

B.Tech (EE) 5th Semester (G-Scheme)
Examination, November-2023

CONTROL SYSTEM

Paper-PCC-EE-305-G

Time allowed : 3 hours]

[Maximum marks : 75

Note : Attempt five questions in all, selecting one question from each unit. Question no. 1 is compulsory. All questions carry equal marks.

1. (a) Differentiate open loop and close loop systems.
- (b) Define Phase margin and Gain margin of bode plot.
- (c) Explain the term transient accuracy with respect to the controller design.
- (d) State the properties of state transition matrix.
- (e) State advantages, disadvantages and applications of lead compensators.
- (f) Mention the Standard Test Input Signals and its Laplace transform.

6×2.5=15

Unit-I

2. (a) Define the following with the help of a neat diagram and write their formulae : 7.5

- (i) Rise time
- (ii) Peak time
- (iii) Peak overshoot
- (iv) Settling time

- (b) Determine the stability of the following using Routh's criterion. 7.5

$$s^6 + 3s^5 + 5s^4 + 9s^3 + 8s^2 + 6s + 4 = 0$$

3. Plot the root locii for the closed loop control system with : 15

$$G(s) = \frac{K}{s(s+1)(s^2+4s+5)}, H(s) = 1$$

Unit-II

4. Sketch the Bode plot for the transfer function : 15

$$G(s) = \frac{1000}{(1+0.1s)(1+0.001s)}$$

Determine :

- (a) Phase margin
- (b) Gain margin
- (c) Stability of the system

5. Sketch the Nyquist plot and determine the stability of a unity feedback control system : 15

$$G(s) = \frac{K}{(1 + sT_1)(1 + sT_2)}$$

Unit-III

6. Discuss the frequency domain methods for controller design. 15
7. (a) Explain compensators. Outline the effect of compensators on the stability of the system. 7.5
- (b) Write short note on digital implementation of controllers. 7.5

Unit-IV

8. (a) Obtain the solution of non-homogeneous state equation. 7.5
- (b) Examine for the controllability and observability for the given system : 7.5

$$\dot{x} = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix} x + \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u; \quad y = \begin{bmatrix} 1 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

(4)

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9. Find $X(t)$, given,

15

$$\dot{x}(t) = \begin{bmatrix} 0 & 1 \\ -3 & -4 \end{bmatrix} x(t) \text{ for } x(0) \begin{bmatrix} 1 \\ 0 \end{bmatrix}$$

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B.Tech (EE) (Elective-I) 5th Semester (G-Scheme)

Examination, November-2023

ELECTRICAL DRIVES

Paper-PEC-EE-03-G

Time allowed : 3 hours] [Maximum marks : 75

Note : Attempt five questions in all, first being compulsory and selecting one question from each section.

1. (a) Write advantages of electric drives over other drives. 10×1.5=15
- (b) Draw speed-torque characteristics of separately excited dc motor.
- (c) Explain current sensing of dc motor drives.
- (d) What is regenerative braking of dc motor drive ?
- (e) How to select motor rating for intermittent periodic duty ?
- (f) Discuss operation of DC chopper.
- (g) Explain flux weakening operation of induction motor.
- (h) What is slip regulation ?

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[P. T. O.]

- (i) Discuss about the impact of rotor resistance on speed-torque curve of induction motor.
- (j) Derive fundamental torque equation of electric drive.

Section-A

- 2. Draw and explain block diagram of electrical drive. 15
- 3. Discuss about the closed-loop speed control of multi-motor drives. 15

Section-B

- 4. Discuss about the operation of single phase half controlled rectifier fed DC motor. 15
- 5. Explain thermal model of motor for heating and cooling. 15

Section-C

- 6. Draw equivalent circuit and torque-speed characteristics of induction motor. 15
- 7. Discuss about the motoring and regenerative braking of chopper fed separately excited DC motors. 15

Section-D

8. Explain variable frequency control of induction motor. 15
9. Discuss about the slip power recovery methods of induction motor. 15

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B.Tech (EE) 5th Semester (G-Scheme)

Examination, November-2023

MICROPROCESSOR & MICROCONTROLLER

Paper-PCC-EE-309-G

Time allowed : 3 hours]

[Maximum marks : 75

Note : Question no. 1 is compulsory. Attempt any one question from each section.

