

# CBCS SCHEME

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18ME71

## Seventh Semester B.E. Degree Examination, Jan./Feb. 2023 Control Engineering

Time: 3 hrs.

Max. Marks: 100

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

### Module-1

- 1 a. With a block diagram, explain automobile speed closed control system. (10 Marks)  
 b. List and explain requirements of an ideal control system. (10 Marks)

OR

- 2 a. Explain: (i) Proportional controller (ii) Derivative controller (10 Marks)  
 b. Obtain transfer function for armature controlled D-C motor. (10 Marks)

### Module-2

- 3 a. Explain typical test signals in control system. (10 Marks)  
 b. Determine order and type for open and closed loop control system as shown in Fig.Q3(b).

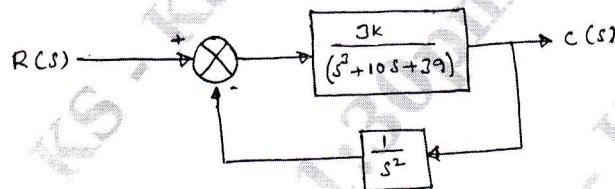


Fig.Q3(b)

(10 Marks)

OR

- 4 a. Define:  
 (i) Delay time (ii) Rise time (iii) Peak time  
 (iv) Maximum overshoot (v) Setting time (10 Marks)

b. A unity feedback system is characterized by open loop transfer function  $G(s) = \frac{16}{s^2 + 2s + 16}$ .

Determine the following when the system subjected to unit step input :

- (i) Undamped natural frequency (ii) Damping ratio (iii) Peak overshoot  
 (iv) Peak time (v) Settling time (10 Marks)

### Module-3

- 5 a. Reduce the block diagram as shown in Fig.Q5(a) to simple form and find transfer function:

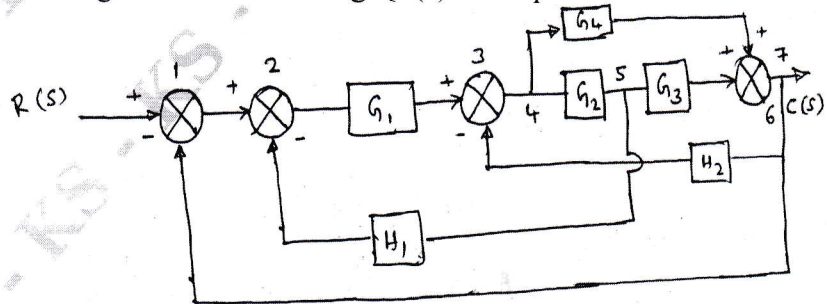


Fig.Q5(a)

(10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
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- b. Obtain transfer function of block diagram shown in Fig.Q5(b) by reduction technique.

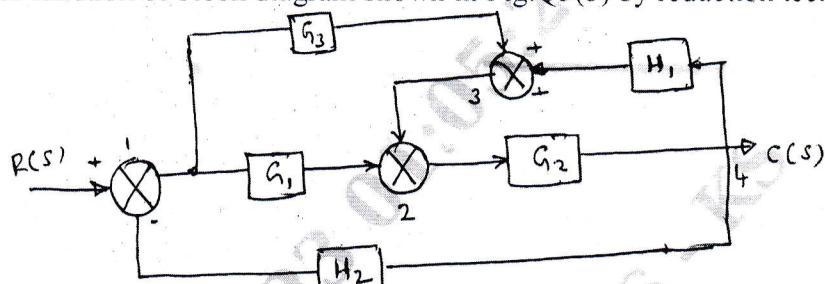


Fig.Q5(b)

(10 Marks)

OR

- 6 a. For the system shown in Fig.Q6(a), determine  $\frac{C(s)}{R(s)}$  using Mason's gain formula.

