3E1653

Roll No. _____ Total No of Pages: 4

3E1653

B. Tech. III - Sem. (Main / Back) Exam., Dec. - 2018
Electronic Instrumentation & Control Engineering
3EI3A Digital Electronics
EE, EX, EC, EI, CS, IT, AI

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 26

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) Find the unknown number – [4×2=8]

(i) $(123)_{10} + (?)_{10} = (BA)_{16}$

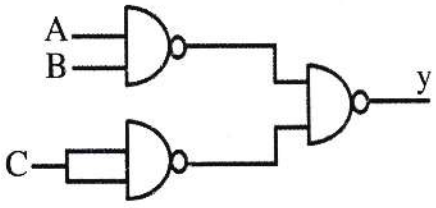
(ii) $(11000)_2 + (143)_8 = (?)_{10}$

(iii) $(1A)_{16} + (342)_8 = (\ )_4$

(iv) $(?)_2 + (102)_8 = (420)_{16}$

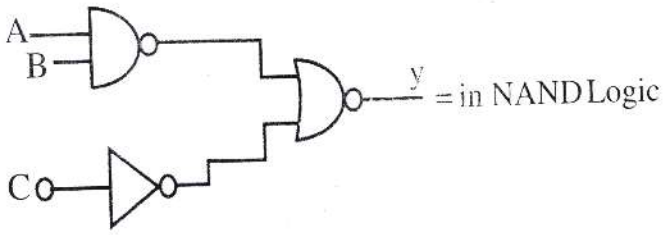
(b) Convert following – [2+2+4=8]

(i)

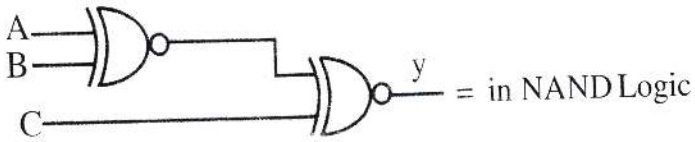


= in NOR Logic

(ii)



(iii)



OR

Q.1 (a) Convert following – [4×2=8]

(i) (1010) gray code → into excess – 3 code

(ii) $(1.204)_{10} = (\ )_2$

(iii) $(0.001)_2 + (1000)_8 = (\ )_{16}$

(iv) $(242)_8 + (2.42)_8 = (\ )_2$

(b) Define following – [4×2=8]

(i) Sign representation in Binary no.

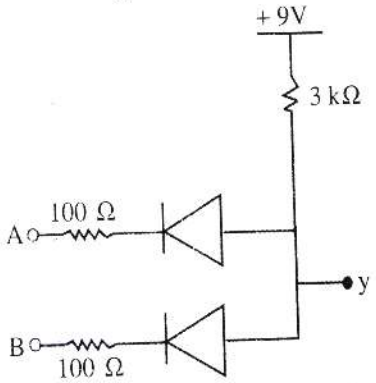
(ii) Negative logic

(iii) Universal logic

(iv) Fixed point representation

UNIT- II

Q.2 (a) Calculate the logic level for high and low output in logic circuit (fig – 2 (i)) [8]



Assume the diode drop is 0.7 volt and the standard input logic level are

0 → 0 volt

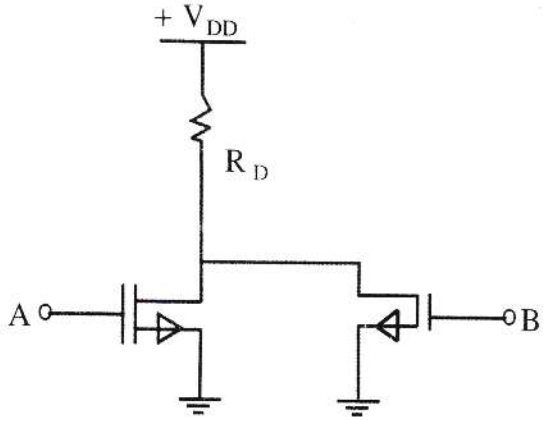
1 → 9 volt

Also explain the logic perfumed by this circuit.

(b) Explain the logic perfumed by the MOSFET circuit Fig – 2 (ii). Also discuss about the high and low voltage levels in this logic under following conditions- [8]

(i) $R_D = 100\ \Omega$ (Very Small)

(ii) $R_D = 100\ M\Omega$ (Very High)



OR

Q.2 (a) What is HTL? Design a 2 – input AND HTL gate to achieve noise margin of 2.5 volt. [8]

(b) Draw the circuit diagram of I^2L logic and explain its working. Where these logics are preferable? [8]

UNIT- III

Q.3 (a) Draw K – map for following and find the minimized logic expression for output. [4+4=8]

(i) $y = \Sigma m\ (2, 5, 6, 8, 12, 13, 14) + d\ (3, 9)$

(ii) $y = \pi\ m\ (0, 1, 2, 7) + d\ (4, 5)$

(b) Minimize following – [4+4=8]

(i) $y = \overline{(A + B)(\bar{C} + D)} + \overline{A\bar{B}C}$ using simplification.

