tan | , Evc | nmir | atio | one l | | 00.3 |)))) | | |
| Note: 1. Question Paper consists of two marks: 3. Answer ALL the questions in 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 2. In Part-A, each question carries Two marks 3. Answer ALL the questions in Part-A and Part-B 3. Answer ALL the questions in Part-A and Part-B 3. Answer all the following short answer questions (5 × 2 = 10M) CO | | III D.16CH. II 36HK | | | • | | | | | | ו כו וכ | 101/01 | - -C 2 | 2025 | | |
| Max. Morks: 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 Part-B PART-A Compulsory question Part-B PART-B Answer all the following short answer questions (5 X 2 = 10M) CO BL a) What are the uses of Wiper? 1 1 b) Explain the use of propeller shaft. 2 1 c) What is the function of brake? 3 1 d) List any two advantages of ABS. Answer five questions by choosing one question from each unit (5 x 12 = 60 Marks PART-B Answer five questions by choosing one question from each unit (5 x 12 = 60 Marks PART-B Answer five questions by choosing one question from each unit (5 x 12 = 60 Marks PART-B Answer five questions by choosing one question from each unit (5 x 12 = 60 Marks PART-B Answer five questions by choosing one question from each unit (5 x 12 = 60 Marks PART-B Answer five questions by choosing one question from each unit (5 x 12 = 60 Marks PART-B Answer five questions by choosing one question from each unit (5 x 12 = 60 Marks PART-B Answer five questions by choosing one question from each unit (5 x 12 = 60 Marks PART-B Answer five questions by choosing one question from each unit (5 x 12 = 60 Marks PART-B Answer five questions by choosing one question from each unit (5 x 12 = 60 Marks PART-B Answer five questions by choosing one question from each unit (5 x 12 = 60 Marks PART-B Answer five questions by choosing one question from each unit (5 x 12 = 60 Marks PART-B PART-B Answer five questions by choosing one question from each unit (5 x 12 = 60 Marks PART-B PAR | | | | | | | - | _ | | _ | | | | | | |
| 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) What are the uses of Wiper? 1 1 1 b) Explain the use of propeller shaft. 2 1 c) What is the function of brake? 3 1 d) List any two advantages of ABS. 4 1 e) What are the limitations of Electrical Vehicles? 5 1 PART-B Answer five questions by choosing one question from each unit (5 x 12 = 60 Marks) UNIT-I | M | ax. Marks: 70 | | (**** | | | | | | <i>,</i> | | | Tin | ne: 3 Ho | ours | |
| 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) What are the uses of Wiper? 1 1 b) Explain the use of propeller shaft. 2 1 c) What is the function of brake? 3 1 d) List any two advantages of ABS. 4 1 e) What are the limitations of Electrical Vehicles? 6 Marks CO BL PART—B | ът | . 1 O D | ٠, | C 4 | | | | • | 1 1 |) 4 | D) | | | | | |
| 3. Answer ALL the questions in Part-A and Part-B PART-A (Compulsory question) COmpulsory question) COmpulsory question COmpu | INC | _ | | | _ | | | | ina I | art- | ъ) | | | | | |
| Name | | _ | | | | | | | t-B | | | | | | | |
| 1. Answer 11 the following short answer questions 5 x 2 = 10M 1 1 1 1 1 1 1 1 1 | | | 1 | | | | | | | | | | | | | |
| a) What are the uses of Wiper? b) Explain the use of propeller shaft. c) What is the function of brake? d) List any two advantages of ABS. e) What are the limitations of Electrical Vehicles? e) What are the limitations of Electrical Vehicles? FART-B Answer five questions by choosing one question from each unit (5 x 12 = 60 Marks) UNIT-I | | | | ((| Comp | oulso | ry qı | ıestic | n) | | | | | | | |
| Discuss in detail the Ackermann steering mechanism. 2 1 1 1 1 1 1 1 1 1 | 1. <i>A</i> | nswer <i>all</i> the following s | hort a | answ | er qu | estic | ns | (5 | X 2 | = 10 | M) | | | CO | BL | |
| c) What is the function of brake? d) List any two advantages of ABS. e) What are the limitations of Electrical Vehicles? PART-B Answer five questions by choosing one question from each unit (5 x 12 = 60 Marks) Marks CO BL UNIT-I Describe the various chassis components of automobiles and discuss the advantages and disadvantages. OR a) Explain with neat sketch about the constructional details of spark ignition (SI) engine. Draw schematic diagram showing the layout of complete transmission system of a four wheeler automobile. OR IUNIT-II Draw schematic diagram showing the layout of complete transmission system of a four wheeler automobile. OR IUNIT-III Discuss in detail the Ackermann steering mechanism. OR IUNIT-III Discuss in detail the Ackermann steering mechanism. OR Compare the mechanical and hydraulic braking systems. OR IUNIT-IV Write short notes on a) Seat belt system and b) Anti-theft systems OR With a neat sketch explain the working of air bag restraint system UNIT-V What are the various components of Electrical vehicle? Explain each component with neat sketch. OR Explain the role of National and International emission standards role in controlling the Automobile emissions Discuss the social and environmental importance of hybrid and electric vehicles set in Spirit and electric vehicles of the properties o | | a) What are the uses o | f Wipe | er? | | | | | | | | | | 1 | 1 | |
