EE-L 281

5E1361

Roll No. _____ [Total No. of Pages : 2

5E1361

B.Tech. V-Sem. (Back) Examination, January/February - 2024

ESC Electrical Engg.

5EE3-01 Electrical Materials

Time : 2 Hours **Maximum Marks : 80**

Mm. Passing Marks: 28

Instructions to Candidates:

Attempt all five questions from Part A, four questions out of six questions from Part B and two questions out of three from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory **(5×2=10)**

1. What do you mean by interstitial defect?
2. Define relaxation time of electrons.
3. Differentiate between donor and acceptor impurity.
4. Give definition of Piezoelectricity and give examples of piezoelectric material
5. Write characteristics of good conductor.

PART - B

(Analytical/Problem solving questions)

Attempt any Four questions **(4×10=40)**

1. What is skin effect? Why this effect absent in DC.

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2. Calculate the number of atoms in primitive, body centered, face centered unit cell.
3. Explain different types of point defects in crystal
4. Give the classification of magnetic materials and also give the examples of each magnetic material.
5. Differentiate between soft and hard magnetic materials.
6. Explain factors affecting conductivity of metals.

PART - C

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any Two questions **(2× 15 = 30)**

1. Explain Intrinsic and Extrinsic semiconductor with examples also differentiate between P-Type and N-Type semiconductor materials.
2. Derive expression for internal field for solids and liquids.
3. Define following:
   i) Superconductivity and Meissner effect
   ii) Curie-Weiss law in magnetic material.

Roll No. _____ [Total No. of Pages : 3

5E1767

B.Tech. V-Sem. (Main & Back) Examination, January/February - 2024
Electrical Engineering
5EE3-01 Electrical Materials

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

Attempt all Ten questions from Part A, Five questions out of Seven questions from Part B and Three questions out of Five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination Mentioned in form No.205)

PART- A

(Answer should be given up to 25 words only).

All questions are compulsory. **(10×2=20)**

1. Calculate relative density of packing (packing factor) for face centered cubic structure.
2. What is skin effect and what are the factors affecting skin effect?
3. An elemental dielectric material has $\varepsilon_r = 13$ and it contains 10^{28} atoms/m^3, calculate its electronic polarizability assuming Lorentz field.
4. What are the different factors which affects the Dielectric loss?
5. Classified the magnetic material based on their magnetic behaviour.
6. What is magneto striction in magnetic materials also write the types of magnetostriction?
7. What is drift velocity and write the relation between drift velocity and Electric current.
8. Write the properties of some low and High Resistivity material.
9. Differentiate Insulator, Semiconductors and metals based on energy band structure.
10. Based on the Impurity concentration classified the semiconductors.

PART - B

(Analytical/Problem solving questions)

Attempt any Five questions. **(5×4=20)**

1. What is Hall effect. Calculate the Hall voltage for a semiconductor bar of length l, width b and thickness t. Also write the significance of Hall effect.

2. Develop the Relation between Electric Field(E), electric Displacement(D) and Polarization(p).

3. The electronic polarizability of Argon atom is 1.7×10^{-40} Fm^2. what is the static dielectric constant of solid A_r(below 84K) If it's density is $1.8g/cm^3$. Relative atomic mass of $A_r = 39.95$ g/mol

4. Define Magnetic susceptibility also develop the relation between relative permeability and magnetic susceptibility for magnetic material.

5. Explain the Curie-Weiss law for paramagnetic materials. Also Differentiate the soft and Hard magnetic materials.

6. A uniform silver wire has a resistivity of $1.5\times10^{-6}\Omega$ m at room temperature for an electric field along the wire of 1 volt/em. Compute the average drift velocity of electrons if number of conduction electron is $5.8\times10^{28}m^{-3}$. Also calculate mobility and relaxation time of electrons.

7. Differentiate the following
   a) Direct and Indirect band gap semiconductor.
   b) Degenerate and non-degenerate semiconductor.

PART - C

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any Three questions. **(3×10=30)**

1. Compare the conductors, Semiconductors and Insulations . Define the Resistivity also explain the temperature Dependence of Resistivity for conductor, Semi conductor and Insulators.

2. Determine the percentage of polarizability in the sodium chloride crystal, which has the optical Index of refraction and the static dielectric constant 1.5 and 5.6 respectively.

3. a) Define Hysteresis loop in magnetic material. Draw a hysteresis loop for a ferromagnetic material and Indicate.

   i) Residual Induction ii) Saturation Induction

   b) Compare the ferro magnetism and Antiferro magnetism with the help of suitable diagram.

