Hall Ticket Number :										

R-17

Code: 7G572

IV B.Tech. I Semester Regular & Supplementary Examinations January 2022

Automobile Engineering

(Mechanical Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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			Marks	CO	Blooms Level
		UNIT–I			
1.	a)	On a hilly track, performance of a rear wheel driven vehicle is superior compared to front wheel drive vehicle. Explain the reasons.	7M	CO1	L4
	b)	Explain the crank case ventilation system of automobile with neat sketch.	7M	CO1	L1
		OR			
2.	a)	Draw a simple wiring circuit for lighting system of a car and discuss the same.	7M	CO1	L1
	b)	Describe horn, wiper and engine temperature indicator with neat sketch.	7M	CO1	L2
		UNIT–II			
3.	a)	What are the main sources of pollutants from gasoline / petrol engines?	7M	CO2	L1
	b)	How evaporative emission control is achieved in SI engines.	7M	CO2	L2
		OR			
4.	a)	What are the various methods used to control diesel particulate emissions.	7M	CO2	L2
	b)	Discuss the merits and demerits of Hydrogen and LPG as alternate fuels for IC engines.	7M	CO2	L1
		UNIT–III			
5.	a)	Illustrate the construction and working of multi plate clutch with neat diagram.	7M	CO3	L2
	b)	Describe the construction of a sliding mesh gear box. Show how the power flows in various speeds with suitable diagrams.	7M	CO3	L2
		OR			
6.	a)	Explain the working of Hotch - Kiss drive with neat diagram.	7M	CO3	L2
	b)	Explain how a differential ensures different rotational speeds in rear wheels of automobiles while moving in curved paths.	7M	CO3	L2
		UNIT–IV			
7.	a)	Explain the terms: Camber and Caster	4M	CO4	L1
	b)	Discuss the working of Davis steering mechanism.	10M	CO4	L2
		OR			
8.	a)	Classify hydraulic shock absorbers used in automobiles. Explain any two of them.	7M	CO4	L1
	b)	With a line diagram explain hydraulic braking system.	7M	CO4	L1
		UNIT–V			
9.	a)	Explain the working of seat belt system.	7M	CO5	L2
	b)	Explain the concept of Antilock braking system (ABS).	7M	CO5	L2
		OR			
10.	a)	How air bag restraint works in automobile.	7M	CO5	L2
	b)	Explain the working of anti-theft system of an automobile.	7M	CO5	L2

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Hall Ticket Number :										

R-17

Code: 7G574

IV B.Tech. I Semester Regular & Supplementary Examinations January 2022

CAD/CAM

(Mechanical Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any five* full questions by choosing one question from each unit (5x14 = 70 Marks)

****

		Marks	CO	Blooms Level
	UNIT–I			
1. a)	Write a note on the output devices used in the CAD system.	7M	CO1	L1
b)	Explain briefly about input devices in CAD system.	7M	CO1	L1
	OR			
2. a)	Summarize in detail the basic structure of a CPU with a neat block diagram.	7M	CO1	L2
b)	Elucidate the conventional process of the product cycle in the conventional manufacturing environment.	7M	CO1	L5
	UNIT–II			
3.	Recall various curve representation methods used for geometric modeling? And discuss at least any two curve representation methods	14M	CO2	L1
	OR			
4. a)	Predict and explain the characteristics of the Bezier and B-Spline curves?	7M	CO2	L3
b)	Describe B-rep and CSG approaches of solid modeling.	7M	CO2	L2
	UNIT–III			
5. a)	Discuss the role of “Numerical Control” in the Computer-aided machining process.	7M	CO3	L2
b)	Differentiate CNC and DNC machine tools in detail emphasizing the applications and merits.	7M	CO3	L2
	OR			
6. a)	Categorize the functions of CNC Controllers in CNC Lathe machines.	4M	CO3	L1

b) Write a manual part programming for the part shown in figure 1(all dimensions are in mm).