| c) What is the function of brake? d) List any two advantages of ABS. e) What are the limitations of Electrical Vehicles? PART-B Answer five questions by choosing one question from each unit (5 x 12 = 60 Marks) Marks CO BL UNIT-I Describe the various chassis components of automobiles and discuss the advantages and disadvantages. OR a) Explain with neat sketch about the constructional details of spark ignition (SI) engine. Draw schematic diagram showing the layout of complete transmission system of a four wheeler automobile. OR IUNIT-II Draw schematic diagram showing the layout of complete transmission system of a four wheeler automobile. OR IUNIT-III Discuss in detail the Ackermann steering mechanism. OR IUNIT-III Discuss in detail the Ackermann steering mechanism. OR Compare the mechanical and hydraulic braking systems. OR IUNIT-IV Write short notes on a) Seat belt system and b) Anti-theft systems OR With a neat sketch explain the working of air bag restraint system UNIT-V What are the various components of Electrical vehicle? Explain each component with neat sketch. OR Explain the role of National and International emission standards role in controlling the Automobile emissions Discuss the social and environmental importance of hybrid and electric vehicles set in Spirit and electric vehicles of the properties o | | b) Explain the use of pr | opelle | er sha | aft. | | | | | | | | | 2 | 1 | |
| e) What are the limitations of Electrical Vehicles? PART-B Answer five questions by choosing one question from each unit (5 x 12 = 60 Marks) Marks CO | | | | | | | | | | | | | | 3 | 1 | |
| e) What are the limitations of Electrical Vehicles? PART-B Answer five questions by choosing one question from each unit (5 x 12 = 60 Marks) UNIT-I | | d) List any two advanta | ges o | f AB | S. | | | | | | | | | 4 | 1 | |
| Answer five questions by choosing one question from each unit (5 x 12 = 60 Marks | | • | _ | | | l Veh | nicles | ? | | | | | | 5 | 1 | |
| UNIT-I Describe the various chassis components of automobiles and discuss the advantages and disadvantages. OR a) Explain with neat sketch about the constructional details of spark ignition (SI) engine. b) Explain the concept of Crank case ventilation. OR UNIT-II Draw schematic diagram showing the layout of complete transmission system of a four wheeler automobile. OR Illustrate the working principle of single plate clutch and multi plate with neat sketch. UNIT-II Discuss in detail the Ackermann steering mechanism. OR a) Compare the mechanical and hydraulic braking systems. b) List and explain the objectives of suspension system. OR With a neat sketch explain the working of air bag restraint system UNIT-V What are the various components of Electrical vehicle? Explain each component with neat sketch. OR a) Explain the role of National and International emission standards role in controlling the Automobile emissions b) Discuss the social and environmental importance of hybrid and electric vehicles OR BLEMAIN ARABOR SOR 12M | | , | | | | | | | | | | | | | | |
| UNIT-I Describe the various chassis components of automobiles and discuss the advantages and disadvantages. OR a) Explain with neat sketch about the constructional details of spark ignition (SI) engine. b) Explain the concept of Crank case ventilation. OR UNIT-II Draw schematic diagram showing the layout of complete transmission system of a four wheeler automobile. OR Illustrate the working principle of single plate clutch and multi plate with neat sketch. UNIT-II Discuss in detail the Ackermann steering mechanism. OR a) Compare the mechanical and hydraulic braking systems. OR Compare the mechanical and hydraulic braking systems. OR UNIT-IV Write short notes on a) Seat belt system and b) Anti-theft systems OR With a neat sketch explain the working of air bag restraint system UNIT-V What are the various