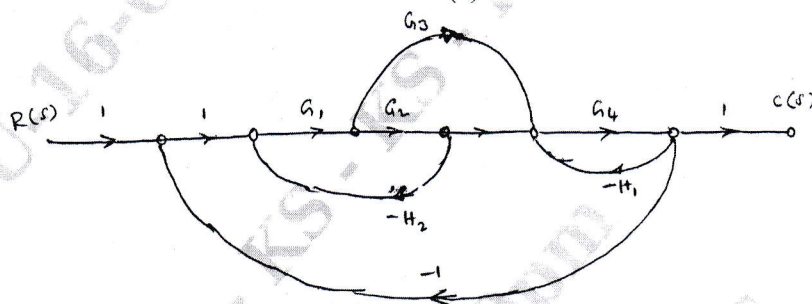


Fig.Q6(a)

(10 Marks)

- b. Using SFG and Mason's gain formula, obtain the overall transfer function of system shown in Fig.Q6(b).

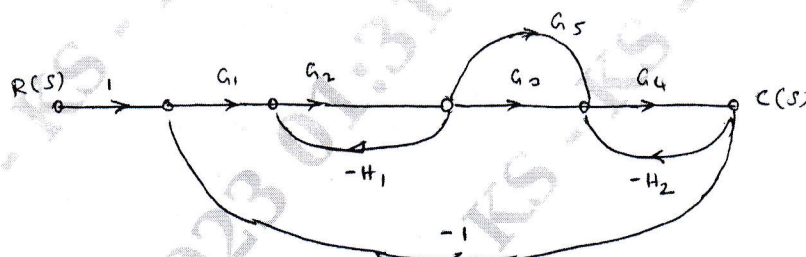


Fig.Q6(b)

(10 Marks)

**Module-4**

- 7 a. Applying Routh criterion, discuss the stability of closed loop system as function for open loop transfer function:

$$G(s)H(s) = \frac{K(s+1)}{s(s-1)(s^2+4s+16)} \quad (10 \text{ Marks})$$

- b. Investigate the stability of system using Routh Hurwitz criterion having characteristic equation  $s^5 + 4s^4 + 12s^3 + 20s^2 + 30s + 100 = 0$  (10 Marks)

OR

- 8 Sketch the root locus for negative feedback system whose open loop transfer function is

$$\text{given by } G(s)H(s) = \frac{K}{s(s+3)(s^2+3s+4.5)} \quad (20 \text{ Marks})$$

**Module-5**

- 9 a. Sketch polar plot for transfer function  $G(s) = \frac{10}{s(s+1)(s+2)}$ . (10 Marks)
- b. Open loop function control system  $G(s)H(s) = \frac{1}{s^2(s+2)}$ , sketch Nyquist plot and ascertain stability. (10 Marks)

**OR**

- 10 A unity feedback control system has  $G(s) = \frac{80}{s(s+2)(s+20)}$ . Draw the Bode plot if phase cross over occur at  $\omega = 6.35$  rad/sec, find the corresponding gain margin. (20 Marks)

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# CBCS SCHEME

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18ME72

Seventh Semester B.E. Degree Examination, Jan./Feb. 2023

## Computer Aided Design and Manufacturing

Time: 3 hrs.

Max. Marks: 100

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

### Module-1

- 1 a. What is Automation? List different types of automation and discuss with an example. (10 Marks)
- b. Define : (i) Production rate  
(ii) Production capacity  
(iii) Utilization and availability  
(iv) MLT and WIP (10 Marks)

OR

- 2 a. Sketch and explain any two types of Automated flow lines. (10 Marks)
- b. The ideal cycle time of an 16 station transfer line is 1.4 min. The average down time per line will be 6 min and the probability of break downs per cycle is equal for all cycles and is equal to 0.004. Determine production rate and line efficiency by considering both upper bound and lower bound approaches. (10 Marks)

### Module-2

- 3 a. Briefly explain design process and the application of computer in design process. (10 Marks)
- b. Explain the following in detail:  
Translation , Rotation , Concatenation and benefits of CAD. (10 Marks)

OR

- 4 a. What do you understand by CAPP? With a block diagram explain Generative System. (10 Marks)
- b. Write a note on MRP Inputs and Outputs, Benefits of MRP. (10 Marks)

### Module-3

- 5 a. Define Group Technology. List various types of FMS and benefits of FMS. (10 Marks)
- b. What do you mean by As/Rs? Explain briefly about Part Identification System. (10 Marks)

OR

- 6 a. A manual assembly line has to accomplish 10 work elements to complete the assembly. The element times and precedence requirements are listed in the table. The production rate of the line is 60 units per hour. The efficiency of the line is 95% and the repositioning time is 3 sec. Use Kilbridge and Westers method to balance the line and compute balance delay and balance efficiency.