4. An Electric field of 100 v/m is applied in Copper calculate

   a) Average thermal velocity
   b) Mobility
   c) Drift velocity for Electron

   When the particles have three dimensional movement. The restivity of copper at 298 K is 1.72×10^{-8} ohm-m.

5. a) What is meant by Zone refining and crystal growth. Discuss the Bridgman-stock Barger technique for Crystal growth.

   b) Explain the electronic properties of Gallium Arsenide and Silicon carbide.

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Roll No. _____ [Total No. of Pages : 2]

5E1362

B.Tech. V-Sem. (Back) Examination, January/February - 2024

Electrical & Electronics Engg

5EX4-02 Power System - I

EX,EE

Time : 3 Hours **Maximum Marks : 120**

Min. Passing Marks: 42

Instructions to Candidates:

Attempt all ten questions from Part A, five question out of seven from Part B and four questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/ calculated must be stated clearly. Use of following supporting material is permitted during examination. (Mentioned in form No.205)

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory **(10×2=20)**

1. Define Ferranti effect in transmission line.
2. Define microgrid with example.
3. Write types of Electric Load.
4. Differentiate between Synchronous and asynchronous grid.
5. Define Power factor in AC
6. What is a benefit of energy storage?
7. Define Insulation Coordination.
8. Differentiate between unsymmetrical and symmetrical faults.
9. Define travelling wave.
10. Define symmetrical components.

PART - B

(Analytical/Problem solving questions)

Attempt any FIVE questions **(5× 8 = 40)**

1. Explain Ring Mains Distribution System.
2. A 3-phase transmission line has its conductors at the corners of an equilateral triangle with side 3m. The diameter of each conductor is 1.63 cm. Find the inductance of the line per phase per km
3. Explain Factors affecting corona loss and disadvantages of corona.
4. Explain calculations of medium transmission line having nominal-T circuit configuration.
5. Explain Types of DC link in HVDC system.
6. Derive expression of fault current in single line to ground fault.
7. Explain types of Solar PV system.

PART - C

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any FOUR questions **(4× 15 = 60)**

1. Explain effect of Electric and Magnetic Field in Transmission Line on Human beings, animals and plants.
2. Explain Capacitance calculations of a single phase two-wire line.
3. Explain basic scheme and equipment of converter station.
4. Explain method of generation and protection used for over voltages.
5. Write short note on
   i) SF6 Circuit Breaker
   ii) Differential protection

Roll No. _____ [Total No. of Pages : 2

5E1760

5E1760

B.Tech. V-Sem (Main and Back) Examination, January/February - 2024
Electrical Engineering
5EE4-02 Power System-I
EE, EX

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

Attempt all Ten questions from Part A, Five questions out of Seven questions from Part B and Three questions out of Five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination.(Mentioned form No.205

PART A
(Answer should be given up to 25 words only).

All questions are compulsory. **(10×2=20)**

1. What is a micro grid?
2. What do you mean by reactive power?
3. Describe the application of tap change transformer?
4. Explain the concept of surge impedance loading?
5. What is traveling surge?
6. What information can be extracted from Bewely Diagram?
7. Give basic difference between balance and unbalance faults?
8. Give application of neutral grounding?
9. Majorly which type of generator is deployed for wind turbine?
10. What is importance of V-I characteristics for PV system.

PART - B

(Analytical/Problem solving questions)

Attempt any Five questions **(5×4=20)**

1. Give scope and outcome of this course?
2. By help of line diagram of transmission and distribution system explain the various voltage levels.
3. Provide the sinusoidal steady state representation of a short power line?
4. Explain the lightning and switching surges?
5. A 3 phase 37.5 MVA, 33kV alternator having X_1=0.18 pu, X_2=0.12 pu and X_0=0.10 pu, based on its rating is connected to a 33 kV overhead line having X_1=6.3 ohm and X_2=6.3 ohm and X_0=12.6 ohm per phase. A single line to ground fault occurs at the remote end of the line. The alternator neutral is solidly grounded. Calculate fault current.
6. Describe the working mechanism of induction generator?
7. Explain LCC and VSC base DC link?

PART - C

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any Three questions **(3×10=30)**

1. By help of valid analysis explain the evolution of power system and present day scenario?
2. a) Give the steady state performance characteristics of synchronous machine?
   b) Two generators rated 10 MVA, 13.2 kV and 15 MVA, 13.2kV, respectively are connected in parallel to a bus. The bus feeds two motors rated at 8 MVA and 12 MVA respectively. The rated voltage of motor is 12.5 kV. The reactance of each generator is 15% and that of each motor is 20% on its own rating. Assume 50 MVA, 13.8 kV base and draw reactance diagram?
3. By help of suitable diagram and mathematical model explain the Propagation of surge and Voltage produced by traveling surges?
4. a) What is circuit breaker explain it various types?
   b) Explain over current protection scheme?
5. Write short note on
   1) Fixed and variable speed Wind Turbine
   2) Role of Power electronics devices in PV system.