components of Electrical vehicle? Explain each component with neat sketch. OR a) Explain the role of National and International emission standards role in controlling the Automobile emissions Explain the role of National and International emission standards role in controlling the Automobile emissions b) Discuss the social and environmental importance of hybrid and electric vehicles OR Social Automobile emissions OR Automobile and international emission standards role in controlling the Automobile emissions Explain the role of National and International emission standards role in controlling the Automobile emissions Discuss the social and environmental importance of hybrid and electric vehicles | A | Answer five questions l | y ch | oosi | ng o | ne q | uest | ion f | rom | each | uni | t (5 x 1 | 2 = 6 | 0 Marks | ;) | |
| Describe the various chassis components of automobiles and discuss the advantages and disadvantages. OR a) Explain with neat sketch about the constructional details of spark ignition (SI) engine. Draw schematic diagram showing the layout of complete transmission system of a four wheeler automobile. OR Illustrate the working principle of single plate clutch and multi plate with neat sketch. UNIT-II Discuss in detail the Ackermann steering mechanism. OR I) UNIT-III Discuss in detail the Ackermann steering mechanism. OR a) Compare the mechanical and hydraulic braking systems. OR UNIT-IV Write short notes on a) Seat belt system and b) Anti-theft systems OR With a neat sketch explain the working of air bag restraint system UNIT-V What are the various components of Electrical vehicle? Explain each component with neat sketch. OR a) Explain the role of National and International emission standards role in controlling the Automobile emissions Explain the role of National and International emission standards role in controlling the Automobile emissions Explain the role of National and International emission standards role in controlling the Automobile emissions OR Discuss the social and environmental importance of hybrid and electric vehicles | | | | | | | | | | | | | | Marks | CO | BL |
| Advantages and disadvantages. OR Explain with neat sketch about the constructional details of spark ignition (SI) engine. Explain the concept of Crank case ventilation. Draw schematic diagram showing the layout of complete transmission system of a four wheeler automobile. OR Illustrate the working principle of single plate clutch and multi plate with neat sketch. Discuss in detail the Ackermann steering mechanism. OR IDNIT-III Discuss in detail the Ackermann steering mechanism. OR Compare the mechanical and hydraulic braking systems. IDNIT-IV Write short notes on a) Seat belt system and b) Anti-theft systems OR With a neat sketch explain the working of air bag restraint system UNIT-V What are the various components of Electrical vehicle? Explain each component with neat sketch. OR Explain the role of National and International emission standards role in controlling the Automobile emissions Explain the role of National and International emission standards role in controlling the Automobile emissions Explain the role of National and International emission standards role in controlling the Automobile emissions Explain the role of National and International emission standards role in controlling the Automobile emissions Explain the role of National and International emission standards role in controlling the Automobile emissions Explain the role of National and International emission standards role in controlling the Automobile emissions Explain the role of National and International emission standards role in controlling the Automobile emissions Explain the role of National and International emission standards role in controlling the Automobile emissions Explain the role of National and International emission standards role in controlling the Automobile emissions | | | | | | UN | IIT–I | | | | | | | | | |
