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

5E1361

5E1361

B. Tech. V - Sem. (Main / Back) Exam., January - 2022
ESC Electrical Engineering
5EE3 – 01 Electrical Materials

Time: 2 Hours   Maximum Marks: 80
                                                              Min. 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 may 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. NIL _____   2. NIL _____

PART – A

(Answer should be given up to 25 words only)   [5×2=10]

All questions are compulsory

Q.1 Write the unit of electrical and thermal conductivity.

Q.2 Write the name of all possible polarization in water molecules (H_2O).

Q.3 Show the total stored magnetic energy in a permanent magnet on it B-H loop.

Q.4 Define relaxation time of electrons in a conductor.

Q.5 A P-type material having majority carrier density $10^{16}/cm^3$ it further doped with $10^{14}/cm^3$ Boron then find its final electron and hole concentration. Assume intrinsic carrier concentration is $10^{10}/cm^3$.

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PART – B

Attempt any four questions

Q.1 What is the crystalline defects? Define.

(a) Point defects and

(b) Volume defects.

Also discuss how these defects on temperature of sample.

Q.2 Write the name of two piezoelectric materials. Also define any two parameter of piezoelectric materials that determine its performance.

Q.3 Why dielectric constant is complex when a time varying electric field incident? If a dielectric material has dielectric constant $0.9 + j\,0.8$ and another has $10.5 + j\,0.2$ then what is the difference in application in these two material.

Q.4 State Curie and Curie-Weiss law. Also write the name of two material where these law can applied.

Q.5 How magnetic materials are classified? Also define following terminology used for magnetic material -

(a) Magnetic domain

(b) Magnetic retentivity

(c) Spin orientation

Q.6 Calculate the conductivity a semi-conductor material which has -

Hole density $\approx 10^{13}/cm^3$

Electron density is $10^{15}/cm^3$

Electron mobility is 1300 cm^2/V-sec.

Hole mobility is 600 cm^2/V-sec.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions)   [2×15=30]

Attempt any two questions

Q.1 What is skin effect? Why this effect absent at DC fields? Find the skin depth in a conductor at 2,000 Hz and 20,000 Hz. Assume the conductivity of sample is 10^4 Ω -cm.   [15]

Q.2 (a) If the resistivity of a semiconductor sample is charge with temperature as -

$\sigma (t) = 10^5 - 10^3 \exp \{- 0.05 t\}$

Then find the resistance of above sample at 500 °C. Assume its resistance at 0 °C as 1000 Ω.   [10]

(b) Why resistance of metallic conductor increases with temperature? Draw its variation with temperature for two different metals on same axis.   [5]

Q.3 (a) Define following terms of superconducting material -   [2×5=10]

   (i) Critical current density

   (ii) Meissner effect

(b) Draw energy band diagram of metal, semiconductor and insulator.   [5]

5E1362

5E1362

B. Tech. V - Sem. (Main / Back) Exam., March - 2022
Electrical & Electronics Engineering
5EX4 – 02 Power System – I
EE. EX

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 questions from Part B and four questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may 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. Semi Log Paper

2. Graph Paper

PART – A

(Answer should be given up to 25 words only)   [10×2=20]

All questions are compulsory

Q.1 Explain Bulk Power Grids and Micro-grids

Q.2 What are the effect of Electric and Magnetic Field in Transmission Line?

Q.3 What is the difference between synchronous and asynchronous grid?

Q.4 What you mean by Renewable Energy Sources? Give the example.

Q.5 Describe term corona. What are the factors which affect the corona losses?

Q.6 Why fault analysis is needed in power system?

Q.7 Explain the difference between feeder and distributor.

Q.8 What is the per unit value?

Q.9 Write short note on Distributed Energy Resources.

Q.10 Describe single line diagram with voltage levels topologies (meshed and ring system).

PART – B

(Analytical/Problem solving questions)   [5×8=40]

Attempt any five questions

Q.1 A 50 km long transmission line supplies a load of 5 MVA at 0.8 power factor lagging at 33 kV. The efficiency of transmission is 90 percent. Calculate the volume of conductor aluminum required for the line when -

(a)   Single phase 2-wire system is used

(b)   Three phase 3-wire system is used

Q.2 Explain clearly how the magnetic field energy and the reactive power in an inductive circuit are related.

Q.3 Discuss the advantages and disadvantages of HVDC transmission system.

Q.4. Explain the operations of standalone and grid interactive Solar PV systems with the help of block diagram.

