

CBCS SCHEME

USN

--	--	--	--	--	--	--	--	--	--

18ME71

Seventh Semester B.E. Degree Examination, Dec.2023/Jan.2024 Control Engineering

Time: 3 hrs.

Max. Marks: 100

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

Module-1

- Define control system. With example, explain open loop control system and closed loop control system. (10 Marks)
 - List the types of controllers and explain PID controller with block diagram. (10 Marks)

OR

- A thermometer is dipped in a vessel containing a liquid at constant temperature " $\theta_i(t)$ " with thermal capacitance " C " and Thermal Resistance (R). Temperature indicated by thermometer is " $\theta_0(t)$ ". Develop a transfer function for the system. (10 Marks)
 - Develop a transfer function $\frac{X_2(s)}{F(s)}$ for the Fig.Q2(b).

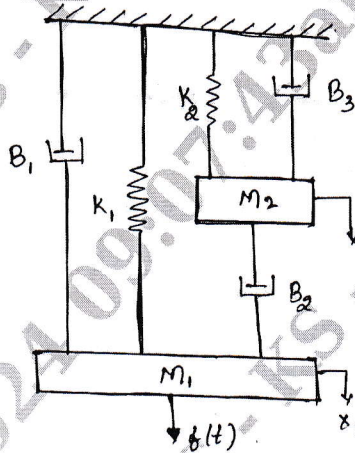


Fig.Q2(b)

(10 Marks)

Module-2

- List and explain the various standard inputs used in control system analysis. (10 Marks)
 - Develop an expression for steady state error for a simple closed loop control system. (10 Marks)

OR

- Examine a 2nd order under damped system subjected to unit step input. (10 Marks)
 - Evaluate the following quantities for a 2nd order unity feedback system with open loop

transfer function $G(s) = \frac{25}{s(s+7)}$, find :

- Undamped natural frequency
- Damped natural frequency
- Raise time

- Damping ratio
- Setting time
- Peak time

(vi) The percentage over shoot for unit step input.

(10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-3

- 5 a. List the basic elements of block diagram. (05 Marks)
 b. Develop a closed loop transfer function for the block diagram shown in Fig.Q5(b).

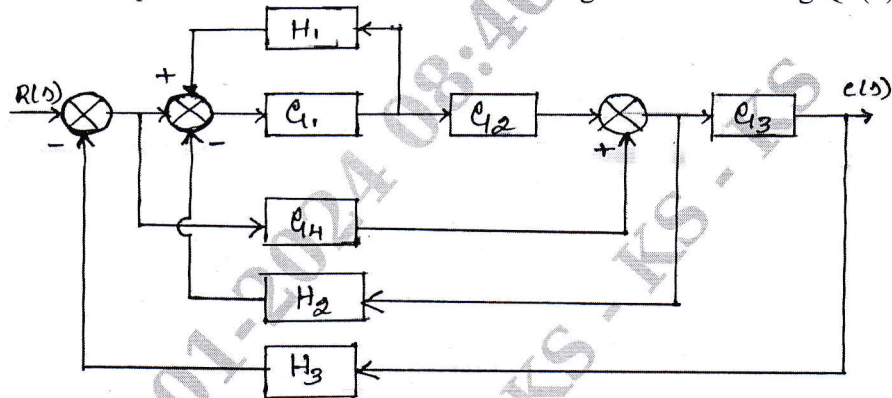


Fig.Q5(b)

(15 Marks)

OR

- 6 a. Explain the terms (i) Node (ii) Input node (iii) Output node (iv) Branch (v) Path. (05 Marks)
 b. Construct a S.F.G. for a block diagram shown in Fig.Q6(b) and obtain a transfer function using Mason's gain formula.