| a) Explain with neat sketch about the constructional details of spark ignition (SI) engine. b) Explain the concept of Crank case ventilation. CINIT-II Draw schematic diagram showing the layout of complete transmission system of a four wheeler automobile. OR Illustrate the working principle of single plate clutch and multi plate with neat sketch. CINIT-III Discuss in detail the Ackermann steering mechanism. OR a) Compare the mechanical and hydraulic braking systems. OR UNIT-IV Write short notes on a) Seat belt system and b) Anti-theft systems OR With a neat sketch explain the working of air bag restraint system UNIT-V What are the various components of Electrical vehicle? Explain each component with neat sketch. OR Explain the role of National and International emission standards role in controlling the Automobile emissions Explain the role of National and International emission standards role in controlling the Automobile emissions Explain the social and environmental importance of hybrid and electric vehicles 6M 5 3 | | Describe the various of | hassi | s co | mpor | nents | of | autor | nobi | es a | ind c | discuss | the | | | |
| a) Explain with neat sketch about the constructional details of spark ignition (SI) engine. b) Explain the concept of Crank case ventilation. CINIT-II Draw schematic diagram showing the layout of complete transmission system of a four wheeler automobile. OR Illustrate the working principle of single plate clutch and multi plate with neat sketch. UNIT-III Discuss in detail the Ackermann steering mechanism. OR a) Compare the mechanical and hydraulic braking systems. OR UNIT-IV Write short notes on a) Seat belt system and b) Anti-theft systems OR With a neat sketch explain the working of air bag restraint system UNIT-V What are the various components of Electrical vehicle? Explain each component with neat sketch. OR Explain the role of National and International emission standards role in controlling the Automobile emissions Explain the role of National and International emission standards role in controlling the Automobile emissions Explain the social and environmental importance of hybrid and electric vehicles 6M 5 3 | | advantages and disadv | antag | es. | | | | | | | | | | 12M | 1 | 4 |
| engine. b) Explain the concept of Crank case ventilation. CUNIT-II Draw schematic diagram showing the layout of complete transmission system of a four wheeler automobile. OR Illustrate the working principle of single plate clutch and multi plate with neat sketch. UNIT-III Discuss in detail the Ackermann steering mechanism. OR a) Compare the mechanical and hydraulic braking systems. OR UNIT-IV Write short notes on a) Seat belt system and b) Anti-theft systems OR With a neat sketch explain the working of air bag restraint system UNIT-V What are the various components of Electrical vehicle? Explain each component with neat sketch. OR Explain the role of National and International emission standards role in controlling the Automobile emissions Explain the role of National and International emission standards role in controlling the Automobile emissions 6M 5 3 Solution Explain the role of National and International emission standards role in controlling the Automobile emissions 6M 5 3 B) Discuss the social and environmental importance of hybrid and electric vehicles | | | | | | C |)R | | | | | | | | | |
| b) Explain the concept of Crank case ventilation. UNIT-II | a) | • | h abo | ut the | e cor | nstru | ction | al de | tails | of sp | ark i | gnition (| (SI) | | | _ |
| UNIT-II Draw schematic diagram showing the layout of complete transmission system of a four wheeler automobile. OR Illustrate the working principle of single plate clutch and multi plate with neat sketch. UNIT-III Discuss in detail the Ackermann steering mechanism. OR a) Compare the mechanical and hydraulic braking systems. OR UNIT-IV Write short notes on a) Seat belt system and b) Anti-theft systems OR With a neat sketch explain the working of air bag restraint system UNIT-V What are the various components of Electrical vehicle? Explain each component with neat sketch. OR Explain the role of National and International emission standards role in controlling the Automobile emissions Discuss the social and environmental importance of hybrid and electric vehicles 6M 5 3 | | • | | | | | | | | | | | | | | |
| Draw schematic diagram showing the layout of complete transmission system of a four wheeler automobile. OR Illustrate the working principle of single plate clutch and multi plate with neat sketch. ILM 2 5 UNIT-III Discuss in detail the Ackermann steering mechanism. OR a) Compare the mechanical and hydraulic braking systems. OR b) List and explain the objectives of suspension system. UNIT-IV Write short notes on a) Seat belt system and b) Anti-theft systems OR With a neat sketch explain the working of air bag restraint system UNIT-V What are the various components of Electrical vehicle? Explain each component with neat sketch. OR a) Explain the role of National and International emission standards role in controlling the Automobile emissions Discuss the social and environmental importance of hybrid and electric vehicles 6M 5 3 | b) | Explain the concept of | Crank | case | ven | | | | 7 | | | | | 6M | 1 | 3 |