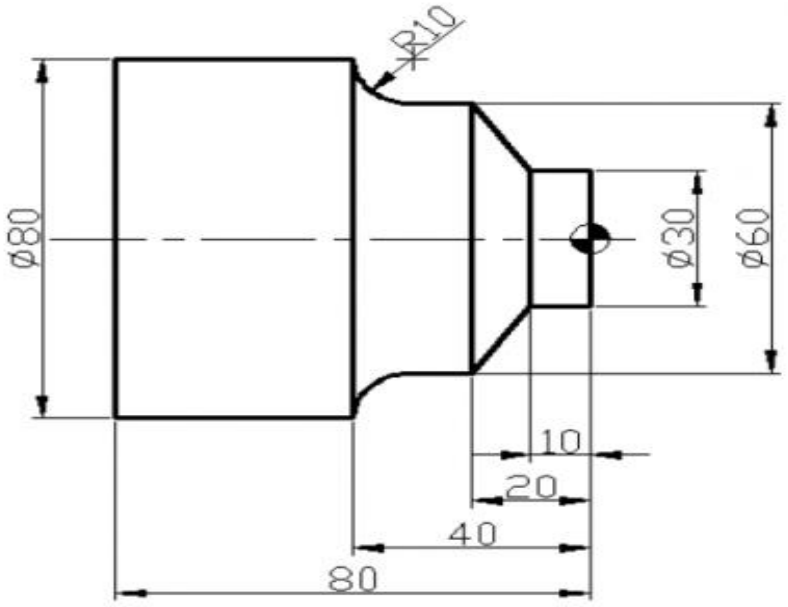

Figure 1 10M CO3 L1

UNIT–IV

7. a) Define group technology? Discuss its limitations 7M CO4 L1

b) What is a part family? Choose and explain at least one method used in part family formation. 7M CO4 L6

OR

8. a) Memorize and explain the different types of machines used in FMS workstations 7M CO4 L1

b) Outline the applications of FMS. 7M CO4 L4

UNIT–V

9. a) Define capacity planning? Explain various strategies in it. 7M CO5 L1

b) Explore the significance of quality control in CIM. 7M CO5 L4

OR

10. a) Explain the importance of computers in QC 7M CO5 L1

b) Discuss the advantages of CIM over conventional manufacturing. 7M CO5 L2

****END****

Hall Ticket Number :										

R-17

Code: 7G674

IV B.Tech. I Semester Regular & Supplementary Examinations January 2022

Disaster Management

(Common to All Branches)

Max. Marks: 70 Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)

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			Marks	CO	Blooms Level
		UNIT–I			
1.	a)	Define Disaster and Hazard. Write a detailed note on Natural disaster.	7M	CO1	L1
	b)	Explain the difference between hazard and vulnerability with examples.	7M	CO1	L2
		OR			
2.	a)	How can we mitigate on the disasters in the environment?	7M	CO1	L1
	b)	How does capacity influence disaster? Explain with example.	7M	CO1	L1
		UNIT–II			
3.	a)	How Earthquake is measured and what are all the damages caused by Tsunami.	7M	CO2	L1
	b)	Explain the necessary steps to be avoid dangerous epidemics after a flood disaster?	7M	CO2	L2
		OR			
4.	a)	List the activities that trigger human-induced disasters.	7M	CO2	L1
	b)	Describe the Bhopal Gas Tragedy	7M	CO2	L2
		UNIT–III			
5.	a)	Explain in detail about the impacts of disaster on environment.	7M	CO3	L2
	b)	Explain in detail about Recent Trends in Disaster Management.	7M	CO3	L2
		OR			
6.	a)	How does climate change affect disasters?	7M	CO3	L1
	b)	Explain in detail about urban disaster.	7M	CO3	L2
		UNIT–IV			
7.	a)	Discuss the important steps in relief distribution. Examine the problem areas during recovery phase of disaster management.	7M	CO4	L3
	b)	Discuss key stages of Disaster Cycle.	7M	CO4	L3
		OR			
8.	a)	Explain the role and functions of a disaster manager.	7M	CO4	L2
	b)	Discuss the principles of community based disaster management.	7M	CO4	L3
		UNIT–V			
9.	a)	Describe the role of sustainable development in disaster management.	7M	CO5	L2
	b)	Explain the need of quick reconstruction technologies in disaster management.	7M	CO5	L2
		OR			
10.	a)	Explain the factors to be considered while planning the rebuilding works after a major disaster due to flood.	7M	CO5	L2
	b)	Describe the role of land use planning and development regulations in disaster management.	7M	CO5	L2

END

Hall Ticket Number :										