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

(10 Marks)

- b. From above data compute balance delay and balance efficiency using RPW method.

(10 Marks)

**Module-4**

- 7 a. Define CNC. Enlist various advantages / disadvantages and application of CNC. (10 Marks)  
 b. List few G and M codes you came across and write a program to cut the profile shown in Fig.Q7(b).

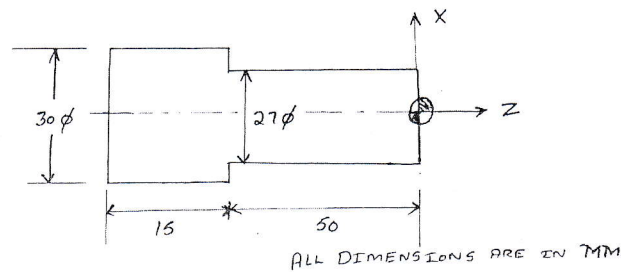


Fig.Q7(b)

(10 Marks)

**OR**

- 8 a. With neat sketches show robot components and joints. (10 Marks)  
 b. List various configuration of a Industrial robot, sketch and draw in detail. (10 Marks)

**Module-5**

- 9 a. Discuss the basic principles of additive manufacturing and list various advantages / limitations of AM technique. (10 Marks)  
 b. Explain the process in brief photopolymerization, material jetting. (10 Marks)

**OR**

- 10 a. Describe Slicing in AM. (10 Marks)  
 b. Explain the following :  
 (i) Direct Energy deposition (ii) Sheet lamination. (10 Marks)

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18ME734

## Seventh Semester B.E. Degree Examination, Jan./Feb. 2023 Total Quality Management

Time: 3 hrs.

Max. Marks: 100

**Note:** Answer any FIVE full questions, choosing ONE full question from each module.

### Module-1

- 1 a. Define Quality. Explain quality in daily life in middle age during Industrial revolution. (10 Marks)  
b. What are the factors affecting Quality? (10 Marks)

OR

- 2 a. Explain the list of dimension of Quality. (10 Marks)  
b. Explain the contribution of Gurus Quality. (10 Marks)

### Module-2

- 3 a. Explain the Modern method of Leadership. (10 Marks)  
b. What are the duties of Quality Control? (10 Marks)

OR

- 4 a. Mention the Deming's Philosophy of 14 points. (10 Marks)  
b. What are the future requirements for the short and long term factors affects in the Organisation? (10 Marks)

### Module-3

- 5 a. Explain with neat sketch, the Kano model. (10 Marks)  
b. What are the elements present in structure of Quality circle? (10 Marks)

OR

- 6 a. Mention the Tangible and Intangible benefits through TQM. (10 Marks)  
b. Who was Malcolm Baldrige? What is the Malcolm Baldrige National Quality Award? What was the award established? (10 Marks)

### Module-4

- 7 a. What is Six Sigma? Define Six Sigma and phases of Six Sigma. (10 Marks)  
b. With neat analysis of graph, explain Pareto Analysis. (10 Marks)

OR

- 8 a. Define Process of Operation of Quality circle and steps. (10 Marks)  
b. What are the benefits of Forming Quality circles? (10 Marks)

### Module-5

- 9 a. What is meant by Total Productive Maintenance, with an example? (10 Marks)  
b. Define Quality by Design in TQM and What are elements of Quality by design? (10 Marks)

OR

- 10 a. Define the Environmental Management Systems and what is the importance. (10 Marks)  
b. Explain EMS under ISO 14001. What is the cost and benefits? (10 Marks)

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18ME741

## Seventh Semester B.E. Degree Examination, Jan./Feb. 2023 Additive Manufacturing

Time: 3 hrs.

