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

Examination, December–2024

POWER SYSTEM-1

Paper-PCC-EE-301G

Time allowed : 3 hours] *[Maximum marks : 75*

Note : *Attempt **five** questions in all, selecting **one** question from each section. **Question Number 1 is compulsory.** All questions carry equal marks.*

1. (a) Draw impedance and reactance diagram of power system?

   (b) What are different types of fault in power system?

   (c) Classify the types of Circuit breaker.

   (d) Explain neutral grounding.

   (e) Define recovery voltage and restriking voltage in circuit breaker.

   (f) Compare ac and dc transmission system.

   6×2.5=15

Section-A

2. (a) Mention the advantage and drawbacks of per-unit system. Prove that the per-unit impedance of a transformer is the same regardless of the side from which it is viewed. 10

(b) A single phase transformer is rated 100 kVA, 11/ 0.4 kV. Its leakage reactance is 0.15 Ω when referred to low voltage side. Determine its leakage reactance in percent and per unit. 5

3. Explain in detail steady state model of synchronous machine. 15

Section-B

4. What are the causes of unsymmetrical fault in power systems? Find an expression for the fault current for single L-L-G fault. Develop sequence network when L-L-G fault occur in power system. 15

5. Describe how the sequence network is represented for three phase transformer in power system. 15

Section-C

6. Discuss the principle of operation of air-circuit breaker. What are advantage and disadvantage of using air as an arc quenching medium? 15

7. Illustrate the operating principle and area of application of differential relay. 15

Section-D

8. (a) Explain LCC and VCC based dc link. 7.5

(b) Write notes on permanent magnet synchronous generator. 7.5

9. (a) Draw and explain I-V ad P-V characteristics of PV panel. 7.5

(b) Write notes on power electronic interface of PV to the grid. 7.5

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B.Tech. (EE) 5th Semester, G-Scheme
Examination, December-2024
CONTROL SYSTEM
Paper -PCC-EE-305-G

Time allowed : 3 hours] *[Maximum marks : 75*

Note : ***Question No. 1 is compulsory.*** *Attempt* ***five*** *questions in all, selecting* ***one*** *question from each section.*

1. (a) What are feedback and feedforward system? State with example.

(b) State the use and need of lead and lag compensators in control system.

(c) Enlist the time-domain specifications.

(d) Discuss briefly Hurwitz stability criterion.

(e) Discuss the root locus concept.

(f) Define servomechanism and compensation.

(g) State advantages of State space analysis?

(h) Explain pole placement by state feedback.

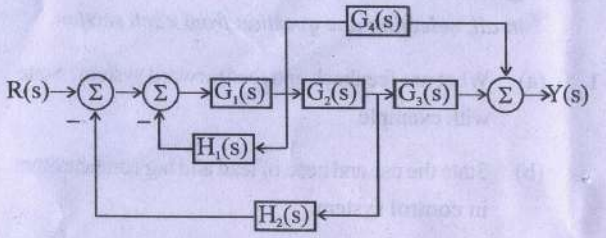
(i) Define sink and source in control systems.

(j) What do you mean by steady state error?

10×1.5=15

Section-A

2. (a) Find the closed loop transfer function of the system as given below through block diagram simplification:- 7.5



(b) Elaborate the feedback effect on following parameters:- 7.5

(i) Sensitivity

(ii) Stability

(iii) Overall gain

3. Explain the linear time invariant system with its properties. Also discuss the open loop control system and closed loop control system. 15

Section-B

4. Construct the Bode plot for the system whose open loop transfer function of the system given by-

$$G(S)\,H(S) = \frac{30}{S(1+0.5S)(1+0.08S)}$$

Determine the gain margin, phase margin, closed loop stability. 15

5. Write notes on:-

(i) Closed loop frequency response

(ii) Relative stability 15

Section-C

6. Explain the terms:-

(i) Phase lead compensation

(ii) Phase lag compensation

use examples to explain the above. 15

7. Write notes on:-

(i) Time response of 2nd order system.