R-17

Code: 7G573

IV B.Tech. I Semester Regular & Supplementary Examinations January 2022

Finite Element Methods

(Mechanical Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any five* full questions by choosing one question from each unit (5x14 = 70 Marks)

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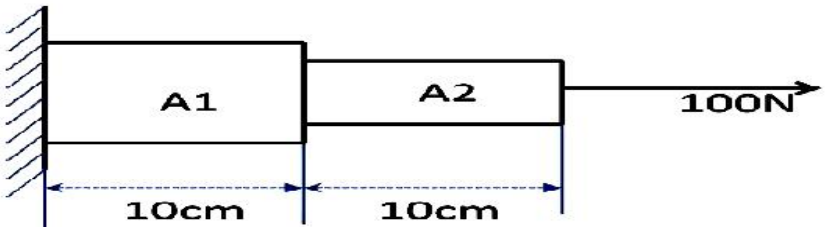
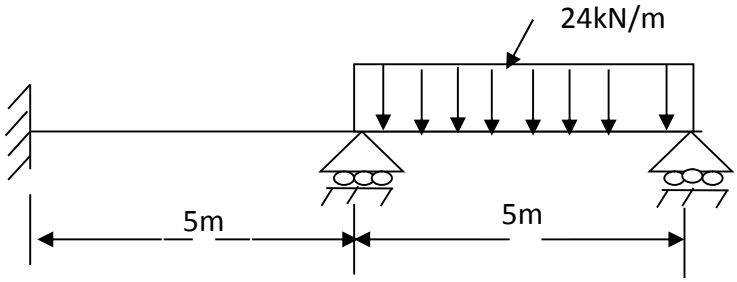
		Marks	CO	Blooms Level
	UNIT-I			
1.	Describe the steps involved in Finite Element Method	14M	CO1	L2
	OR			
2.	Consider a bar shown in Figure 1, Young's modules E= $2x10^5$ N/mm^2. A_1= 2 cm^2, A_2= 1 cm^2, and force of 100N is applied. Determine the nodal displacements and element stresses.			
	 Figure 1	14M	CO2	L3
	UNIT-II			
3.	Derive the stiffness matrix of a Truss element.	14M	CO3	L6
	OR			
4.	For the beam loaded as shown in Figure 2, determine; (i) the slope at the simple supports, (ii) Vertical defection at the mid-point of the load. Take E=200GPa, I=$4x10^6m^4$.			
	 Figure 2	14M	CO3	L3
	UNIT-III			
5.	The (x, y) co-ordinates of three noded triangular element if thickness 0.2 cm are (1, 4), (5, 2), (3, 6) cms. Its young's modulus is 200GPa, Poisson's ratio is 0.3. The edge formed by the points (1, 4) and (5, 2) is fixed and a load of 5kN is acting at point (3,6) in downward direction. Determine the nodal displacements.	14M	CO4	L3
	OR			

6. For axisymmetric element shown in Figure 3, determine the stiffness matrix. Let E = $2.1x10^5 N/mm^2$ and ϑ = 0.3. The co-ordinates shown in figure are in millimeters.

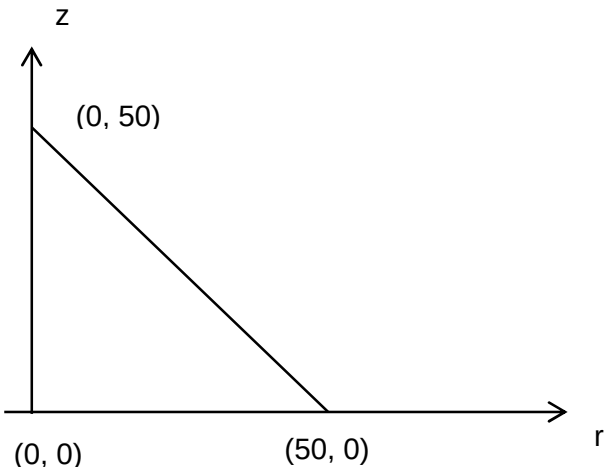


Figure 3 14M CO4 L3

UNIT-IV

7. Derive the strain-displacement matrix and stiffness matrix for a 4 noded isoparametric quadrilateral element 14M CO5 L6