5E5043

Total No. of Questions: Total No. of Pages:

Roll No. _____

B.Tech. V-Sem (old Back) Exam 2024
Electrical & Electronis Engg.
5EX3A Control Systems
EE,EX
5E5043

Time: 3Hours **Maximum Marks: 80**
Min Passing Marks: 24

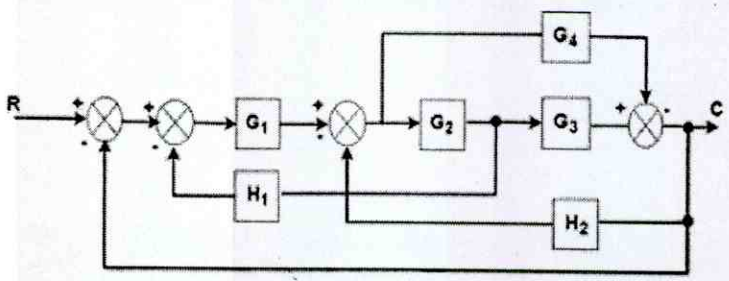
Attempt any **five questions,** selecting **one question** from **each unit**. All Questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

1_____ 2. _____

UNIT -I

Q. 1 Determine the transfer function $\left[\frac{C(s)}{R(s)}\right]$ for the block diagram show below by first drawing its signal flow graph and then using the mason's gain formula.



16

OR

Q.1 (a) What is control system? Explain difference between open loop & closed loop control system with the help of block diagram.

(b) Find the inverse laplace transform of the system given by $\left[\frac{C(s)}{R(s)}\right] = \frac{1.5}{s^2(s+2)}$

2x8=16

UNIT -II

Q. 2 (a) Derive the values of steady state error for type 0, 1 and 2 system due to following
(i) Step input
(ii) Ramp input
(iii) Parabolic input

(b) What do you understand by the term stability? Also explain the importance of stability.

2x8=16

OR

Q.2 (a) Determine the stability of system $2s^6+s^5+8s^4+5s^3+4s^2-4s-6=0$.

(b) Derive the expression for "Time response of a second order system subjected to unit step input function".

2x8=16

UNIT -III

Q. 3 (a) Determine stability of a system by root locus technique $G(s) = \frac{K}{s^2(s+4)(s+3)}$, $H(s) = 1$

(b) Explain the Routh Hurwitz criterion for the stability of the system.

2x8=16

OR

Q.3 (a) Explain servo motors. Draw the block diagram of field controlled d.c. motor and armature controlled d.c. motor.

(b) Explain the salient feature of root locus plot.

2x8=16

UNIT -IV

Q. 4 Draw the complete nyquist plot for a unity feedback system having the open loop function

$$G(s) = \frac{6}{s(1+0.2s)(8+0.25s)}$$

From this plot obtain all the information regarding absolute as well as relative stability.

16

OR

Q.4 (a) The transfer function of a unity feedback control system is gven by

$$G(s)H(s) = \frac{625(s+0.625)}{s(s+25)(s^2+2s+169)}$$

Determine the closed loop stability using bode plot method.

(b) Write short note on:
(i) Phase Margin
(ii) Gain Margin

2x8=16

UNIT -V

Q. 5 Explain frequency domain specification and derive expressions for following-

(i) Resonant Peak

(ii) Resonant Frequency

(iii) Bandwidth

By considering second order system. Also discuss their co-relation with time domain. 16

OR

Q.5 (a) Compare lag, lead and lead-leg compensating network in detail.

(b) What is controller? Explain PID controller with effect of PID individually. 2x8=16

5E1363

Roll No. _____ [Total No. of Pages : 3

5E1363

B.Tech. V Sem. (Back) Examination, January/February - 2024

Electrical & Electronics Engg.