(ii) Bode plot

(iii) Stability 15

Section-D

8. Construct a state model for a system characterized by the differential equation:-

$$\frac{d^3y}{dt^3} + 6\frac{d^2y}{dt^2} + 11\frac{dy}{dt} + 6y + u = 0$$

Also give the block diagram representation of the state model. 15

9. Write notes on:-

(i) Eigen values and stability

(ii) Controllability and observability 15

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

Examination, December–2024

MICROPROCESSOR AND MICROCONTROLLER

Paper-PEC-EE-309-G

Time allowed : 3 hours] *[Maximum marks : 75*

Note : *Attempt **five** questions in all, selecting **one** question from each unit. **Question number 1 is compulsory.** All questions carry equal marks.*

1. (a) Define Bus Interface Unit.

   (b) Why is the 8284 A clock generator used with 8086 μC?

   (c) What are functions of handshake signals?

   (d) Explain maximum mode of 8086.

   (e) State the applications of Load Control.

   (f) Explain Clocking.

   6×2.5

Unit-I

2. (a) Explain in detail the internal architecture of 8086 microprocessor. 7.5

   (b) Describe the interrupts and flags of 8086 microprocessor. 7.5

3. How instruction set works? Explain the instruction set of 8086 microprocessor in detail. How many addressing modes are used in this? Explain. 15

Unit-II

4. (a) List the operating modes of 8255 a programmable peripheral interface. 7.5

   (b) Describe internal architecture and working of 8259 (Interrupt Controller) 7.5

5. With the help of neat diagram, explain the interface of ADC 0808 with 8051 microprocessor and explain its operation in detail. 15

Unit-III

6. Explain microcontroller memory types in detail. 15

7. (a) Explain Embedded microcontrollers. 7.5

   (b) Explain CISC v/s RISC. 7.5

Unit-IV

8. (a) Explain the architecture of 8051 microcontrollers. 7.5

   (b) Describe in detail how the memory is organised in 8051 microcontroller. 7.5

9. Compare serial communication and parallel communication. Explain how the 8051 microcontroller transfers data using serial port. 15

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

Examination, December-2024

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. **Q. No. 1 is compulsory.***

1. (a) Develop an output equation of a.c. machine. 3

(b) What are various design factors in electrical machine? 3

(c) Compare leakage flux and leakage reactance. 3

(d) Define specific electrical and magnetic loading. 3

(e) What do you mean by term cogging and crawling in an electrical machine design? 3

Section-A

2. Describe various design factors and limitations in electrical machine design. 15

3. Develop an output equation of a.c. mahine and discuss various factors affecting size of rotation machine. 15

Section-B

4. Determine the main dimension of a 5 h.p., 400V, 3-phase, 50 Hz. 1500 synch. r.p.m. squirrel cage induction motor. Star-Delta-Starting is used. Use the following data:

   Average flux density in the air gap = 0.46Wb/m^2

   Ampere conductor per meter of armature periphery = 22000

   Full load efficiency = 83%, full load p.f. = 0.84 lagging

   Appropriate values for additional data required may be assumed. 15

5. Explain the stator design of an Induction Motor. 15

Section-C

6. Explain the design procedure for Yoke and Core design of a transformer. 15

7. (a) Explain the choice of specific magnetic and electrical loading in design of synchronous machine. 8

   (b) Differentiate turbo alternator and salient pole generator. 7

Section-D

8. (a) Explain the design of field system. 8

   (b) Enlist the advantages of CAD for machine design along with its limitations. 7

9. Write short note on :

   (a) Optimization technique for machine design 8

   (b) Analysis and Synthesis method 7

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

Examination, December, 2024

ELECTRICAL DRIVES

Paper : PEC-EE-03G

Time allowed : 3 hours] *[Maximum marks : 75*

Note: *Attempt **five** questions in all. **Question No. 1 is compulsory.** Attempt **four** more questions from the **Section A, B, C,** and **D** by selecting at least **one** question from each section.*

1. 3×5=15

(a) Derive the emf equation of DC generator.