OR

8. A composite wall consists of three materials of different thermal conductivities i.e., 20 W/m^{o}C, 30 W/m^{o}C, 50 W/m^{o}C of thickness 0.3m, 0.15m, 0.15m respectively. The outer surface is 20^{o}C and the inner surface is exposed to the convective heat transfer coefficient 25W/m^{2o}C at 300^{o}C. Determine the temperature distribution within the wall. 14M CO5 L3

UNIT-V

9. Determine the natural frequency of a cantilever beam vibrating freely in the axial direction. The exact solution is $\omega = \frac{n\Pi}{2l}\sqrt{\frac{E}{\rho}}$. Use lumped mass formulation. 14M CO6 L6

OR

10. A pump pumping fluid at Q=6500m^3/hr is located at coordinates (5, 2) in the element as shown in Figure 4. Determine the amount of Q allotted to each node. All nodal coordinates are in mm. Assume unit thickness of t=1mm.

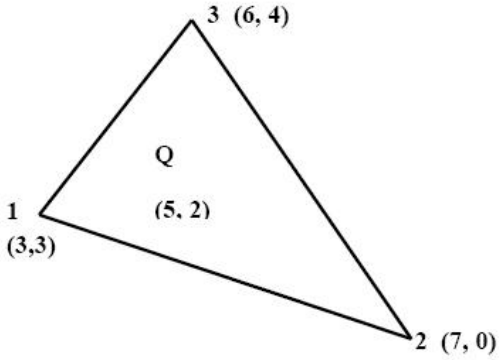


Figure 4 14M CO6 L6

****END****

Hall Ticket Number :										

R-17

Code: 7GA71

IV B.Tech. I Semester Regular & Supplementary Examinations January 2022

Human Resource Management

(Common to All Branches)

Max. Marks: 70 Time: 3 Hours

Answer *any five* full questions by choosing one question from each unit (5x14 = 70 Marks)

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			Marks	CO	Blooms Level
		UNIT–I			
1.	a)	Explain the nature and scope of human resource management in the context of an organization.	7M	1,2	1
	b)	Discuss any three ethical issues faced by human resource professionals with an example for each of them.	7M	1,2	2
		OR			
2.	a)	Write a short notes on competitive challenges influencing HRM.	7M	1,3	3
	b)	Discuss the functions of human resource management by highlighting the operative functions and its strategic intent.	7M	1,4	3
		UNIT–II			
3.	a)	Elucidate the importance of human resource planning.	7M	1,4	3
	b)	Give different methods of collecting data for job analysis and compare any two of the methods.	7M	4,5	5
		OR			
4.	a)	Explain in detail about Human Resource Information systems and its applications in business world.	7M	3,5	4
	b)	What is job design? Present any three techniques of job design.	7M	3,4	4
		UNIT–III			
5.	a)	L&G is an IT based start-up company that opts for campus recruitment. If you are a HR specialist of L & G, what process you will you recommend for the recruitment of fresher's.	7M	4,5	6
	b)	Explain any three factors that affect the selection decision outcomes.	7M	3,4	4
		OR			
6.	a)	Narrate the process of recruitment with appropriate steps and examples.	7M	1,4	5
	b)	Develop an orientation program for the undergraduate students of any degree program.	7M	3,4	6

UNIT–IV

7.	a)	Compare the different types of training.	7M	1,3	2
	b)	What is development? What are the factors influencing executing development in an organization.	7M	2,3	6

OR

8.	a)	Explain different ways an organization can support employees in career advancement.	7M	2,5	5
	b)	How can training helps employees in career progression in the organization?	7M	3,5	5

UNIT–V

9.	a)	Elucidate the procedure for arriving at the compensation for a job role.	7M	2,3	4
	b)	Explain the grievance handling procedure with the help of organizational related grievances.	7M	3,4	5

OR

10.	a)	Distinguish between monetary and non-monetary perquisites and give three examples for each of them.	7M	4,5	4
	b)	Give the importance of collective bargaining and state reasons why maintaining cordial employee-employer relationship is needed.	7M	4,5	5

****END****

Hall Ticket Number :										

R-17

Code: 7G571

IV B.Tech. I Semester Regular & Supplementary Examinations January 2022

Operations Research

(Mechanical Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any five* full questions by choosing one question from each unit (5x14 = 70 Marks)