5EX4-03 Control System

EX, EE

Time : 3 Hours **Maximum Marks : 120**

Min. Passing Marks: 42

Instructions to Candidates:

Attempt all Ten questions from Part A, five question out of seven from Part B and four questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used! calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

PART - A

(Answer should be given up to 25 words only)

ALL questions are Compulsory. **(10×2=20)**

1. Write the advantage of feed back system.
2. Explain standard test Inputs.
3. What is state, state variable and state equation.
4. Explain open loop and closed loop system.
5. Describe stability and Relative Stability
6. Explain State Transition Matrix
7. Define State-Space Models of Linear Discrete-Time Systems.
8. Define Transient Accuracy
9. Explain Lead and Lag compensation.
10. Define the absolute and relative stability

PART - B

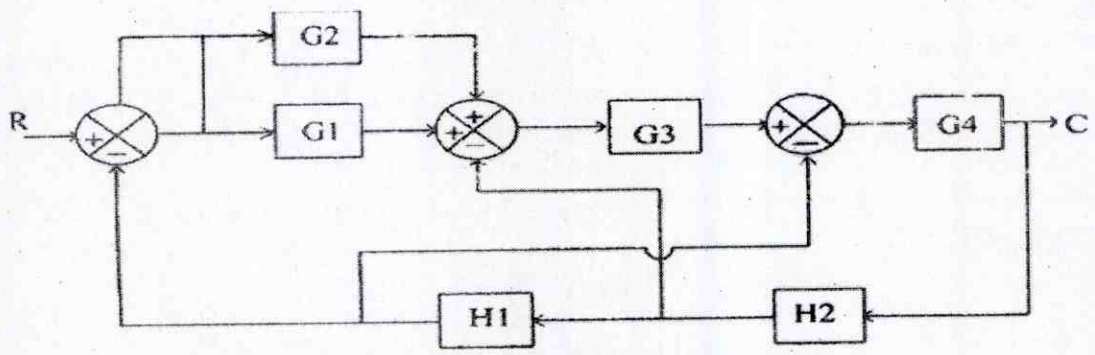
(Analytical/Problem solving questions)

Attempt any FIVE questions. **(5×8=40)**

1. Explain the basic building block diagram of control system. Differentiate between open loop and closed loop control system.
2. Explain initial and final value theorem
3. Write a short note on Proportional, Integral and Derivative controller.
4. Explain observability and controllability with example in detail.
5. For given equation of state model find the Transfer function.

$$A=\begin{bmatrix}1 & 0\\ 2 & 3\end{bmatrix} \quad B=\begin{bmatrix}0\\ 1\end{bmatrix} \quad C=\begin{bmatrix}1 & 1\end{bmatrix}$$

6. Determine the transfer function of given system



7. Write short note on Nonlinear Control system with examples.

PART - C

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any FOUR questions. **(4×15=60)**

1. Derive the response of the first order series RC circuit when the input is unit step, unit ramp and impulse input.
2. Draw bode plot for the unity feedback system having open loop transfer function is $G(s)=\dfrac{50}{s(s+1)(1+0.5s)}$

3. Determine the critical values of k for the stability of a unity negative feedback control system whose open - loop transfer function is given by $G(s)=\frac{Ke^{-0.5s}}{(s+1)}$ Use Nyquist plot method

4. A system open loop transfer function is $G(s)H(s)=\frac{K}{s(s+1)(s+2)}$ Draw the root locus and also determine the range of K for system to be stable, unstable and marginal stable

5. Define the following terms

   a) Gain Margin

   b) Phase Margin

   c) Resonant frequency

   d) Cut off frequency

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5E1761

Roll No. _____ [Total No. of Pages : 3

5E1761

B.Tech. V-Sem. (Main&Back) Examination, January/February - 2024
Electrical Engineering
5EE4-03 Control System
EE, EX

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

Attempt all Ten questions from Part A, Five questions out of Seven questions from Part B and Three questions out of Five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

PART-A
(Answer should be given up to 25 words only)

All questions are compulsory. **(10×2=20)**

1. What do you mean by sensitivity of the Control system?
2. What is feedback? What type of feedback is employed in control system?
3. Distinguish between open loop and close loop control system.
4. Describe the transfer function. Also state the Principle of Superposition theorem.
5. Sketch the response of a second order under damped systems.
6. What is steady state error?
7. How the system is classified depending on the value of damping?
8. What are the basic components of block diagrams reduction technique?
9. What type of feedback is employed in control systems?
10. Write down the basic steps of constructing root locus.