Q.5 What is grounding? Describe about the various methods of neutral grounding in detail.

Q.6 Explain the conversion of wind energy into electric energy in a wind power plant, with the help of diagram.

Q.7 What is nominal π (pi) circuit? Find the ABCD constants for nominal π circuit.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions)   [4×15=60]

Attempt any four questions

Q.1 (a) Describe puffer type SF6 circuit breaker with neat and clean diagram, also state its advantages and disadvantages over others circuit breaker.

(b) Explain power flow through a transmission line and calculate active and reactive power at sending end and receiving end.

Q.2 (a) Explain short circuit of synchronous machine. Also describe steady state, transient and sub-transient operation of synchronous machine.

(b) Explain shunt compensation of transmission line in detail.

Q.3 Describe the I-V and P-V characteristics of PV panels of solar system with neat and suitable diagram.

Q.4 Why Line Commutated Converters (LCC) used in HVDC transmission system? Compare AC transmission system with DC transmission system, also explain their merits and demerits.

Q.5 Write note on the followings protection schemes with their application -

(a) Over-current

(b) Directional protection

(c) Distance protection

(d) Differential protection

5E1363

5E1363

B. Tech. V - Sem. (Main / Back) Exam., January - 2022
Electrical & Electronics Engineering
5EX4 – 03 Control System
EE, EX

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 questions from Part B and four questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may 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. NIL _____

2. NIL _____

PART – A

(Answer should be given up to 25 words only)   [10×2=20]

All questions are compulsory

Q.1 Define open loop and closed loop system with examples.   [2]

Q.2 What is gain margin and phase margin?   [2]

Q.3 Define the phase crossover frequency and gain crossover frequency.   [2]

Q.4 Differentiate asymptotic and relative stability.   [2]

Q.5 Explain the salient features of root locus plot.   [2]

Q.6 Write short note on state and state space equation.   [2]

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Q.7 Describe state-transition matrix. [2]

Q.8 Define regulator problem. [2]

Q.9 Explain nonlinear control system with an example. [2]

Q.10 Differentiate continuous time system and discrete-time system. [2]

PART – B

(Analytical/Problem solving questions) [5×8=40]

Attempt any five questions

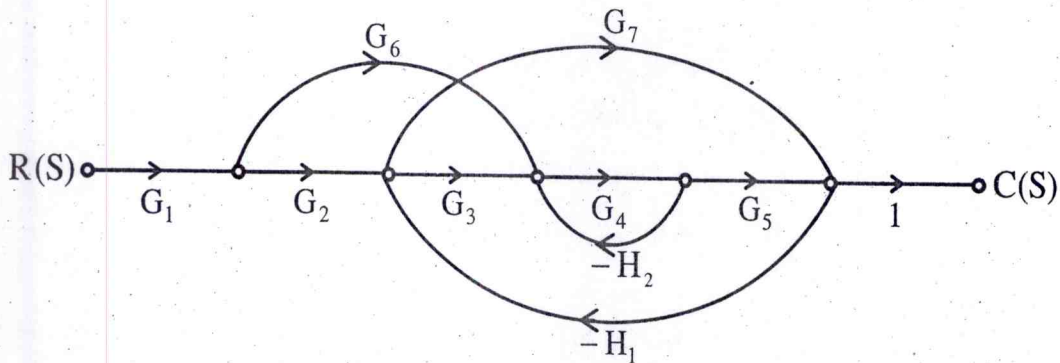Q.1 Find the transfer function of the system whose signal flow graph in figure-1. [8]

Figure (1)

Q.2 The open loop transfer function of a unity feedback control system is given below - [8]

$$G(s) = \frac{(s+0.25)}{s^2(s+1)(s+0.5)}$$

Determine closed loop stability and Nyquist criteria.

Q.3 Sketch the bode plot for - [8]

$$G(s) = \frac{1000}{(1+0.2s)(1+0.002s)}$$

Q.4 Obtain the state space model for transfer function - [8]

$$\frac{Y(s)}{U(s)} = \frac{6(s+3)(s+2.5)}{(s+2)(s^2+4s+5)}$$

Q.5 Derive Jordan's canonical form for the following transfer function - [8]

$$\frac{Y(s)}{U(s)} = \frac{6}{(s+1)^2(s+2)}$$

Q.6 Write short notes on - [8]

(a) Digital PID controller

(b) Optimal control system

Q.7 Explain the phenomena of derivation of transfer function from state model with example

(3rd order system). [8]

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) [4×15=60]

Attempt any four questions

Q.1 Using the Routh-Hurwitz criterion and the unity feedback system with - [15]

$$G(s) = \frac{K}{s(s+1)(s+2)(s+5)}$$

(i) For stability find the range of K.