| OR Illustrate the working principle of single plate clutch and multi plate with neat sketch. ILM 2 5 UNIT-III Discuss in detail the Ackermann steering mechanism. OR a) Compare the mechanical and hydraulic braking systems. b) List and explain the objectives of suspension system. UNIT-IV Write short notes on a) Seat belt system and b) Anti-theft systems OR With a neat sketch explain the working of air bag restraint system UNIT-V What are the various components of Electrical vehicle? Explain each component with neat sketch. OR Explain the role of National and International emission standards role in controlling the Automobile emissions Discuss the social and environmental importance of hybrid and electric vehicles 6M 5 3 | | | | | | | | | | | | | _ | | | |
| Illustrate the working principle of single plate clutch and multi plate with neat sketch. UNIT-III | | • | | | • | the | layou | ut of | cor | nplet | e tr | ansmiss | sion | 121/ | 2 | 3 |
| Illustrate the working principle of single plate clutch and multi plate with neat sketch. UNIT-III | | System of a four wheele | autt | JIIIOD | iic. | (| חר | | | | | | | 12111 | ۷ | 3 |
| UNIT-III Discuss in detail the Ackermann steering mechanism. OR a) Compare the mechanical and hydraulic braking systems. b) List and explain the objectives of suspension system. Write short notes on a) Seat belt system and b) Anti-theft systems OR With a neat sketch explain the working of air bag restraint system UNIT-V What are the various components of Electrical vehicle? Explain each component with neat sketch. OR Explain the role of National and International emission standards role in controlling the Automobile emissions Discuss the social and environmental importance of hybrid and electric vehicles 6M 5 3 | | Illustrate the working n | rincinl | of of | einal | | | utch | and | multi | nlat | a with n | eat | | | |
| Discuss in detail the Ackermann steering mechanism. OR a) Compare the mechanical and hydraulic braking systems. Explain the objectives of suspension system. OR With a neat sketch explain the working of air bag restraint system OR What are the various components of Electrical vehicle? Explain each component with neat sketch. OR Explain the role of National and International emission standards role in controlling the Automobile emissions Discuss the social and environmental importance of hybrid and electric vehicles 12M 3 3 4 4 3 2 | | • | пор | C OI | sirigi | c pia | ilo oi | aton | ana | manı | piat | C WILLI II | Cat | 12M | 2 | 5 |
| Discuss in detail the Ackermann steering mechanism. OR a) Compare the mechanical and hydraulic braking systems. Explain the objectives of suspension system. OR With a neat sketch explain the working of air bag restraint system OR What are the various components of Electrical vehicle? Explain each component with neat sketch. OR Explain the role of National and International emission standards role in controlling the Automobile emissions Discuss the social and environmental importance of hybrid and electric vehicles 12M 3 3 4 4 3 2 | | | | | | UN | IT–II | <u> </u> | | | | | | | | |
| a) Compare the mechanical and hydraulic braking systems. b) List and explain the objectives of suspension system. UNIT-IV Write short notes on a) Seat belt system and b) Anti-theft systems OR With a neat sketch explain the working of air bag restraint system UNIT-V What are the various components of Electrical vehicle? Explain each component with neat sketch. OR a) Explain the role of National and International emission standards role in controlling the Automobile emissions b) Discuss the social and environmental importance of hybrid and electric vehicles 6M 5 3 | | Discuss in detail the Ac | kerma | ann s | teeri | | | | _). | | | | | 12M | 3 | 3 |
| b) List and explain the objectives of suspension system. UNIT-IV Write short notes on a) Seat belt system and b) Anti-theft systems OR With a neat sketch explain the working of air bag restraint system UNIT-V What are the various components of Electrical vehicle? Explain each component with neat sketch. OR Explain the role of National and International emission standards role in controlling the Automobile emissions b) Discuss the social and environmental importance of hybrid and electric vehicles 6M 3 2 MIT-IV A 3 5 6M 5 3 | | | | | | - | | | | | | | | | | |