(ii) $y = \Sigma\ (0, 1, 2, 6, 7)$ using Quine – McCluskey method.

OR

Q.3 (a) In a 4 – variable K – map there are following groups formed. [8]

(i) 2 – Quad (four entries)

(ii) 2 – two entries group.

Write all possible minimized logic expressions for it.

(b) Express following in – [2×2=4]

(i) $y = AB(\bar{C} + D)$ in POS

(ii) $y = (A + B) + \bar{C}D$ in SOP

(c) Discuss the role of don't care conditions in minimization. [4]

UNIT- IV

Q.4 (a) Draw the Block diagram of a serial 4 bit adder and calculates its total time taken in addition in terms of clocks. [8]

(b) Implement a 16 × 1 mux in terms of 2 × 1 mux. Also estimate its total delay from input to output. Compare this delay with a direct implementation of 16 × 1 Mux. [8]

OR

Q.4 (a) Design an octal to binary converter. [8]

(b) Draw the circuit diagram of a 2 bit multiplier. [8]

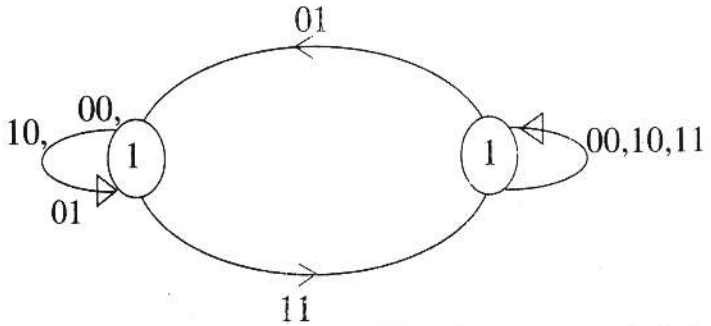
UNIT- V

Q.5 (a) Draw Synchronous Modulo – 7 Counter and explain its working. [8]

(b) Design a counter that count from 0 – 12 but skip 6, 7 and 9. [8]

OR

Q.5 (a) Draw the logic circuit for the state diagram given in fig – 5 [8]



(b) Draw state diagram of a JK and D – FF. Also discuss their inter conversion. [8]

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3E1654

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3E1654

B. Tech. III - Sem. (Mercy Back) Exam., Dec. - 2018
Computer Science & Engineering
3CS5A Object Oriented Programming
EE, EX, CS, IT

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) Write a short note on structure in C. Explain pointer to structures. [8]

(b) Explain structure as user defined data types. [8]

OR

Q.1 (a) Explain the difference between structure and union in C. [8]

(b) Differentiate between structures of C and class of C++. [8]

UNIT- II

Q.2 (a) Explain container classes and proxy classes. [8]

(b) What do you mean by a class? Explain data and function members. [8]

OR

Q.2 (a) Explain OOP with suitable example. [6]

(b) What do you mean by data hiding and encapsulation explain in brief. [10]

UNIT- III

Q.3 (a) Explain the requirement of constructors and destructors. [8]

(b) Explain operator overloading with example. [8]

OR

Q.3 (a) Write the difference between operator functions and friend functions. [8]

(b) Write C++ code to demonstrate binary operators. [8]

UNIT- IV

Q.4 (a) Explain virtual functions with example. [8]

(b) Explain dynamic binding with example. [8]

OR

Q.4 (a) Explain various types of Inheritance. [12]

(b) Differentiate between public, private and protected inheritance. [4]

UNIT- V

Q.5 (a) What do you mean by virtual base classes. Explain with example. [8]

(b) Explain pointer to classes and class members. [8]

OR

Q.5 (a) Write short notes on:

(i) Templates [8]

(ii) Exception Handling. [8]

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3E1655

Roll No. _____ Total No of Pages: 3

3E1655

B. Tech. III - Sem. (Mercy Back) Exam., Dec. - 2018
Computer Science & Engineering
3CS4A Linux and Shell Programming
CS, IT

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 method to change the permission for a file and directory. [8]

(b) Explain the open source technology. [8]

OR

Q.1 Explain following commands with example: [4×4=16]

(a) echo

(b) who

(c) sort

(d) grep

UNIT- II

Q.2 (a) Explain vi editor with example of different modes. [8]

(b) Explain programming utilities with examples. [8]

OR

Q.2 Write short note on:

(a) Advance editing techniques [8]

(b) System call. [8]

UNIT- III

Q.3 (a) Explain X–window system with architecture diagram. [8]

(b) Explain the concept of window manager in detail. [8]