(ii) For marginal stability find the value of K.

(iii) If the system is marginally stable, find the actual location of the closed loop system.

Q.2 The transfer function of the unity feedback control system is given by -

$$G(s) = \frac{K}{s(s+2)(s+4)}$$

Determine:

(a) The value of K to have 40% overshoot for unit step input [3]

(b) The value of K_v for sustained oscillation in output [4]

(c) The value of K_v corresponding to value of K obtained in (a) [4]

(d) The value of settling time t_s, using root locus method [4]

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Q.3 Determine the critical values of K for the stability of a unity feedback control system whose open loop transfer function is given by - [15]

$$G(s) = \frac{Ke^{0.55}}{(s+1)}$$

Using Nyquist plot method.

Q.4 What is controllability and observability, explain it in detail, also for given state equation find that system is controllable and observable? [15]

$$\dot{x}_1 = -6x_1 + 2x_2 - 4x_3 + u(t)$$

$$\dot{x}_2 = -18x_1 + 3x_2 - 8x_3 + 3u(t)$$

$$\dot{x}_3 = -6x_1 + x_2 - 3x_3 + 1u(t)$$

and $y(t) = x_1 - x_2 + 2x_3$

Q.5 (a) Explain the phenomena of pole placement by help of state feedback. [7]

(b) Explain feedback compensation technique. [8]

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5E1364

5E1364

5E1364

B. Tech. V - Sem. (Main / Back) Exam., January - 2022
Electrical & Electronics Engineering
5EX4 – 04 Microprocessor
EE, EX

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 questions from Part B and four questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may 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. NIL _____   2. NIL _____

PART – A

(Answer should be given up to 25 words only)   [10×2=20]

All questions are compulsory

Q.1 What does the term Embedded System mean?

Q.2 What is the drawback of Memory Mapped I/O?

Q.3 List the benefits of subroutine.

Q.4 How is the A/D converter interfaced with 8051 microcontroller?

Q.5 Give four differences between Static and Dynamic RAM.

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Q.6 Why are AD0–AD7 lines are multiplexed?

Q.7 What are the different types of Addressing modes in 8051?

Q.8 Differentiate between 16-bit & 32-bit microcontrollers.

Q.9 Draw the block diagram of 8051 microcontroller and labeled it properly.

Q.10 Differentiate between Timers and Counters. Draw the diagram of TCON in 8051.

PART – B

(Analytical/Problem solving questions)   [5×8=40]

Attempt any five questions

Q.1 What is the use of Stack? Explain "PUSH" and "POP" operations with the help of suitable examples.

Q.2 Briefly describe the key features of Synchronous and Asynchronous communication.

Q.3 Elaborate the instructions set in 8051 microcontroller with the help of examples.

Q.4 Draw the T-states and Machine cycles for the following instructions –

(a)   CMP

(b)   STAX

(c)   LDA

(d)   STA

Q.5 Explain various timers and interrupts and their functions in 8051 microcontroller.

Q.6 Explain the interfacing of Analog to Digital and Digital to Analog converter with 8051 microcontroller.

Q.7 Show the interfacing circuit and functional pins of LCD.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) [4×15=60]

Attempt any four questions

Q.1 A binary coded decimal number between 0 and 99 is stored in R/W memory location called the "Input Buffer" (INBUF). Write a main program and a conversion subroutine (BCDBIN) to convert BCD number into its equivalent binary number. Store the result in a memory location defined as the output buffer (OUTBUF).

Q.2 Draw and explain the architecture of 8051 Microcontroller. Give PSW of 8051 Microcontroller and describe each bit in PSW.

Q.3 With the help of schematic diagram, explain the interfacing of stepper motor with 8051 Microcontroller. Also write ALP to change the speed and direction of motor.

Q.4 Draw the pin diagram of programmable peripheral interface chip 8255 and explain its various operational modes.

Q.5 Write an assembly language program to perform traffic light control operation.

