

Instructions:

- (1) Question No.1 is compulsory and Answer 3 Questions remaining 5 Questions.
- (2) Assume suitable data wherever necessary
- (3) Diagram and sketches explanations are right to reserve full marks

- Q1. Attempt any four. 20
- a. What are the social responsibilities of business manager?
 - b. What are the three approaches for selecting an alternative?
 - c. Briefly describe the system approach to staffing.
 - d. Write short note on scope of economics.
 - e. Which are the types of market? Explain briefly.
 - f. Explain various functions of money.
- Q2 a. Explain five managerial functions in detail. 10
- b. Construct a diagram depicting the formal organization of an enterprise or activity with which you are familiar, chart its informal organization . Does it help or hinder the formal organization? Why? 10
- Q3. a. For planning a project at VIIth semester apply the decision steps of (1) Premising (2)Identify alternatives(3) Evaluating alternatives in terms of goal sought, and (4)Choosing an alternative. 10
- b. What is feed forward control? Why is it important to managers? 10
- Q4.a. How are the leadership theory and leadership styles related to motivation? 10
- b. Explain PPC curve in detail. 10
- Q5.a. Explain economical equilibrium in detail. 10.
- b. Explain the functions of central bank in detail. 10
- Q6. a. Write short note on Henry Fayol contribution to management 05.
- b.Differentiate between formal and informal organization. 05
- c.What are theory X and theory Y assumptions?. 05
- d. Write short note on elasticity with respect to economics. 05

8/5/2018

Q. P. Code : 37976

[Time: Three Hours]

[Marks:80]

Please check whether you have got the right question paper.

- N.B:
1. Question.No.1 is compulsory.
 2. Attempt any **three** questions out of the remaining **five** questions.
 3. Figures to the **right** indicate **full marks**.
 4. Assume suitable data wherever required but justify the same.

1. Write short note on **any 4** 20
 - (a) Applications of mechatronics in home and office.
 - (b) Hydraulic and pneumatic actuators
 - (c) Stepper motors
 - (d) Hardware in loop simulation
 - (e) PZT Sensor/Actuator mounting in beam vibration case study
2.
 - (a) Explain role of information systems in mechatronics. 7
 - (b) What are indexing mechanisms? Explain the indexing mechanisms used in mechatronic applications. 13
3.
 - (a) What are BLDC motors? Draw 3 phase equivalent circuit for driving a BLDC motor. 10
 - (b) Explain the generalized mechatronic design process. 10
4.
 - (a) Write short note on analog to digital conversion. 6
 - (b) Discuss the software design in mobile robot case study with regards to data collection, motion algorithm and map generation. 8
 - (c) What are the types of SLA printing systems? 6
5.
 - (a) Differentiate between explicit steering and skid steering with reference to mobile robot case study. 5
 - (b) Explain the experimental setup of beam vibration case study. 10
 - (c) What is dynamic masking in projection SLA? How is it implemented? 5
6.
 - (a) Discuss PID control in beam vibration case study. 10
 - (b) Explain working of combined scanning and projection stereolithography process. 10

Time: 3 Hours

Total Marks: 80

- N.B. (1) Question no. 1 is **compulsory**.
 (2) Attempt any **three** questions out of remaining **five** questions.
 (3) **Illustrate** your answer with **necessary** sketch wherever **necessary**.
 (4) **Figures** to the **right** indicate full **marks**.

1. **Attempt any FOUR of the following :** (20)
- Describe dynamic physical model with suitable sketch and examples.
 - What is the significance of mathematical modeling?
 - How is the validation of computer simulation models done?
 - Explain the Monte-Carlo simulation techniques with suitable example.
 - Describe any one technique to solve ordinary differential equation.
2. (a) For a free vibrating pendulum derive an expression for period of spring. (10)
 (b) Describe exponential growth and decay while charging a capacitor. (10)
3. (a) Describe the various methods of random number generation. (10)
 (b) Derive a state space model of the given differential equation. (10)
- $$\frac{d^3y}{dt^3} + 8\frac{d^2y}{dt^2} + 11\frac{dy}{dt} + 6y = 5u$$
4. (a) Elaborate any five probability concepts in simulation. (10)
 (b) Describe with an example the steps in a sound simulation study. (06)
 (c) Compare between deterministic and stochastic simulation model. (04)
5. (a) Compare the step response method of two, three and four parametric model with necessary sketches. (10)
 (b) Use Taylor's theorem to find the approximate value of $\log [(1.03)^{1/3} + (0.98)^{1/4} - 1]$ (06)
 (c) Show diagrammatically the types of model. (04)
6. Write short notes on any **FOUR :** (20)
- Advantages of simulation
 - Numerical approximation
 - Principles of mathematical modeling
 - Applications of mathematical model
 - Dimensional analysis