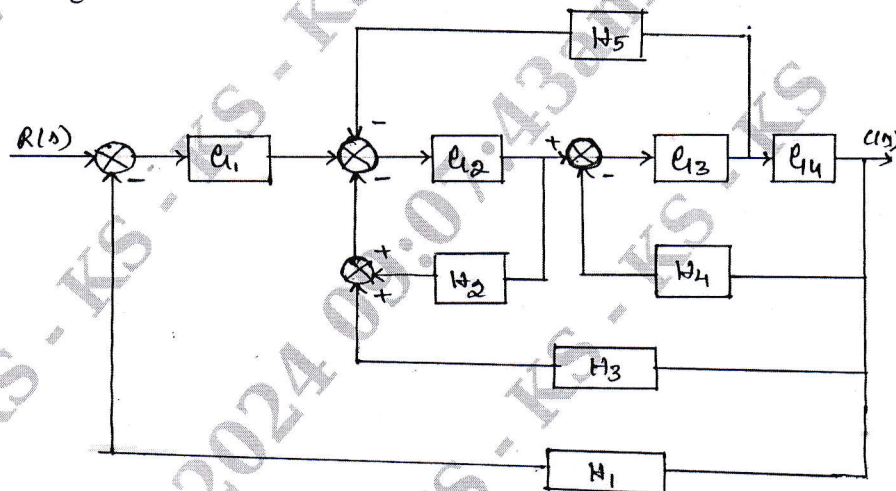


Fig.Q6(b)

(15 Marks)

Module-4

- 7 a. For a system with characteristic equation $F(s) = s^6 + 3s^5 + 4s^4 + 6s^3 + 5s^2 + 3s + 2 = 0$. Examine stability using Routh Herwitz criterion. (10 Marks)
 b. A given system oscillates with frequency 2 rad/sec. Find values of K_{mar} and 'P' are in RHS.

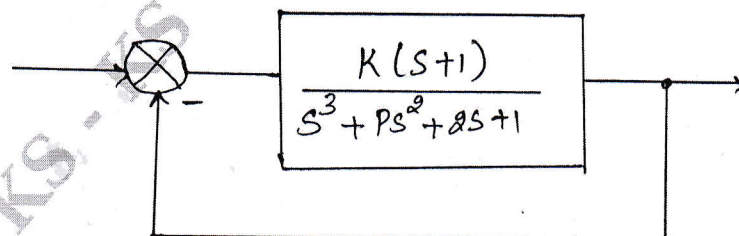


Fig.Q7(b)

(10 Marks)

OR

- 8 Construct a root locus for all value of 'K' ranging from 0 to ∞ for a feedback control system characterized by

$$G(s)H(s) = \frac{K}{s(s+4)(s^2+4s+20)} \quad (20 \text{ Marks})$$

Module-5

- 9 Using Nyquist crieterion, examine the stability of a system whose open loop transfer function is

$$G(s)H(s) = \frac{K}{(s+1)(s+2)(s+3)} \quad (20 \text{ Marks})$$

OR

- 10 Construct a Bode plot for the following transfer function and determine gain margin and phase margin:

$$G(s)H(s) = \frac{10}{s(1+s)(1+0.02s)} \quad (20 \text{ Marks})$$

CBCS SCHEME

USN

--	--	--	--	--	--	--	--	--	--

18ME72

Seventh Semester B.E. Degree Examination, Dec.2023/Jan.2024 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. Define CAD and CAM. Briefly explain the features of Fixed automation and programmable automation. (06 Marks)
- b. Illustrate the following with mathematical models:
(i) Production capacity
(ii) Work in process
(iii) TIP ratio (06 Marks)
- c. A batch manufacturing plant must be processed through 7 machines. There are 30 new batches. Average operation time is 8 min. Average setup time is 2 hours and non-operations time is 4 hours. Average batch size is 15 parts. Number of workstations is 10. The plant operates for an average of 125 hours/week. Determine manufacturing lead time, plant capacity and utilization. (08 Marks)

OR

- 2 a. What are automated flow lines? With sketches, explain Inline and Rotary type of automated flow lines. (08 Marks)
- b. Describe the methods of control of an automated flow line. (06 Marks)
- c. The following data applies to a 12 station inline transfer line, $p = 0.01$ for all the stations, cycle time is 0.3 min and repair time is 3 min using upper bound approach, compute the following:
(i) Frequency of line stops/cycle
(ii) Average production rate
(iii) Line efficiency (06 Marks)

Module-2

- 3 a. With block diagram, explain the various steps in computer aided design process. (08 Marks)
- b. Explain the functions of a graphics package. (06 Marks)
- c. Briefly explain Translation and Scaling. (06 Marks)

OR

- 4 a. Define Computer Aided Process Planning. List its benefits. (06 Marks)
- b. With block diagram, explain variant type of CAPP system. (08 Marks)
- c. What is shop floor control? Briefly explain the various phases of shop floor control. (06 Marks)

Module-3

- 5 a. With neat sketches, explain the types of FMS layouts. (10 Marks)
- b. Explain in brief with diagram the structure of Automated Storage and Retrieval System. (05 Marks)
- c. List the advantages of Group Technology. (05 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