5E1365

5E1365

B. Tech. V - Sem. (Main / Back) Exam., March - 2022
Electrical Engineering
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 questions from Part B and four questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may 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. Semi Log Paper   2. Graph Paper

PART – A

(Answer should be given up to 25 words only)   [10×2=20]

All questions are compulsory

Q.1 Write the factors for consideration in electrical machine design. [2]

Q.2 What are the various cooling methods used for oil type transformers? [2]

Q.3 Define short circuit current of induction motor. [2]

Q.4 Explain the use of damper winding in synchronous machine. [2]

Q.5 What are the various types of commonly used conducting materials for electrical machines? [2]

68

Q.6 Define the short circuit ratio of synchronous machine and no-load current of a transformer. [2]

Q.7 What is the difference between brushless DC motor and switched reluctance motor? [2]

Q.8 What are the advantages and disadvantages of synthesis method of computer aided design? [2]

Q.9 Define voltage regulation of a transformers and explain in brief temperature rise in transformers. [2]

Q.10 Which type of rotor is generally used for high speed alternators? Define heat flow. [2]

PART – B

(Analytical/Problem solving questions)

[5×8=40]

Attempt any five questions

Q.1 Determine the dimensions of the core and yoke for a 100kVA, 50Hz, 1 - ϕ, core type transformer. A square core is used with distance between adjacent limbs equal to 1.6 times the width of the laminations. Assume voltage per turn of 14 volts, maximum flux density 1.1 wb/m^2, window space factor 0.32 and the current density 3A/mm^2. Take stacking factor = 0.9, flux density in the yoke to be 80% of the flux density in core. [8]

Q.2 Derive the kVA output equation of a three-phase transformer. Also define window space factor. [8]

Q.3 Explain the synthesis method of computer aided design with neat flow-chart. Also write its advantages and disadvantages. [8]

Q.4 Write short notes on – [4+4=8]

(a) Permanent magnet synchronous machine

(b) Analysis method of computer aided design with its advantages

Q.5 A 3-φ induction motor has 54 slots with 8 conductors per slot and 72 rotor slots with 4 conductors per slot. Find the number of stator and rotor turns. Find voltage across the rotor slip-rings, when the rotor is open circuited at rest. Both stator and rotor are star connected and a voltage of 400 volts is applied across the stator terminals. [8]

Q.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. [8]

Q.7 Explain the steps for the design of wound rotor of an induction motor. [8]

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) [4×15=60]
Attempt any four questions

Q.1 A 90kW, 500V, 50Hz, three phase, 8-pole induction motor has a star-connected stator winding accommodated in 63 slots with six conductors per slot. If the slip-ring voltage on open-circuit is to be 400V. Find a rotor winding stating – [15]

(a) Number of slots

(b) Number of conductors per slot

(c) Coil span

(d) Slip-ring voltage on open circuit

(e) Approx full load current per phase in rotor. Assume efficiency 0.9, power factors 0.86.

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Q.2 Explain the procedure to draw circle diagram of an induction motor. What are the various information which can be obtained from a circle diagram? [15]

Q.3 Explain about the shape of pole face of a synchronous machine. Also explain the design of turbo-alternators with design of damper winding. [15]

Q.4 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. [15]

Q.5 Determine the main dimensions of a 12MVA, 13.8 kV, 50Hz, 1500 rpm, three-phase star connected alternator. The following data are provided – [15]

Average gap density = 0.60 tesla,

Ampere conductors per meter = 42000,

Peripheral speed = 80m/second.

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

5E1366

5E1366

B. Tech. V - Sem. (Main / Back) Exam., January - 2022
PCC / PEC Electrical Engineering
5EE5 – 11 Restructured Power System

Time: 2 Hours   Maximum Marks: 80
                                            Min. 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 may 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. NIL _____   2. NIL _____

PART – A

(Answer should be given up to 25 words only)   [5×2=10]

All questions are compulsory

Q.1 What is Deregulation in power Industry?

Q.2 Define market equilibrium.

Q.3 What is Cournot?

Q.4 Explain the Nodal pricing.

Q.5 What is Lerner index?

PART – B

Q.1 Explain the reasons & objectives of deregulation of various power system across the world.

Q.2 By the help of suitable example explain the concept of elasticity of demand & supply curve?

Q.3 Explain the distinguishing features of electricity as a commodity.

Q.4 Explain the type and start capability services.

Q.5 Explain the Rolled-in transmission pricing paradigm.

Q.6 What is congestion management explain its importance?

PART – C

Q.1 By the help of suitable model explain the following –

(a) Monopoly model

(b) Single buyer model

(c) Wholesale competition model

Q.2 Explain the need of restructuring of power industry, also explain the restructuring process.