Max. Marks: 100

**Note:** Answer any FIVE full questions, choosing ONE full question from each module.

### Module-1

- 1 a. Define Additive Manufacturing process. List out advantages and disadvantages of Additive Manufacturing process in detail. (06 Marks)  
b. Explain Additive Manufacturing process chain with block diagram. (08 Marks)  
c. Differentiate between Additive Manufacturing and CNC. (06 Marks)

OR

- 2 a. Explain the classification of Additive Manufacturing process. (10 Marks)  
b. Write a note on :  
i) Reverse Engineering Technology ii) Computer Aided Design Technology. (10 Marks)

### Module-2

- 3 a. With a neat sketch, briefly explain principle operation of Stereolithography. State its applications. (10 Marks)  
b. Explain the principle operation of selective laser sintering with neat sketch. List the advantages of SLS. (10 Marks)

OR

- 4 a. List the advantages and disadvantages of Powder bed fusion process. (06 Marks)  
b. Sketch and explain Fused Deposition Modelling [FDM] process. Also add a note on FDM materials. (10 Marks)  
c. List the various materials which may be used for electro beam melting process. (04 Marks)

### Module-3

- 5 a. Describe three dimensional printing process, with a neat sketch. (10 Marks)  
b. Explain Principle of Operation and application of LOM. (10 Marks)

OR

- 6 a. With a neat sketch, explain Beam Deposition process and list its advantages and disadvantages. (10 Marks)  
b. List the various Direct write technologies and explain Ink based direct write process. (10 Marks)

### Module-4

- 7 a. Discuss guidelines for process selection in AM. (08 Marks)  
b. Write a short note on STL file. (06 Marks)  
c. Discuss problems occurred with STL file. (06 Marks)

OR

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- 8 a. Explain Post processing of Additive Manufacturing parts. (10 Marks)  
b. Explain steps involved in property enhancement using thermal technique and non thermal technique. (10 Marks)

**Module-5**

- 9 a. Explain Multi Material Manufacturing process and state its applications. (10 Marks)  
b. Explain the applications of Additive Manufacturing process in various fields. (10 Marks)

**OR**

- 10 a. Explain use of Pattern prepared by AM process for investment casting. (10 Marks)  
b. Write a note on :  
i) Align technology ii) DDM drives. (10 Marks)

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18ME751

## Seventh Semester B.E. Degree Examination, Jan./Feb. 2023 Energy and Environment

Time: 3 hrs.

Max. Marks: 100

**Note: Answer any FIVE full questions, choosing ONE full question from each module.**

### Module-1

- 1 a. Differentiate between Energy and Power. (04 Marks)  
b. Explain different forms of Energy. (06 Marks)  
c. Explain the key trend in India Energy Scenario. (10 Marks)

**OR**

- 2 a. List the factors affecting India's Energy Development. (06 Marks)  
b. Explain the demographic policy of Energy in India. (06 Marks)  
c. Explain Energy process and affordability. (08 Marks)

### Module-2

- 3 a. Explain the necessity of Thermal Energy Storage system with suitable examples. (10 Marks)  
b. Explain any Two Mechanical Energy storage systems with neat diagram. (10 Marks)

**OR**

- 4 a. Define Energy Management. Explain the Principles of Energy Management. (10 Marks)  
b. Explain the type of Pre – audit and Detailed audit. (10 Marks)

### Module-3

- 5 a. What is need for studying Environmental issues? (06 Marks)  
b. What is the scope of Environmental education? (06 Marks)  
c. How would Environmental awareness help to protect our Environment? (08 Marks)

**OR**

- 6 a. Write a short notes on :  
i) Tropical rain forest ii) Savannas iii) Arctic Tundra. (10 Marks)  
b. What are the Ecological pyramids? Explain why some of these pyramids are upright while others are inverted in different ecosystem. (10 Marks)

### Module-4

- 7 a. Briefly describe the sources, effects and control of noise pollution. (10 Marks)  
b. What are the natural and man made pollutants that cause Air pollution? (10 Marks)

**OR**

- 8 a. Write a short note on :  
i) Bhopal gas tragedy ii) Love canal tragedy. (10 Marks)  
b. How can you as an individual , prevent environmental pollution? Why such an effort at individual level is important? (10 Marks)

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**Module-5**

- 9 a. What are the major implications of enhanced global warming? Explain. (10 Marks)  
b. Write a critical note on Nuclear Holocaust. (10 Marks)

**OR**

- 10 a. Discuss the salient features of :  
i) Wild Life (Protection) Act 1972. (10 Marks)  
ii) Forest (Conservation) Act 1980. (10 Marks)  
b. What are the different methods to propagate Environmental awareness in the Society? (10 Marks)

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