PART - B

(Analytical/Problem solving questions)

Attempt any Five questions. **(5×4=20)**

1. Draw the root locus of the system whose open loop transfer function is

$$G(S)H(S)=\frac{K}{S(S^2+6s+10)}$$

2. Derive the time response of under damped and critically damped second order system for unit step input.

3. For a unity feedback system, the open loop transfer function : $G(S)=\frac{10(S+2)}{S^2(S+1)}$

4. How close loop frequency response is determined from open loop frequency using M and N circles.

5. Draw the Polar Plot for $G(S)=\frac{1}{(1+ST)}$

6. Write short note on :

   i) Polar Plot

   ii) Nichel chart

7. a) Define and derive the expression for resonant frequency.

   b) Draw the magnitude bode plot for the system having the following transfer function

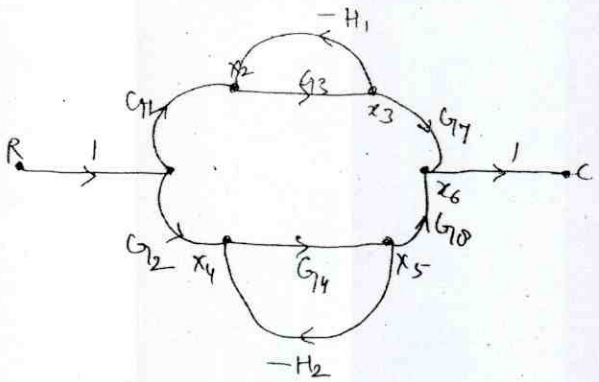
$$G(S)H(S)=\frac{2000(S+1)}{S(S+10)(S+40)}$$

PART - C

(Descriptive/Analytical/Problem Solving/Design Question)

Attempt any Three questions. **(3×10=30)**

1. Using Mason gain formula find the transfer function C/R for the signal flow graph shown in figure:



2. Listout the time domain specification and derive the expressions for Rise time, Peak time and peak overshoot.

3. Define steady state error and service the static error components for type 0, type 1 and type 2 systems?

4. The system has $G(S)=\frac{K}{S(1+ST)}$ with unity feedback, where K & T are constant. Determine the factor by which gain 'K' should be multiplied to reduce the overshoot from 15% to 25%?

5. Write short notes on following.

   a) Controllability and Observability
   b) Lead and Lag compensation
   c) Nyquist criterion for stability
   d) Difference Equations

5E5045

Total No. of Questions:
Roll No. _____

Total No. of Pages:

B.Tech. V-Sem (Back) Feb. 2024
Electrical & Electronis Engg.
5EX5A Transmission & Distribution of Electrical Power
5E5045
EE,EX

Time: 3 Hours

Maximum Marks: 80
Min Passing Marks: 26

Attempt any **fivequestions,** selecting **one question** from **each unit**. All Questions carry **equal**marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/ calculated must be stated clearly. Use of following supporting material is permitted during examination. (Mentioned in form No.205)

1_____ 2._____

UNIT -I

Q. 1 Distinguish between a feeder and a distributor in detail .Draw single line diagram representing element of transmission system

16

OR

Q.1 Explain the effect of system voltage on size of conductor and losses.

16

UNIT -II

Q. 2 Write the short note on following:

a) Conductor material. (4)
b) Damper. (4)
c) Type of conductors. (4)
d) Conductor arrangement. (4)

OR

Q.2Show how the sag of an overhead line can be calculated in case of supports at different levels.

16

UNIT -III

Q. 3 How is the inductance of a single phase two line is calculated? Describe the process how inductance of each conductor due to internal and external flux linkage will be calculated?

16

300

OR

Q.3Write the short note on following:

a) Skin Effect. (4)
b) Proximity Effect. (4)
c) GMD & GMR. (4)
d) Line Transposition. (4)

16

UNIT -IV

Q. 4 What is mean by visual critical voltage and disruptive critical voltage? Explain briefly the method adopted to reduce corona.

16

OR

Q.4Drive the expressions for A,B,C and D constant for long transmission line in terms of line parameters.

16

UNIT -V

Q. 5 Write the short note on following:

a) Different types of insulators. (4)
b) Methods of improving string efficiency. (8)
c) General construction of cable. (4)

OR

Q.5 a) Drive the formula for electric stress in single core cable. (8)

b)A three phase overhead transmission line is being supported by three disc insulator potential across middle and lowest unit are 15 KV and
20 KV respectively.Calculate
(1) Ratio of capacitance between pin and earth to self capacitance of each unit.
(2) The Line Voltage
(3) String Efficiency. (8)

Roll No. _____ [Total No. of Pages : 2

5E1364

5E1364

B.Tech. V-Sem. (Back) Examination, January/February - 2024

Electrical and Electronics Engg

5EX4-04 Microprocessor

EX,EE

Time : 3 Hours **Maximum Marks : 120**

Mm. Passing Marks: 42

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven from Part B and four questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/ calculated must be stated clearly. Use of following supporting material is permitted during examination. (Mentioned in form No.205)

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory **(10×2=20)**

1. Differentiate between timers and counters for 8051.
2. Compare the microprocessor and microcontroller.
3. What do you mean by interrupt?
4. Define the programming and debugging tools.
5. Draw the memory organization of 8051 microcontroller.
6. What is an embedded system?
7. Define the role of address and data bus.
8. List all the functions of accumulator.
9. Compare between the 8 bit and 16 bit microcontrollers.
10. Which register is used for serial programming?