Q.3 Write short note on –

(a) Re-dispatching

(b) Locational Marginal Price

(c) Counter trade

5E5041

5E5041

B. Tech. V - Sem. (Back) Exam., January - 2022
Electrical & Electronics Engineering
5EX1A Power Electronics
EX, EE

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

Instructions to Candidates:

*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.   NIL _____   2.   NIL _____

UNIT- I

Q.1 (a) Explain the construction and principle of operation of thyristor.   [10]

      (b) Discuss the characteristic and application of power thyristor.   [6]

OR

Q.1 (a) Explain thyristor commutation methods in detail. Also draw a suitable diagram in support of your answer.   [12]

      (b) Briefly explain the characteristics of MCT.   [4]

UNIT- II

Q.2 (a) Explain the working of relaxation oscillator.   [8]

      (b) Explain the construction and characteristics of SCR.   [8]

OR

Q.2 Discuss the various methods of turning ON a SCR and available triggering circuits for SCR.   [16]

UNIT- III

Q.3 (a) A single phase full converter feeds power to RLE load with R = 6 Ω, L= 6 mH and E = 60 V. The ac source voltage is 230 V, 50 Hz. For continuous conduction, find the average value of load current for a firing angle delay of 50°. [8]

(b) Explain with diagram, single phase dual converters. [8]

OR

Q.3 (a) Explain the working and waveform of three phase half wave converter. [8]

(b) A single phase full converter is made to deliver a constant load current. For zero degree firing angle, the overlap angle is 15°. Calculate the overlap angle when firing angle is- [8]

(i) 30°

(ii) 45°

(iii) 60°

UNIT- IV

Q.4 Write short note on -
(a) Extinction angle control [8]
(b) Symmetrical angle control [8]

OR

Q.4 (a) Explain the working single phase semi converter with RL Load. [8]
(b) Discuss sinusoidal pulse width modulation control. [8]

UNIT- V

Q.5 (a) Discuss the different chopper configurations with a suitable diagrams. [10]
(b) For type-A chopper, feeding an RLE load, obtain a maximum value of average current rating for the thyristor in case load current remains constant. [6]

OR

Q.5 (a) Explain the working of current and load commutated chopper. Give supporting diagrams. [8]
(b) Discuss the utility of Multiphase Chopper. [8]

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Roll No. _____   Total No. of Pages: 3

5E5042

5E5042

B. Tech. V - Sem. (Back) Exam., January - 2022
Electrical Engineering
5EE2A Microprocessors & Computer Architecture

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks: 24

Instructions to Candidates:

*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.   NIL _____   2.   NIL _____

UNIT- I

Q.1 (a) Draw the Pin diagram of 8085 microprocessor. How many address lines are required

to address of 32 kB memory?   [8]

(b) How does the demultiplexing of address Bus and Data Bus take place in 8085

microprocessor?   [8]

OR

Q.1 (a) For 8085 microprocessor define the different addressing mode with example.   [8]

(b) Define the significance of buffer and latch in microprocessor 8085.   [8]

UNIT- II

Q.2 (a) Draw the timing diagram for the instruction MVI A, 82H. [8]

(b) Example the operation of the following instruction with example - [4×2=8]

(i) XCHG

(ii) LHLD

(iii) JMP

(iv) RAR

OR

Q.2 (a) Calculate the Machine cycles and T-states for the following instruction - [8]

(i) MOV A, B

(ii) MVIA, 2FH

(iii) MVIM, 7AH

(b) Write an assembly language program to add two 8 bit numbers stored in some memory location. [8]

UNIT- III

Q.3 (a) Define the mode: 0, 3, 5 for programmable Interval Timer 8253. [8]

(b) Design the block diagram of 8255 and explain each block. [8]

OR

Q.3 (a) Define following terms for 8257 - [2×4=8]

(i) Mode set register & status register

(ii) Operating modes

(b) With the help of block diagram of 8259, explain its functions in detail. [8]

UNIT- IV

Q.4 (a) Explain the role of Bus Interface unit & instruction queue in 8086 using internal architecture block diagram. [8]

(b) Write short note on- [2×4=8]

(i) Addressing modes of 8086

(ii) Min. & Max. mode of 8086

OR

Q.4 (a) Write the basic difference between 8085 & 8086. [8]

(b) Explain the various interrupts available in 8086. [8]

UNIT- V

Q.5 (a) Define register transfer language, arithmetic, logic and shift micro operations. [8]

(b) Explain the classification of RAM. [8]

OR

Q.5 (a) Define following terms - [2×4=8]

(i) Memory Bandwidth

(ii) Memory seek time

(b) Write short notes on - [2×4=8]