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			Marks	CO	Blooms Level
		UNIT–I			
1.	a)	Define Operations research	2M	1	2
	b)	Solve the following Linear Programming Problem by Graphical method Minimize $Z=20X_1 + 10X_2$ Subject to the conditions $X_1 + 2X_2 \leq 40$ $3X_1 + X_2 \geq 30$ $4X_1 + 3X_2 \geq 60$ and $X_1, X_2 \geq 0$	12M	1	3
		OR			
2.		Use Two-Phase Simplex method to solve the linear programming problem Minimize $Z = X_1 + X_2$ Subjected to $2X_1 + X_2 \geq 4$ $X_1 + 7X_2 \geq 7$ $X_1, X_2 \geq 0$	14M	1	3
		UNIT–II			
3.		Solve the following transportation problem, where S_1,S_2,S_3 represents the sources and D_1,D_2,D_3,D_4 represents the destinations and the cell entries are the unit costs to transport the goods from each source to each destinations.			

	D_1	D_2	D_3	D_4	Availability
S_1	6	8	8	5	30
S_2	5	11	9	7	40
S_3	8	9	7	13	50
Demand	35	28	32	25	

14M 2 5

OR

4. Three jobs are to be done by 4 machines. Each job can be assigned to one and only one machine. The cost of each job on each machine is given in the following table.

Jobs\Machines	**M_1**	**M_2**	**M_3**	**M_4**
J_1	18	24	28	32
J_2	8	13	17	19
J_3	10	15	19	22

What are the job assignments which will minimize the total cost? Which machine will remain idle? 14M 2 5

UNIT–III

5. The cost of a product is Rs. 6100, and its scrap value is Rs. 100. The maintenance cost found from experience is as follows:

Year	1	2	3	4	5	6	7	8
Maintenance cost (Rs)	100	250	400	600	900	1200	1600	2000

When should the product be replaced? 14M 3 5

OR

6. Solve the following game using graphical method. Find the strategies for the players A and B

	Strategies of A and B	B: I	B: II
A	I	1	-3
	II	3	5
	III	-1	6
	IV	4	1
	V	2	2
	VI	-5	0

14M 4 4

UNIT–IV

7. Arrivals at a telephone booth are following Poisson law of distribution with an average time of 10 minutes between one arrival and the next. Length of a phone call is assumed to be distributed exponentially with mean of 3 minutes. What is the probability that a person arriving at the booth will have to wait? What is the system length? How many are the in the queue waiting for the service to take phone call? 14M 5 4

OR

8. a) classify simulation models 5M
   b) Write the different phases of simulation 5M
   c) Explain the advantages and disadvantages of simulations 4M 6 2

UNIT–V

9. Find the most economic batch quantity of a product on a machine. The production rate of the item on the machine is 200 pieces / day. The demand is uniform at the rate of 100 pieces / day. The set-up cost is Rs.200 per batch and the cost of holding one item in inventory is Rs.0.81 per day. How will be the batch quantity varies if the machine production rate was infinite? 14M 8 5

OR

10. Solve the following Linear Programming Problem by **DPP method**

Maximize $Z=6X1+ 4X2$

Subject to the conditions

$2X_1 + 3X_2 \leq 100$

$4X_1 + 2X_2 \leq 120$ and

$X_1, X_2 \geq 0$ 14M 7 5

END

Hall Ticket Number :										

R-17 (SS)

Code: 5G575

IV B.Tech. I Semester Supplementary Examinations January 2022

Advanced Manufacturing Systems

(Mechanical Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. What are the strategies of a Manufacturing system? Explain in detail? 14M

OR

2. a) What are the components of manufacturing system? State its Limitations of traditional manufacturing systems. 7M

   b) Discuss various types of production systems. 7M

UNIT–II

3. a) Explain the concept of Concurrent engineering 7M

   b) Discuss the features and requirements of Just-in-time production systems 7M

OR

4. a) Discuss quantitative analysis in cellular manufacturing – 7M

   b) Discuss rank order clustering technique. 7M

UNIT–III

5. a) compare of mass production and lean production 7M

   b) What is agile manufacturing& state the principles of agile manufacturing 7M

OR

6. State the features for production system towards agility in areas of product design, marketing and production operations. 14M