PART - B

(Analytical/Problem solving questions)

Attempt any FIVE questions. **(5×08 =40)**

1. Draw the architecture diagram of 8085 microprocessor and briefly describe the steps involved in an embedded system development.
2. What is the difference between internal and external program memory also define memory wait states.
3. State different types of instructions of 8051 and explain any three instructions from each group of instructions.
4. Illustrate with diagram the significance of gate in TMOD register to control timer/counter module in 8051 microcontroller.
5. What is an SFR? How can you identify the bit —addressable SFRs from their addresses?
6. Describe the synchronous and asynchronous communication with suitable explanation.
7. List the pins of alphanumeric LCD module which help in interfacing with the microcontroller.

PART - C

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any FOUR questions. **(4×15 =60)**

1. Describe the significance of interfacing and with suitable explanations discuss below mentioned interfacing
   a) Sensor interfacing.
   b) Stepper motor interfacing.
   c) DC motor interfacing.
2. Discuss in detail with a neat block diagram, the architecture of 8051.Give its pin diagram also. Briefly explain the role of timers in counting external event using 8051 micro controller.
3. Explain the salient features of an ADC. What are the signals of importance while interfacing such an ADC to an 8051 controller?
4. Explain different addressing modes of 8051 microcontroller and describe each addressing mode with a suitable examples.
5. Write a short notes on following.
   a) RS232.
   b) Blue-tooth and Zig-bee.

5E1762

Roll No. _____ [Total No. of Pages : 2

5E1762

B.Tech. V-Sem (Main & Back) Examination, January/February - 2024
Electrical Engineering
5EE4-04 Microprocessor
EE, EX

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

Attempt all Ten questions from Part A, Five questions out of Seven questions from Part B and Three questions out of Five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

PART A

(Answer should be given up to 25 words only).
All questions are compulsory. **(10×2=20)**

1. What is Embedded system, Write its application.
2. What is the use of ALE Pin in 8085 Microprocessor.
3. Explain Indexed Addressing Mode with example.
4. How can the time taken to execute an Instruction be estimated in 8051 Microcontroller.
5. Explain DPTR in 8085 Microcontroller.
6. Draw 8-bit Format of TCON Register.
7. What are Address Range of RAM and ROM used in 8051 Microcontroller.
8. What is draw back of Memory Mapped I/O?
9. How is A/d converter interfaced with 8051.
10. Define Simplex, half duplex, and Full duplex mode of communication.

PART - B
(Analytical/Problem solving questions)

Attempt any Five questions. (5×4=20)

1. What is Stack Pointer and Program counter in 8085? Explain How it is use in Instructions with detail.

2. Explain different addressing modes in 8051 Microcontroller.

3. Draw and explain the timing diagram of external data Memory Read cycle.

4. Explain RAM structure of 8051 Microcontroller.

5. Write a program to blink LED alternatively with some delay.

6. Write difference between LJMP, SJMP and AJMP instruction.

7. What is PSW in 8051, describe the use of each bit of PSW with example.

PART - C
(Descriptive/Analytical/Problem Solving/Design question)

Attempt any Three questions. (3×10=30)

1. Explain all types of Arithmetic Instruction of 8051 microcontroller with example.

2. Explain Interfacing of an 8K bytes of PROM to 8051 Microcontroller.

3. Describe working and block diagram of 8255 PPI in detail.

4. What is SFR, explain used of all SFR in 8051 microcontroller.

5. Draw the block diagram of Embedded system and explain the each block in detail.

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5E1365

Roll No. _____ [Total No. of Pages : 3

5E1365

B.Tech. V Sem. (Back) Examination, January/February - 2024

Electrical Engg.

5EE4-05 Electrical Machine Design

Time : 3 Hours **Maximum Marks : 120**

Min. Passing Marks: 42

Instructions to Candidates:

Attempt all Ten questions from Part A, Five questions out of seven from Part B and four questions out of Five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

PART - A

(Answer should be given up to 25 words only)

ALL questions are Compulsory. **(10×2=20)**

1. What are the factors that affect the size of rotating machines?
2. How iron loss can be reduced in transformers?
3. What are the advantages of using synthesis design method in CAD?
4. List the advantages of using open slots.
5. Give the purpose of providing damper windings in synchronous machines.
6. What are the different types of heat transfer methods found in electrical machines?
7. Define specific electric loading.
8. Why do we prefer use of revolving field system in synchronous machines?
9. What are the various cooling methods used for oil type transformer?
10. What are the various types of commonly used conducting materials for electrical machines?