| b) List and explain the objectives of suspension system. UNIT-IV Write short notes on a) Seat belt system and b) Anti-theft systems OR With a neat sketch explain the working of air bag restraint system UNIT-V What are the various components of Electrical vehicle? Explain each component with neat sketch. OR Explain the role of National and International emission standards role in controlling the Automobile emissions b) Discuss the social and environmental importance of hybrid and electric vehicles 6M 3 2 MIT-IV A 3 5 6M 5 3 | a) | Compare the mechanic | al and | d hyd | raulio | c bra | king | syste | ems. | | | | | 6M | 3 | 4 |
| Write short notes on a) Seat belt system and b) Anti-theft systems OR With a neat sketch explain the working of air bag restraint system UNIT-V What are the various components of Electrical vehicle? Explain each component with neat sketch. OR Explain the role of National and International emission standards role in controlling the Automobile emissions b) Discuss the social and environmental importance of hybrid and electric vehicles 12M 4 3 Lambda 4 3 Explain the role of National and International emission standards role in controlling the Automobile emissions 6M 5 3 | b) | | | - | | | _ | - | | | | | | 6M | 3 | 2 |
| With a neat sketch explain the working of air bag restraint system UNIT-V What are the various components of Electrical vehicle? Explain each component with neat sketch. 12M 5 2 OR Explain the role of National and International emission standards role in controlling the Automobile emissions Discuss the social and environmental importance of hybrid and electric vehicles 6M 5 3 | , | | | | | UN | IT–I\ | / | | | | | | | | |
| With a neat sketch explain the working of air bag restraint system UNIT-V What are the various components of Electrical vehicle? Explain each component with neat sketch. OR Explain the role of National and International emission standards role in controlling the Automobile emissions b) Discuss the social and environmental importance of hybrid and electric vehicles 12M | | Write short notes on a) | Seat | belt s | yste | m a | ınd | b) Ar | nti-th | eft sy | /sten | ns | | 12M | 4 | 3 |
| What are the various components of Electrical vehicle? Explain each component with neat sketch. OR a) Explain the role of National and International emission standards role in controlling the Automobile emissions b) Discuss the social and environmental importance of hybrid and electric vehicles ON 6M 5 3 | | | | | | C |)R | | | | | | | | | |
| What are the various components of Electrical vehicle? Explain each component with neat sketch. OR a) Explain the role of National and International emission standards role in controlling the Automobile emissions b) Discuss the social and environmental importance of hybrid and electric vehicles 6M 5 3 | | With a neat sketch expl | ain th | e wo | rking | of a | ir ba | g rest | traint | syst | em | | | 12M | 4 | 3 |
| with neat sketch. OR a) Explain the role of National and International emission standards role in controlling the Automobile emissions b) Discuss the social and environmental importance of hybrid and electric vehicles 12M 5 2 6M 5 3 | | | | | | UN | IT–V | 7 | | | | | | | | |
| a) Explain the role of National and International emission standards role in controlling the Automobile emissions b) Discuss the social and environmental importance of hybrid and electric vehicles 6M 5 3 | | What are the various co | mpone | ents o | of Ele | ectrica | al vel | hicle? | Exp | lain (| each | compon | ent | | | |
| a) Explain the role of National and International emission standards role in controlling the Automobile emissions 6M 5 3 b) Discuss the social and environmental importance of hybrid and electric vehicles 6M 5 3 | | with neat sketch. | | | | | | | | | | | | 12M | 5 | 2 |
| controlling the Automobile emissions 6M 5 3 b) Discuss the social and environmental importance of hybrid and electric vehicles 6M 5 3 | | | | | | | | | | | | | | | | |
| b) Discuss the social and environmental importance of hybrid and electric vehicles 6M 5 3 | a) | • | | | | ernat | tiona | l em | issio | n sta | anda | rds role | in | 014 | _ | _ |
| vehicles 6M 5 3 | اد ا | G | | | | ا ام | | | | ادا. | ، لد: | -ا- امم | .4 m! - | 6IVI | 5 | 3 |
| | D) | | a en | viron | ment | aı ır | npor | iance | ot of | nybr | ıa a | na elec | iric | 6M | 5 | 3 |
| | | . 5.115.56 | | | | *** F | nd ** | ** | | | | | | CIVI | 3 | 5 |