(b) Explain regenerative braking in DC motors.

(c) What is slip regulation?

(d) Discuss the torque equation of DC motor.

(e) Classify the DC drives.

Section-A

2. (a) Explain the difference between a DC drive and an AC drive. 7

(b) What is a closed-loop control system in the context of DC drives? 8

3. Discuss armature voltage control for varying motor speed. 15

Section-B

4. Discuss steady-state operation of multi-quadrant chopper fed dc drive in detail. 15

5. Explain load equalization and determination of moment of inertia of the flywheel in detail. 15

Section-C

6. Discuss the speed control methods for chopper fed dc motor. 15

7. Explain the variation of torque for chopper speed curve of Induction motor with : 15

   (i) Applied voltage

   (ii) Applied frequency

Section-D

8. Explain constant V/f control of induction motor in detail. 15

9. Discuss the operation of slip-ring induction motor with external rotor Resistance. 15

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

Examination, December, 2024

POWER PLANT ENGINEERING

Paper : OEC-EE-07-G

Time allowed : 3 hours] *[Maximum marks : 75*

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

1. Explain the following :

(a) Describe the process of Rankine cycle 2.5

(b) List the applications of diesel engine power plant 2.5

(c) Explain the function of nuclear reactor 2.5

(d) Define the function of surge tank in hydro plants 2.5

(e) Describe the water hammer 2.5

(f) Explain solar cell 2.5

Section-A

2. Explain with a neat sketch the working of a thermal electric power plant station and discuss the function of major components in it. 15

3. Define thermodynamic cycle. Explain the various types of thermo dynamic cycle with relevant diagram. 15

Section-B

4. (i) Explain in detail about the construction and working of IGCC. 7.5

   (ii) Draw and explain PV and TS diagrams of Brayton cycle. 7.5

5. Identify P-V and T-S diagram explain the effect of intercooling, reheating and regeneration in a gas turbine plant. 15

Section-C

6. Demonstrate the difference between a pressurized water reactor nuclear power plant and boiling water reactor nuclear power plant. 15

7. Explain CANDU reactor with neat sketch. Give its advantages and disadvantages. Explain what is chain reaction in connection with a nuclear reactor. 15

Section-D

8. (i) Examine the factors to be considered while selecting the site of a hydro power plant. 7.5

   (ii) Illustrate the pumped storage plant. Explain with a sketch. 7.5

9. Explain the pollution control technologies including waste disposal options for nuclear power plant. 15

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

Examination, November-2023

POWER SYSTEMS-I

Paper-PCC-EE-301-G

Time allowed : 3 hours] *[Maximum marks : 75*

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

1. Explain the following : 6×2.5=15

(a) Application of DC transmission

(b) Ferranti effect

(c) Function of relay

(d) Advantages of PU system

(e) Type of C.B

(f) Line-Commutated Converters (LCC)

Unit-I

2. Explain complex power for single phase and three phase loads. 15

3. Explain the steady state model of synchronous machine. 15

Unit-II

4. Discuss the principle of symmetrical component. Drive the necessary equivalent to convert. 15

5. What is 3 phase unsymmetrical fault ? Explain line to ground fault in details. 15

Unit-III

6. Explain generator protection in details. 15

7. Explain in SF_6 circuit breaker in details. 15

Unit-IV

8. (a) Write notes on permanent magnet synchronous generator. 8

   (b) Draw IV & PV characteristics of PV panels. 7

9. Describe LCC (Line Commutated Converter) and VSC (Voltage Source Convertor). 15

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

$$\dot{x} = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix} + \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} 4; \quad y = \begin{bmatrix} 1 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

9. Find X(t), given, 15

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

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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 (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. 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/mm^2, Max flux density in core=1.25 Wb/m^2, Window space factor=0.3, Window proportion Hight/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

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 ?

(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 breaking 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 (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

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