OR

- 6 a. Illustrate the following terms with reference to Line Balancing:
- Minimum rational work element
 - Precedence diagram
 - Balance delay (06 Marks)
- b. In a plant, a product is assembled as per the following data. Assume cycle time as 16 min:
- | Work element | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|--------------|----|---|------|---|----|------|---|---------|
| T_c (min) | 10 | 5 | 8 | 3 | 11 | 3 | 5 | 15 |
| Preceded by | - | - | 1, 2 | 2 | 3 | 3, 4 | 4 | 5, 6, 7 |
- Construct precedence diagram
 - Determine the number of stations required to balance the line by using LCR method.
 - Determine balance delay. (14 Marks)

Module-4

- 7 a. Briefly explain the classifications of CNC system. (06 Marks)
- b. Write a note on cutter radius compensation. (06 Marks)
- c. Write the part program for the part shape shown in Fig.Q7(c). Assume suitable machining parameters.

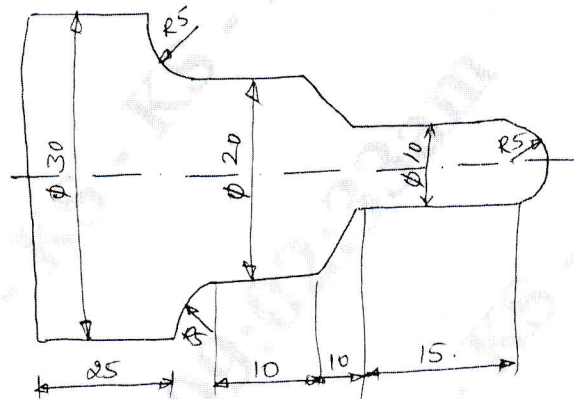


Fig.Q7(c) All dimensions are in mm

(08 Marks)

OR

- 8 a. With sketches, explain any three configurations of Industrial Robot. (12 Marks)
- b. Write a note on various sensors used in Industrial Robot. (08 Marks)

Module-5

- 9 a. With sketch, explain photopolymerization process. (10 Marks)
- b. With sketch briefly explain Fused Deposition Modeling Technique. (10 Marks)

OR

- 10 a. Briefly explain the various components of Industry 4.0. (10 Marks)
- b. Write a note on Smart Manufacturing as applied to Industry 4.0. (10 Marks)

CBCS SCHEME

USN

--	--	--	--	--	--	--	--	--	--

18ME734

Seventh Semester B.E. Degree Examination, Dec.2023/Jan.2024

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. Make the list of the basic concepts of TQM and briefly explain them. (10 Marks)
b. Enlighten on TQM frame work with a neat diagram. (10 Marks)

OR

- 2 a. Differentiate between American and Japan's approach towards quality. (10 Marks)
b. Elucidate on quality from customer's/consumer's and producer's perspective with a block diagram. (10 Marks)

Module-2

- 3 a. Which are the 12 characteristics of quality leaders? Describe them. (10 Marks)
b. Explain briefly the seven characteristics of effective people. (10 Marks)

OR

- 4 a. List out Deming's 14 points of TQM philosophy and explain any 4 of them. (10 Marks)
b. With Time-Management matrix, briefly describe put first things first. (10 Marks)

Module-3

- 5 a. What is Kano model? Why it is used? Explain the salient features. (10 Marks)
b. Who is customer? Define internal and external customer, with an example for each type. (10 Marks)

OR

- 6 a. How do you differentiate between dissatisfied, satisfied and delighted customers articulate with a sketch? (10 Marks)
b. Elucidate on customer perception of quality. (10 Marks)

Module-4

- 7 a. Sketch and explain Juran's Trilogy. (10 Marks)
b. Explicate on Scatter diagram and cause and effect diagram with a neat figures. (10 Marks)

OR

- 8 a. Explain PDSA cycle for continuous improvement with a neat figure. (10 Marks)
b. Enlighten on Histogram, Pareto diagram with a sketch and evidences. (10 Marks)

Module-5

- 9 a. Lean out steps involved in introduction of TPM. (10 Marks)
b. List and mention importance of 5's. (10 Marks)

OR

- 10 a. Which are the 8 pillars of TPM? Describe them with a neat sketch. (10 Marks)
b. Differentiate between productive maintenance and predictive maintenance with a table. (10 Marks)