(i) Associative memory

(ii) Cache memory

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5E5043

5E5043

5E5043
B. Tech. V - Sem. (Back) Exam., January - 2022
Electrical & Electronics Engineering
5EX3A Control Systems
EE, EX

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

Instructions to Candidates:

*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. Semi log Graph paper   2.   Graph paper

UNIT- I

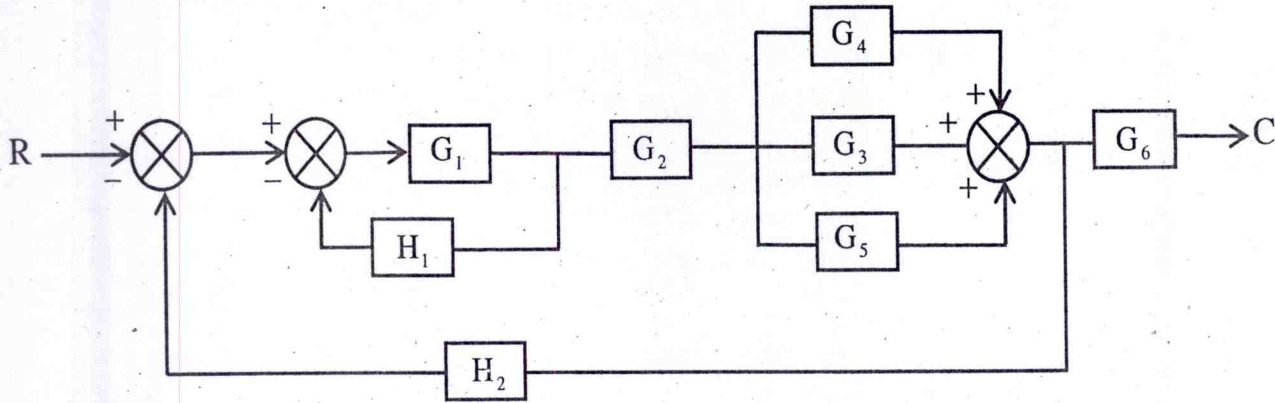Q.1 (a) What do you understand by control system? Classify control system with the help of block diagram. [8]

(b) Draw the electrical analogous circuit of the system shown in figure. [8]

80
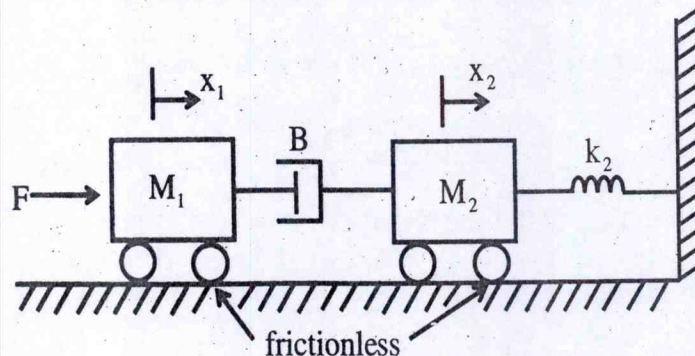
Q.1 Obtain the transfer function for a given block diagram and verify the result with the help of signal flow graph. [16]

UNIT- II

Q.2 (a) Find out the response of a first order system with unit step input. [8]

(b) Define the following - [8]

(i) Delay time

(ii) Rise time

(iii) Peak time

(iv) Maximum overshoot

(v) Settling time

(vi) Steady state error

OR

Q.2 (a) Derive the formula for rise time and peak time. [8]

(b) Write short note on steady state error and error constants. [8]

UNIT- III

Q.3 (a) Explain the construction and working of AC servo motor. [8]

(b) Check the stability of the given characteristic equation with help of Routh-Hurwitz criterion. $s^5 + 6s^4 + 3s^3 + 2s^2 + s + 1 = 0$ [8]

OR

Q.3 (a) Explain the construction and working of synchronous motor. [8]

(b) The forward path transfer function of a unity feedback system is given by $G(s) = \dfrac{K}{s\,(s+4)(s+5)}$. Sketch the root locus as K varies from zero to infinity. [8]

UNIT- IV

Q.4 Write short note- (Any two) [16]

(i) Polar Plot

(ii) M & N Loci

(iii) Nichols chart

OR

Q.4 Sketch the bode plot for the transfer function $G(s) = \dfrac{1000}{(1+0.1s)\,(1+0.001s)}$ [16]

Determine –

(a) Phase margin

(b) Gain margin

(c) Stability of the system

UNIT- V

Q.5 Explain lead compensation network and obtain the transfer function. Calculate the formula of ϕ_m & ω_m. Where ϕ_m is the maximum value of phase angle and ω_m is maximum frequency. [16]

OR

Q.5 (a) Write short note on controllers. [8]

(b) Design a suitable log compensating network for [8]

$G(s) = \dfrac{K}{s(s+2)\,(s+20)}$ to meet the following specifications.