2.

3.

4.

5.

6.

7.

8.

9.

10.

11.

Hall Ticket Number: R-20 Code: 20A36DT III B.Tech. II Semester Supplementary Examinations Nov/Dec 2023 **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 CO₁ a) State the principle of automation? L1 CO2 b) Describe the process of assembly? L2 c) What is meant by end effector? CO3 L1 CO4 d) Distinguish the forward and inverse kinematics? L2 CO5 L3 e) What is the application of the proximity sensor? PART-B Answer five questions by choosing one question from each unit ($5 \times 12 = 60$ Marks) Marks CO BL UNIT-I 2. Classify the various levels of automation and explain them with suitable sketch? 12M CO1 L4

OR

3. Describe the part transfer mechanism with neat sketch?

12M CO1 L2

UNIT-II

4. Solve the following problem using largest candidate rule. Also calculate its balancing efficiency and balance delay

| Work | T _{ei} | Must be |
|---------|-----------------|----------|
| Element | (min) | preceded |
| (j) | (111111) | by |
| 1 | 1.2 | |
| 2 | 1.4 | |
| 3 | 1.7 | 1 |
| 4 | 1.1 | 1,2 |
| 5 | 1.3 | 2 |
| 6 | 1.11 | 3 |

| Work | Tei | Must be |
|---------|----------|----------|
| Element | (min) | preceded |
| (j) | (111111) | by |
| 7 | 1.32 | 3 |
| 8 | 1.6 | 3,4 |
| 9 | 1.27 | 6,7,8 |
| 10 | 1.38 | 5,8 |
| 11 | 1.5 | 9,10 |
| 12 | 1.12 | 11 |

12M CO2 L5

Code: 20A36DT

OR

| 5. | Explain the procedure for line balancing using Rank Position Weight Method? Explain the merits and demerits of the same? | 12M | CO2 | L1 |
|-----|--|-----|-----|----|
| | UNIT-III | | | |
| 6. | Explain the various levels of robot and enumerate the need for robot? | 12M | CO3 | L1 |
| | OR | | | |
| 7. | Discuss the various types of robot configuration with suitable sketch? | 12M | CO3 | L2 |
| | UNIT-IV | | | |
| 8. | Describe the manipulator kinematics of homogeneous transformation with respect to rotation and translations? | 12M | CO4 | L2 |
| | OR | | | |
| 9. | Compare and contrast the skew motion, joint integrated motion and straight-line motion? UNIT-V | 12M | CO4 | L2 |
| 10. | Describe the principle and operation of hydraulic actuator for robot with suitable sketch? | 12M | CO5 | L2 |
| | OR | | | |
| 11. | Sketch and explain the application of the robot a) Material Handling b) Assembly *** End *** | 12M | CO5 | L1 |