PART - B

(Analytical/Problem solving questions)

Attempt any FIVE questions. **(5×08=40)**

1. Calculate the main dimensions and winding details of a 100 kVA 2000/400 volts, 50 Hz, single phase shell type , oil immersed, self cooled transformer. Assume : Voltage per turn, 10 V flux density in core, 1.1 Wb/m^2 ; current density 2 A/mm^2, window space factor 0.33.

   The ratio of window height to window width and ratio of core depth to width of central limb = 2.5. The stacking factor is 0.9.

2. Explain the construction of synchronous machine with neat diagram.

3. Explain the necessary steps for the design of wound rotor of an induction motor.

4. Describe the synthesis method of computer aided design with a flow chart. Also write down its disadvantages.

5. Find the main dimensions of a 15 kW, 3 phase, 400 V, 50 Hz, 2810 r.p.m. squirrel cage induction motor having an efficiency of 0.88 and a full load power factor of 0.9. Assume : specific magnetic loading=0.5Wb/m^2 ; specific electric loading=25000A/m Take the rotor peripheral speed as approximately 20 m/s at synchronous speed.

6. Define space factor and rating of a machines. Explain the choice of specific magnetic loading with factors which influence the performance of the machine.

7. Define the kVA output equation of a three-phase transformer. Also define window space factor.

PART - C

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any FOUR questions. **(4×15=60)**

1. What are the various steps of determination of main dimensions for core, yoke and window of a transformer? Explain design of low voltage and high voltage winding of a transformer.

2. A 100 kVA ,3300 V, 50Hz, 300rpm, 3phase alternator has 180 slots with 5 conductors per slot,single layer winding with full pitched coil used. The winding is star connected with one circuit per phase. Determine the specific electric loading and magnetic loading if the stator bore is 2.0 m and core length is 0.4 m. Using the same loading, determine corresponding data for a 1250 kVA, 3300 V, 50Hz, 250 rpm, 3 phase star connected alternator having 2 circuit per phase. The machine has 60° phase spread.

3. Determine the main dimensions of a 12MVA,13.8 kV, 50Hz, 1500 rpm, three phase star connected alternator. The following data are provided.

   Average gap density=0 .60 tesla

   Ampere conductor per meter=42000

   Peripheral speed=80 m/s

   Also find the maximum flux, number of stator slots if one conductor per slot is used, number of turns per phase.

4. Explain the procedure to draw circle diagram of an induction motor. What are the various information which can be obtained from a circle diagram?

5. Derive the expression for design of squirrel cage rotor and end rings of induction motor. Also explain the methods of improving starting torque.

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Roll No. _____ [Total No. of Pages : 2

5E1768

B.Tech. V-Sem (Main&Back) Examination, January/February - 2024
Electrical Engineering
5EE4-05 Electrical Machine Design

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

Attempt all Ten questions from Part A, Five questions out of Seven questions from Part B and Three questions out of Five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination (as mentioned in form No.205)

PART A

(Answer should be given up to 25 words only).

All questions are compulsory. **(10×2=20)**

1. What are the advantages of using open slots?
2. What is Cogging?
3. Define specific electric loading.
4. Define short circuit current of induction motor.
5. What is the use of damper winding in synchronous machine?
6. What are the functions of frames in induction motor?
7. Define "run away speed" in synchronous machine.
8. Why are machines with large dimensions are more efficient.
9. What are the categories of transformers used in Power systems?
10. What is "Gap expansion factor"?

PART - B

(Analytical/Problem solving questions)

Attempt any Five questions. **(5×4=20)**

1. Write a short note on "Specific permeance of deep bar rotor slots".
2. State and derive the KVA output equation of single phase transformer.
3. Which factors should be considered when estimating the length of the airgap of induction motor? Why the airgaps should be as small as possible?
4. What are the factors to be considered for selection of armature slots?
5. Explain the construction of synchronous machine with neat diagram.
6. Write a short note on "FEM based design"
7. Find the main dimensions of a 15 KW, 3 Phase, 400V, 50Hz, 2810 r.p.m squirrel cage induction motor having an efficiency of 0.88 and a full load power factor of 0.9. Assume:

   Specific magnetic loading = 0.5 Wb/m^2

   Specific electrical loading = 25000 A/m

   Take the rotor peripheral speed as approximately 20 m/s at synchronous speed.