$K_v = 20\ \text{sec}^{-1}$

$P.M. \geq 35°$

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5E5044

5E5044

5E5044
B. Tech. V - Sem. (Back) Exam., March - 2022
Electrical Engineering
5EE4A Database Management System
EE, EX

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks: 24

Instructions to Candidates:

*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. NIL _____   2. NIL _____

UNIT- I

Q.1 (a) What is DBMS? Explain DBMS Architecture with suitable diagram.   [8]

  (b) Discuss the concept of generalization and specialization.   [8]

OR

Q.1 (a) Explain primary key and candidate key with suitable example.   [8]

  (b) What do you mean by relational data model? Explain in detail.   [8]

UNIT- II

Q.2 (a) Define various normal forms with example.   [10]

  (b) Explain primitive and composite data types.   [6]

OR

Q.2 (a) Explain TRC and DRC with example.   [8]

  (b) Discuss the concept of physical and logical database in detail.   [8]

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UNIT- III

Q.3 (a) What is stored procedure and trigger? How there are used? [8]

(b) Explain JDBC in detail. [8]

OR

Q.3 (a) Discuss Embedded SQL and its need. [8]

(b) Describe GL's form management and report writer. [8]

UNIT- IV

Q.4 (a) Explain hashing implementation by explaining one hashing technique. [8]

(b) What are the differences between B and B$^+$ tree indexes? Explain in detail. [8]

OR

Q.4 (a) Discuss multi-list structure in detail. [8]

(b) What do you mean by random file organization? Explain non-clustered index. [8]

UNIT- V

Q.5 (a) Explain ACID properties and transaction state with suitable diagram. [8]

(b) Discuss the various techniques of handling deadlocks. [8]

OR

Q.5 Write short note on (any two) – [8×2=16]

(a) Lock based protocol

(b) Log based recovery

(c) Conflict serializability

8S

5E5045

B. Tech. V - Sem. (Back) Exam., January - 2022
Electrical Engineering
5EE5A Transmission & Distribution of Electrical Power
Common for EE, EX

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks: 24

Instructions to Candidates:

*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.   NIL _____   2.   NIL _____

UNIT- I

Q.1 (a) What are the different type of Feeders? Bring out their relative advantages and disadvantages.   [2×5=10]

    (b) Why present day power system is all 3-phase and, why not 6-phase?   [6]

OR

Q.1 (a) Explain Kelvin's law and discuss limitations of Kelvin's law.   [8]

    (b) Discuss, why AC transmission circuit are three phase three wire but AC distribution circuit are three phase four wire?   [8]

UNIT- II

Q.2 (a) An overhead line, over a river crossing is supported by two towers 50 M and 80 M above water level, the horizontal span is 300 m. The weight of conductor is 8.25 N/m and the tension in the conductor is 19620 N. Find the height of midpoint of the line above water level.   [8]

    (b) What is a stringing chart? How can it be prepared? What is its use?   [8]

OR

Q.2 (a) Find the maximum sag of a line with copper conductor 7/0.295 cm size, area 0.484 cm², overall diameter 0.889 cm, weight 428 kg/km and breaking strength 1973 kg. Use a safety factor of 2; span 200 m and level supports - [10]

(i) Due to weight of conductor

(ii) Due to additional weight of ice loading of 1 cm thickness.

(b) Explain conductor vibration and also the methods to damp out these vibrations. [6]

UNIT- III

Q.3 (a) A 3-phase 132 kV, 50 Hz overhead line has ACSR conductors of equivalent copper area 1.5cm² and effective diameter 39.8 mm, spaced equilaterally 8m apart - [8]

(i) Find line parameters

(ii) Find charging current it resistivity of copper is 1.73×10^{-6} ohm-m.