[Time: 3 Hours]

[Marks: 80]

- N.B:
1. Question No. 1 is compulsory
 2. Attempt any three questions from remaining five questions.
 3. Illustrate your answers with neat sketches.
 4. Figures to the right indicate full marks

- Q.1 Write short note on any four 20
- (a) Selective laser sintering
 - (b) Concept generation
 - (c) Function Analysis System Technique (FAST)
 - (d) Design for assembly
 - (e) Morphology of design
- Q.2 (a) Explain design for environment also discuss various regional and global issues of environment pollution 10
- (b) What do you understand by value engineering? What are the various steps of value analysis (VA) job plan? 10
- Q.3 (a) What is product life cycle? Elaborate the phases of life cycle with suitable example 8
- (b) What is product architecture? Explain modular and integral product architectures 8
- (c) How To Create a FAST Diagram 4
- Q.4 (a) Explain important type of manufacturing process with their classification. Describe step of AHP process. 10
- (b) Write short note on (i) Stereo lithography (ii) Quality function deployment (QFD) 10
- Q.5 (a) What is the difference between concurrent engineering and sequential engineering? 5
- (b) Discuss in details manufacturing cost analysis 10
- (c) Explain failure mode and effects analysis (FMEA) 5
- Q.6 (a) Explain industrial design 5
- (b) How ergonomic considerations are useful in product design? Explain physical ergonomic hazards and solutions 10
- (c) Define intellectual property 5

Q.P. Code :50325

[Time: Three Hours]

[Marks:80]

Please check whether you have got the right question paper.

- N.B:
1. Question.No.1 is compulsory.
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1. Write short note on any 4 20
 - (a) Automation and robotics
 - (b) Four axis SCARA robot
 - (c) Linear interpolation
 - (d) Robot programming methods
 - (e) Charge couple device (CCD)

2. (a) What are the future applications of robot? 6
 - (b) Find the A matrices for the manipulator in figure 1 using the link parameters given in table. 14

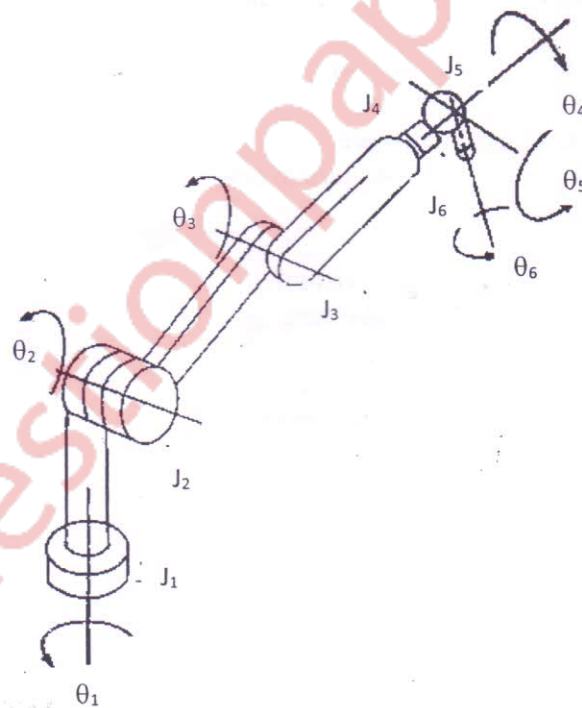


Figure 1

Link	Variable	t	a	d
1	θ_1	-90^0	0	0
2	θ_2	0	0	d_2
3	θ_3	0	a_3	d_3
4	θ_4	-90^0	a_4	0
5	θ_5	-90^0	0	0
6	θ_6	90^0	0	0

3. (a) Explain polar configuration of robot. 7
 (b) Explain forward transformation of 2-degree of freedom planer (RR) arm. 5
 (c) The SCARA robot has four joints and four limbs. It's second joint is required to move from 30^0 to 150^0 in 5 sec. Determine the cubic polynomial trajectory to generate smooth trajectory for the joint. What are the maximum velocity and acceleration for this trajectory? 8
4. (a) Explain utility of workspace analysis. 5
 (b) Explain WAIT, SIGNAL and DELAY command. Write a program for pick and place application by using them 10
 (c) Explain edge detection in machine vision. 5
5. (a) Explain robot program as a path in space. 5
 (b) Explain machine vision system architecture in details. 10
 (c) Write a note on robot learning. 5
6. (a) What is template matching in machine vision? 5
 (b) Explain the effect of robotics on social issues. 15

8/5/2018

BE-Mechatronics -sem VIII -Design of Mechatronics systems

Q. P. Code : 37976

[Time: Three Hours]

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