1. Explain the following :

- | | |
|-------------------------------------|-----|
| (a) Minimum Mode of 8086 | 2.5 |
| (b) USART | 2.5 |
| (c) A/D interface | 2.5 |
| (d) External Memory Microcontroller | 2.5 |
| (e) LCD | 2.5 |
| (f) ADC | 2.5 |

Section-A

2. What do you mean by Interrupts ? Describe different types of interrupts of 8086 processor and also discuss about the priority of these. 15
3. How Instruction Set Works ? Explain the instruction set of 8086 microprocessor in detail. 15

Section-B

4. Explain the following peripheral devices in detail :
- (a) PPI 10
 - (b) DMA Controller 5
5. Draw and describe the architecture of key board and display controller along with its pin diagram in detail. 15

Section-C

6. Discuss the following :
- (a) Processor Architecture : Harvard Vs Princeton 8
 - (b) CISC Vs RISC 7
7. What are the different features of microcontrollers ?
Explain the following : 15
- (a) Clocking
 - (b) Times
 - (c) I/O Pins

Section-D

8. What do you mean by interfacing ? Explain the interfacing of 8051 microcontroller with : 15
- (a) Stepper motor
 - (b) Sensors
9. Explain the following in 8051 microcontroller :
- (a) Pin Diagram 5
 - (b) Internal RAM 5
 - (c) Memory Organization 5

B.Tech. 3rd Semester (Civil Engg.) G-Scheme

Examination, November-2023

ECONOMICS FOR ENGINEERS

Paper-HSMC-01-G

Time allowed : 3 hours]

[Maximum marks : 75

Note : Attempt five questions in all, selecting one question from each unit. Question no. 1 is compulsory. All questions carries equal marks.

1. Write short notes in 40-50 words : 6×2.5=15
- (i) Law of Demand
 - (ii) Factors of Production
 - (iii) Types of Costs
 - (iv) Features of Monopoly Market
 - (v) Supply
 - (vi) Merits of Privatization

Unit-I

2. What do you mean by Demand ? Explain law of demand in detail. 15
3. Define Economics. What is the most acceptable Definition of Economics in your point of view ? 15

(2)

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Unit-II

3×5=15

4. Explain the following :
- (a) Opportuniry cost
 - (b) Marginal cost
 - (c) Total cost
5. Define Production. Explain in detail the law of variable proportions. 15

Unit-III

6. What is Perfect Competition Market ? Explain various features of perfect competition market . 15
7. Define Supply. Explain role of demand and supply in price determination. 15

Unit-IV

8. What do you mean by Privatization ? Explain its merits and demerits. 15
9. Write a detailed note on Globalisation of Indian economy. Also explain its merits and demerits. 15

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B.Tech (EE) 5th Semester (Elective-II) (G-Scheme)

Examination, November-2023

POWER PLANT ENGINEERING

Paper-OEC-EE-07-G

Time allowed : 3 hours]

[Maximum marks : 75

Note : Question no. 1 is compulsory. Attempt total five questions selecting one question from each unit. All questions carry equal marks.

1. Write short notes on :

6×2.5=15

- (a) Binary Cycles
- (b) IGCC System
- (c) BWR
- (d) Hydroelectric power plants
- (e) Load distribution parameters
- (f) Super critical boilers

Unit-I

2. Describe a modern ash handling system in a thermal power plant. 15

3. Explain with the help of a neat diagram the FBC boilers. 15

3247-P-2-Q-9 (23)

[P. T. O.]

Unit-II

4. Explain with neat sketch Brayton cycle gas turbine plant. 15
5. Explain IGCC system in details. 15

Unit-III

6. Explain the construction and working of CANDU with neat sketch with its various advantage and disadvantage. 15
7. Explain the construction and working of PWR. Compare the working of PWR with BWR. 15

Unit-IV

8. Discuss about the site selection of hydropower plant and compare this with other power plants. 15
9. Explain the construction and operation of different components of hydroelectric power plant. 15

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B.Tech (EE) 5th Semester (G-Scheme)

Examination, November-2023

COMPUTER AIDED ELECTRICAL
MACHINE DESIGN

Paper-PCC-EE-313-G

Time allowed : 3 hours]

[Maximum marks : 75

Note : Attempt five questions selecting one question from each section. Question no. 1 is compulsory.

1. (a) Define pole pitch. 3
- (b) Enlist the design factors in electrical machine design. 3
- (c) Compare leakage flux and leakage reactance. 3
- (d) Discuss specific electrical and magnetic loading. 3
- (e) What do you mean by term cogging and crawling in an electrical machine ? 3

Section-A

2. Discuss manufacturing techniques and modern trends in electrical machine design. 15

3. Describe the factors affecting size of rotating machine. Discuss how you will select the choice of specific magnetic loading. 8 15

Section-B

4. (a) Explain the selection of no. of stator slots. Also discuss the evaluation of depth of stator core. 8
(b) Discuss the rule for selection of number of rotor slots. 7
5. Describe the harmonics induction torque and harmonic synchronous torque. 15

Section-C

6. Derive an output equation of 1-phase and 3-phase transformer. 15
7. Design a 250KVA, 2000/40V, 50Hz, 1-phase, 3-stepped core type, oil immersed, self cooled power transformer with following data : Induced e.m.f. per turns = 15, Current density=2.75A/mm², Max flux density in core=1.25 Wb/m², Window space factor=0.3, Window proportion Height/Width=3. Determine the main dimension of core and yoke. 15

Section-D

8. (a) Explain design of core length and armature diameter of d.c. machine. 8
- (b) What are the factors which govern the choice of no of poles in d.c. machines ? 7
9. Write short note on : 15
- (a) Optimization technique for machine design
- (b) Computerization of design procedure for an induction motor