| Hall Ticket Number : | | | | | | | | | | |
|---|------------|------------------------------------|-------------------------|-------------------|--------|------------|----------|-----------|-------|----|
| Code: 20A36DT | | | | | - 1 | | | R-20 | | |
| III B.Tech. II Ser | | | | | | lay/Ju | une 202 | 23 | | |
| | | | _ | obotic neering | _ | | | | | |
| Max. Marks: 70 | (MeC | | ***** | ieeniig | 3) | | Ţ | ime: 3 Hc | ours | |
| Note: 1. Question Paper con 2. In Part-A, each que 3. Answer ALL the que | stion carr | ies Tw o n Part - | o mark A and l | S. | Part- | B) | | | | |
| | (C | | <u>.RT-A</u> ory que | stion) | | | | | | |
| 1. Answer <i>all</i> the following | | _ | | | (5 | 5 X 2 | = 10M |) C(| O BL | |
| a) What is the need for a | | | 40.001 | | (- | | | CC | | |
| b) Write down the benefit | | | anual | assem | ıblv l | ine? | | CC | | |
| c) State the law of robot? | | | aa. | | | | | CC | | |
| d) What is the application | | ctory r | olannir | na? | | | | |)4 L3 | |
| e) Differentiate the hydra | - | | | • | r? | | | |)5 L2 | |
| | | • | RT-B | | | | | | | |
| Answer five questions by | choosin | g one o | questio | n from | each | unit (| 5 x 12 = | 60 Marks | ;) | |
| | | UN | IIT–I | | | | | Marks | CO | BI |
| Describe the elements of | of autom | ated | syster | n with | suita | able s | sketch? | ? 12M | CO1 | L |
| | | | OR | | | | | | | |
| Sketch and explain the | automat | | w line | with b | uffe | r stor | age? | 12M | CO1 | L |
| Explain the procedure as candidate rule? | ssociate | d with | n line b | alanci | ng u | sing | Larges | | CO2 | 1 |

OR

5. Solve the problem by using Rank position weight method. Consider the following assembly network relation shown in table. The number of shifts per day is one and the number of working hours is 8. The company aims to produce 40 units of the product per shift. To compute the balancing efficiency of the line.

| Operation number | Immediate preceding tasks | Duration (Min) |
|------------------|---------------------------|-------------------|
| 1. | | 8 |
| 2. | 1 | 3 |
| 3. | 1 | 2 |
| 4. | 1 | 4 |
| 5. | 3,4 | 7 |

12M CO₂ L₅

| 6. | 2,7 | 4 |
|----|-------|---|
| 7. | 2,4,5 | 5 |
| 8. | 4 | 6 |
| 9. | 6,8 | 8 |

UNIT-III

| 6. | Discuss the degrees of freedom in Robots and what is significance |
|----|---|
| | of the same? |

12M CO₃ L₂

OR

7. Classify the different types of grippers and explain any one of the same with neat sketch?

12M CO₃ L₄

UNIT-IV

8. Discuss the D-H rotation with suitable sketch?

12M CO4 L2

OR

9. Describe the concept of trajectory planning and also discuss the avoidance of obstacle?

12M CO4 L2

UNIT-V

- 10. Discuss the function of the following
 - (i) Resolver (ii) Encodes (iii) Potentiometer

12M CO₅ L₂

OR

- 11. Explain the application of robot
 - (i) Spray painting (ii) Inspection (iii) Loading and unloading

 *** End ***

12M CO₅ L₃