(b) What is the effect of using bundled conductors on line inductance? And, how to calculate GMD? [8]

OR

Q.3 (a) Explain the inductance of three phase line with unsymmetrical spacing. [8]

(b) Explain skin effect in transmission line. Why skin effect occurs in Transmission line? Discuss factor affecting skin effect. [8]

UNIT- IV

Q.4 (a) A 3-Phase 200 km long high voltage line has z = 14.1 + j 51.48 ohms and $y = 0 + j\,1.194 \times 10^{-3}$ siemens. Find the characteristic impedance, propagation constant and constants A, B and C for the line. [8]

(b) What is corona loss? Why is it different in different weather conditions? Also, define radio interference due to corona. [8]

OR

Q.4 (a) Find the disruptive critical voltage and visual corona voltage for a 3-Phase, 220 kV line consisting of 22.26 mm diameter conductors spaced in a 6 m delta configuration. The following data can assume temperature 25°C, pressure 73 cm of mercury, surface factor 0.84, irregularity factor for local corona 0.72, irregularity factor for general (decided) corona 0.82. [8]

(b) Find ABCD constants of a Π circuit having a 500 ohm resistance for the shunt branch at the sending end, 1000 ohm resistance for the shunt branch at the receiving end and 100 ohm resistance for the series branch. [8]

UNIT- V

Q.5 (a) In a 5 insulator disc string capacitance between each unit and earth is $\frac{1}{6}$ of the mutual capacitance. Find the voltage distribution across each insulator in the string as percentage of voltage of the conductor to earth. Find string efficiency. How is this efficiency affected by rain? [10]

(b) Explain breakdown of Cables and its types. [6]

OR

Q.5 (a) Explain the various methods for equalizing the potential across the various units in a insulator string. [8]

(b) Explain various types of cables and which is the most commonly used insulating material for cables and why? [8]

Roll No. _____   Total No. of Pages: 3

5E5047

B. Tech. V - Sem. (Back) Exam., January - 2022
Electrical Engineering
5EE6.2A Principle of Communication Systems
Common for EE, EX

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

Instructions to Candidates:

*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. NIL _____   2. NIL _____

UNIT- I

Q.1 (a) Derive an expression of noise figure for an amplifier.   [10]

   (b) An amplifier operating over the frequency range from 18MHz to 20MHz has a 10kΩ input resistance. Calculate the rms noise voltage at the input to this amplifier if the ambient temperature is 27°C.   [6]

OR

Q.1 (a) A parallel tuned circuit is made to resonate at a frequency of 100 MHz. It uses a coil having a quality factor 'Q' of 10 and a capacitance of 10pF. The temperature of the circuit is maintained at 17°C. Determine the output voltage across the circuit measured by a wide band voltmeter.   [8]

   (b) Describe the effect of noise in networks with reactive elements.   [8]

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UNIT- II

Q.2 (a) Explain the working of ring modulator for generation of DSB-SC signal. [8]

(b) Derive an expression of total transmitted power relating carrier, lower side band and upper side band powers for conventional AM wave. [8]

OR

Q.2 (a) The antenna current of an AM transmitter is 10A when it is modulated to a depth of 30% by an audio signal. It increases to 11A when another signal modulates the carrier signal. What will be the modulation index due to second signal? [8]

(b) What is frequency translation? Explain the need of modulation. [8]

UNIT- III

Q.3 (a) A single tone FM is represented by the voltage equation as- [8]

$V(t) = 12 \cos (6 \times 10^8 t + 5 \sin 1250 t)$

Determine the following –

(i) Carrier frequency

(ii) Modulating frequency

(iii) Modulation index

(iv) Maximum deviation

(v) What power will this FM wave dissipate in 10Ω resistor?

(b) Compare AM, FM and PM. [8]

OR

Q.3 (a) Explain the armstrong method of FM generation. Compare the Narrow Band FM and Wide Band FM. [8]

(b) Explain the following terms for FM wave – [4]

(i) Frequency deviation

(ii) Carrier swing

(c) Discuss the generation of FM using phase modulator and PM using frequency modulator with the help of block diagrams. [4]

UNIT- IV

Q.4 (a) Calculate the figure of merit γ for a DSB-SC system. [8]

(b) Derive an expression for calculating noise in an envelope detector. [8]

OR

Q.4 (a) Calculate the figure of merit γ for a SSB receiver. [8]

(b) Calculate the $(\frac{S}{N})$ ratio for any one type of FM demodulation. [8]

UNIT- V

Q.5 (a) Compare PAM, PPM and PWM. [10]

(b) Find the nyquist rate and nyquist interval for the signal - [6]

$x(t) = \frac{1}{2\pi} \cos(4000\pi t) \cos(1000\pi t)$

OR

Q.5 (a) State and prove sampling theorem. [8]

(b) Explain the working of PAM modulator and demodulator with neat diagram. [8]