PART - C

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any Three questions. **(3×10=30)**

1. Derive the expressions for design of rotor and rings of squirrel cage.
2. Explain the various steps of determination for Core,Yoke and window of a transformer.
3. Explain the design of turbo-alternators with design of damper winding.
4. Calculate the main dimensions and winding details of a 100 KVA 2000/400 volt; 50Hz; single phase shell type oil immersed, self cooled transformer. Assume: voltage per turn, 10V flux density in core, 1.1 W/b m^2; current density, A/mm^2 window space factor, 0.33..
   The ratio of window hight to window width and ratio of core depth to width of central limb = 2.5. The stacking factor is 0.9.
5. Explain the various approaches used in computer aided design with the help of suitable flowcharts?

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Total No. of Questions:

Total No. of Pages:

Roll No. _____

B.Tech.V-Sem.(Back)Exam 2024
PCC/ PEC Electrical Engg.
5EE5-11 Restructured Power System.
5E1366

Time: 2 Hours

Maximum Marks: 80
Min. Passing Marks: 28

Attempt all five questions from Part A, four questions out of six questions from Part B and two questions out of three from Part C.
Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/ calculated must be stated clearly.
Use of following supporting material is permitted during examination.
(Mentioned in form No.205)
1_____ 2. _____

Part A(Answer should be given up to 25 words only)
All questions are compulsory

Q.1 Write the disadvantages of Restructuring of Power System.
Q.2 What do you mean supplier surplus?
Q.3 Write down the name of market based congestion management methods?
Q.4 Explain the nodal pricing?
Q.5 Define the term "oligopoly".

5 x 2 = 10

Part B Analytical/Problem solving questions
Attempt any four questions

Q.1 Write the characteristics of traditional power industries.
Q.2 Explain demand elasticity with their curves.
Q.3 What are the four pillars of market design? Explain in brief.
Q.4 Give the brief explanation about the Locational Marginal Prices (LMPs).
Q.5 What do you know about the Co-optimization of energy and reserve services?
Q.6 Explain the rolled-in transmission pricing paradigm in brief.

4 x 10 =40

Part C(Descriptive/Analytical/Problem Solving/Design Question)
Attempt any two questions

Q.1 Explain the process of Restructuring of Power System and also explain the various entities involved in this process.
Q.2 Explain HHI Index, Entropy Coefficient and Lerner Index in detail.
Q.3 Explain the Cournot, Bertrand and Stackelberg competition model in detail.

2 x 15 =30

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Roll No. _____ [Total No. of Pages : 2

5E1769

B.Tech. V-Sem. (Main & Back) Examination, January/February - 2024
Electrical Engineering
5EE5-11 Restructured Power System.(Elective-I)

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

Attempt all Ten questions from Part A, Five questions out of Seven questions from Part B and Three questions out of Five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

PART - A
(Answer should be given up to 25 words only)

All questions are compulsory. **(10×2=20)**

1. Write any four objectives of *deregulation* of power systems industry.
2. What is re-dispatching in power systems?
3. What is elasticity of electrical power demand?
4. What is Cournot competition model?
5. What are ancillary services in power system industry?
6. What is the effect of congestion in context of electrical power transmission?
7. Why is the transmission pricing required?
8. Explain total utility and marginal utility.
9. What are thermal limits and voltage limits in transmission congestion management?
10. Name any eight types of ancillary services in Power systems.

PART - B

(Analytical/Problem solving questions)

Attempt any Five questions. (5×4=20)

1. What are the challenges encountered in making competition work in the electricity market?
2. Explain the roles of different entities involved in power system restructuring.
3. Discuss the four pillars of market design.
4. What are the desired features of a congestion management system?
5. What is available transfer capability (ATC)? Explain the terms TTC, TRM, CBM related to ATC.
6. Write a detailed note on Locational Marginal Prices.
7. Write short notes on :
   a) Entropy Coefficient
   b) Loss of opportunity cost.

PART - C

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any Three questions. (3×10=30)

1. Give a detailed classification of transmission pricing methods under the following points:
   a) Rolled-in transmission pricing
   b) Marginal transmission pricing
   c) Composite transmission pricing
2. Discuss the following contractual arrangements models of electricity market:
   a) Pool model
   b) Bilateral contracts model
   c) Hybrid model
3. Write detailed notes on the following methods of transmission capacity allocation in congestion management:
   a) First come first serve basis method
   b) Pro-rata method
   c) Type of contract
   d) Explicit Auctioning
   e) Coordinated auctioning.
4. Discuss the merits and demerits of Monopoly, Single Buyer, Wholesale Competition and Retail Competition market models.
5. Write a sector wise detailed note on the compelling reasons of power systems restructuring required for various sectors of power systems across the world.