* * * * *

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

CBCS SCHEME

USN

--	--	--	--	--	--	--	--	--	--

18ME741

Seventh Semester B.E. Degree Examination, Dec.2023/Jan.2024 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. Differentiate between CNC and Additive Manufacturing. (10 Marks)
b. Explain Additive Manufacturing Process Chain. (10 Marks)

OR

- 2 a. What is Additive Manufacturing? What are the benefits of AM? (10 Marks)
b. With a block diagram, explain general integration of AM machine. (10 Marks)

Module-2

- 3 a. With a neat sketch, explain photopolymerization process. (10 Marks)
b. What are benefits and drawbacks of use of photopolymerization technology? (10 Marks)

OR

- 4 a. With a neat sketch, explain Selective Laser Sintering (SLS) process. (10 Marks)
b. What is extrusion based system? With a neat sketch, explain Fused Deposition Modelling (FDM). (10 Marks)

Module-3

- 5 a. With a neat sketch, explain the working of Laminated Object Manufacturing (LOM). (10 Marks)
b. Write a note on research achievements in printing deposition process. (10 Marks)

OR

- 6 a. Explain with neat sketch, Beam Deposition Process. List advantages and limitations of the process. (10 Marks)
b. What is direct write technology? Explain Ink based direct write technology. (10 Marks)

Module-4

- 7 a. Write a note on selection methods for a part. (10 Marks)
b. Explain the following post processing operations:
(i) Support material removal (10 Marks)
(ii) Surface texture improvements

OR

- 8 a. Explain different types of problems that occur in STL file. (10 Marks)
b. Explain the following post processing operations :
(i) Accuracy improvements (10 Marks)
(ii) Preparation for use as pattern

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

Module-5

- 9 a. Write a note on AM applications in the field of
(i) Medical
(ii) Automobile (10 Marks)
- b. Write a note on:
(i) Align technology
(ii) Siemens and phonak hearing (10 Marks)

OR

- 10 a. Write a note on AM applications in the field of
(i) Aerospace
(ii) Industrial design (10 Marks)
- b. Write a note on:
(i) Life cycle Costing
(ii) Future of direct digital marketing (10 Marks)

* * * * *

CBCS SCHEME

USN

--	--	--	--	--	--	--	--	--	--

18ME751

Seventh Semester B.E. Degree Examination, Dec.2023/Jan.2024 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. With relevant statistics enumerate the primary energy production trend in India. (10 Marks)
b. List and explain various forms of energy in a brief manner. (05 Marks)
c. Define energy management and explain energy demand estimation. (05 Marks)

OR

- 2 a. Elaborate the effect of various social and environmental aspects of India's energy development. (10 Marks)
b. Define energy and power. Differentiate the same. (05 Marks)
c. Interpret world energy scenario with respect to production and consumption using relevant statistics. (05 Marks)

Module-2

- 3 a. Define and explain sensible heat storage methods. (10 Marks)
b. Explain in detail various phases of energy audit methodology. (10 Marks)

OR

- 4 a. Define and explain Latent heat storage methods. (10 Marks)
b. Define energy audit and explain the need for energy audit. (05 Marks)
c. Elaborate the benefits of thermal energy storage. (05 Marks)

Module-3

- 5 a. Define ecosystem and explain the following term :
i) Food chain
ii) Food web
iii) Ecological pyramid. (10 Marks)
b. Enumerate how carbon cycle is utilized in the ecosystem. (05 Marks)
c. Discuss how oxygen cycle is utilized in the ecosystems. (05 Marks)

OR

- 6 a. Define environment. Mention its scope. Discuss need for public awareness. (10 Marks)
b. Elaborate how the nitrogen cycle ecosystem operates. (05 Marks)
c. Discuss how water cycle is utilized in the ecosystem. (05 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

18ME751

Module-4

- 7 a. Discuss solid waste management techniques. (10 Marks)
b. Discuss briefly the causes effects and control measure of air pollution. (10 Marks)

OR

- 8 a. Enumerate the role of an individual in prevention of pollution. (10 Marks)
b. Enumerate the water pollution cases and its effects. Mention the control measures that can be initiated for mitigating the same. (10 Marks)

Module-5

- 9 a. Write a note on ozone layer depletion. (10 Marks)
b. Explain the role of Environment Impact Assessment (EIA) in reinforcing environmental legislation. (10 Marks)

OR

- 10 a. Discuss :
i) Wildlife Protection Act (10 Marks)
ii) Forest Conservation Act. (10 Marks)
b. Enumerate the impact of global warming and acid rain on our mother nature. (10 Marks)

* * * * *