UNIT–IV

7. Name three production situations in which FMS technology can be applied. Explain these production systems with examples. 14M

OR

8. What is carousel system? Explain the two storage location strategies? 14M

UNIT–V

9. a) Draw and explain the basic structure of expert system? 7M

   b) Explain How expert system is useful for FMS with a case study. 7M

OR

10. a) Explain with suitable sketch knowledge based system. 7M

    b) Describe the elements of artificial intelligence. Is machine vision a part of it? Explain. 7M

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Hall Ticket Number :										

R-17

Code: 7G579

IV B.Tech. I Semester Regular & Supplementary Examinations January 2022

Automation and Robotics

(Mechanical Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)

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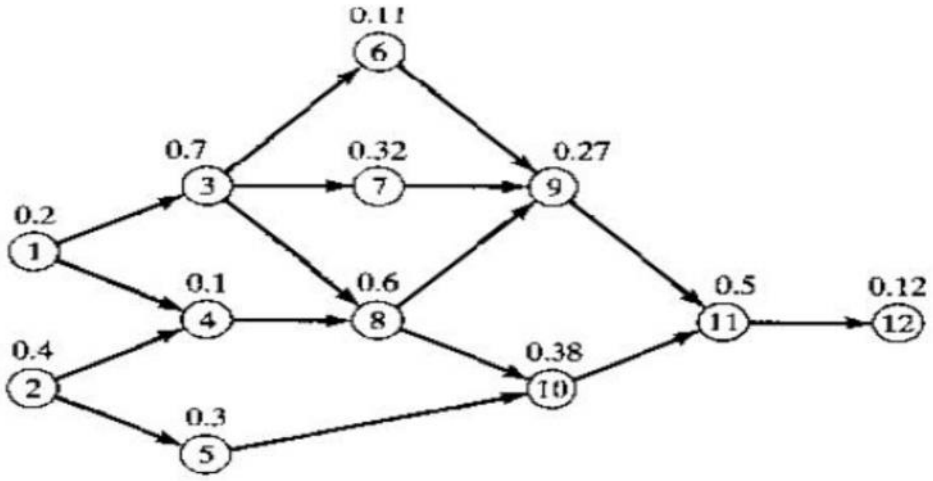
			Marks	CO	Blooms Level
		UNIT–I			
1.	a)	With a relevant figure, briefly outline the following types of automation based on the production quantity and product variety.	12M	CO1	L4
	b)	What are the additional features of flexible automation as compared to programmable automation?	2M	CO1	L2
		OR			
2.	a)	i. Distinguish between blocking and starving in the case of transfer lines with internal storage. ii. List the reasons for the use of storage buffers in a transfer line.	8M	CO1	L2
	b)	Write a short notes on automation strategies	6M	CO1	L5
		UNIT–II			
3.		Apply the Largest Candidate Rule for below Figure and determine the following. (i). Balancing Efficiency, (ii). Balance delay			



			14M	CO2	L3
		OR			
4.		Describe Kilbridge and Wester method of line balancing with an example.	14M	CO2	L4

UNIT–III

5.	Briefly explain the robot components with neat sketch	14M	CO3	L2

OR

6.	a) Explain the degrees of freedom.	5M	CO3	L4
	b) With a relevant schematic diagram describe the concept and relevance of pitch, yaw and roll motions of a robot wrist.	9M	CO3	L2

UNIT–IV

7.	a) i. State the properties of the rotation matrix. ii. Identify the four different transformations and the corresponding parts (submatrices) of the homogeneous transformation matrix.	7M	CO4	L2
	b) i. Outline the concept of the manipulator Jacobian. How are the singular configurations of a robot manipulator identified?	7M	CO4	L2

OR

8.	Describe the D-H notation with neat figure	14M	CO4	L3

UNIT–V

9.	a) Explain the importance of actuators in robots	7M	CO5	L5
	b) With a schematic diagram, describe the principle of operation of ANY TWO external sensors	7M	CO5	L5

OR

10.	a) Discuss the applications of robots.	7M	CO5	L3
	b) i. Distinguish between tactile sensing and proximity sensing. Identify ANY ONE principle of sensing and application for tactile sensing and proximity sensing. ii. Outline the need for position sensing and velocity sensing in robotics.	7M	CO5	L2

END