OR

Q.3 (a) Explain Customize-x work environment. [8]

(b) How can we customize the fvwm window manager? [8]

UNIT- IV

Q.4 Explain meaning and purpose of shell. How many types of shell used in Linux OS. [16]

OR

Q.4 (a) Explain command line, standard input and standard output in detail. [8]

(b) Explain parameters and variables. [8]

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UNIT- V

Q.5 Write short note on:

(a) 'Here' document [8]

(b) Control structure. [8]

OR

Q.5 (a) What is the difference between RCS and CVS? [8]

(b) Explain awk utility. [8]

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3E1656

Roll No. _____ Total No of Pages: 4

3E1656

B. Tech. III - Sem. (Back) Exam., Dec. - 2018

Computer Science & Engineering

3CS6A Advanced Engineering Mathematics - I

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) Obtain the extreme points of (if any) – [8]

$f = x_1^3 + x_2^3 + 2x_1^2 + 4x_2^2 + 6$

(b) Find the dimensions of a box of largest volume that can be inscribed in a sphere of unit radius. [8]

OR

Q.1 (a) Determine the value of x for which the function [8]

$f(x) = x_1^2 + x_2^2 + x_3^2 - 4x_1 - 8x_2 - 12x_3 + 56$

assume the optimum value.

(b) Determine the optimal solution for the following NLPP [8]

$Z = x_1^2 - 10x_1 + x_2^2 - 6x_2 + x_3^2 - 4x_3$

subject to $x_1 + x_2 + x_3 = 7$, $x_1, x_2, x_3 \geq 0$

UNIT- II

Q.2 (a) Solve the following LPP graphically [8]

$$\text{Max } Z = 5x_1 + 3x_2$$

subject to $3x_1 + 5x_2 \leq 15$

$$5x_1 + 2x_2 \leq 10$$

$$x_1, x_2 \geq 0$$

(b) Use Big-M method to solve the following LPP [8]

$$\text{Max } Z = -2x_1 - x_2$$

subject to $3x_1 + x_2 = 3$

$$4x_1 + 3x_2 \geq 6$$

$$x_1 + 2x_2 \leq 4 \ , x_1, x_2 \geq 0$$

OR

Q.2 (a) Use duality to solve the following LPP [8]

$$\text{Min } Z = 10x_1 + 6x_2 + 2x_3$$

Subject to $-x_1 + x_2 + x_3 \geq 1$

$$3x_1 + x_2 - x_3 \geq 2 \ , x_1, x_2, x_3 \geq 0$$

(b) Obtain the optimal solution to the following transportation problem [8]

	D_1	D_2	D_3	Supply
S_1	2	7	4	5
S_2	3	3	1	8
S_3	5	4	7	7
S_4	1	6	2	14
Demand	7	9	18	

UNIT- III

Q.3 (a) Find the remainder when 16^{53} is divided by 7. [8]

(b) Prove that the set $G = \{0,1,2,\ldots,m-1\}$ of m non-negative integers is a finite abelian group under the operation of addition modulo m. [8]

OR

Q.3 (a) Define the following- [4×2=8]

(i) Greatest common divisors

(ii) Euclidean Algorithm

(iii) Congruence

(iv) Rings

(b) Prove that order of a cyclic group is equal to order of its generating element. [8]

UNIT- IV

Q.4 (a) Find Laplace Transform of $\left(\frac{1-\cos t}{t^2}\right)$. [8]

(b) Use Laplace Transform to solve the following equation [8]

$(D^2 - 3D + 2)x = 1 - e^{2t}$, x (0) = 1, x′(0) = 0

OR

Q.4 (a) Use convolution theorem to find [8]

$L^{-1}\left\{\frac{1}{s^2(s+1)^2}\right\}$

(b) Solve $\frac{\partial^2 y}{\partial t^2} = 9\frac{\partial^2 y}{\partial x^2}$, given y (0, t) = 0 = y (2, t) [8]

y (x, 0)=20 sin 2πx-10 sin 5πx and y(x,0) = 0

UNIT- V

Q.5 (a) Use stirling formula to find U_{32} from the following values [8]

U_{20}= 14.035, U_{25} = 13.674, U_{30}=13.257

U_{35} = 12.734, U_{40} = 12.089, U_{45} = 11.309

(b) Evaluate $\int_0^{\pi/2} \sqrt{\cos\theta d\theta}$ by dividing the interval into eight equal parts. [8]

OR

Q.5 (a) Given $\frac{dy}{dx} = x^2 + y$, $y(0) = 1$ [8]

Determine y (0.02), y (0.04) using the modified method of Euler's.

(b) Describe Milne's predictor-corrector method. Apply the method to find a solution of differential equation [8]

$$\frac{dy}{dx} = x - y^2$$

for next value of x.

Given y (0) = 0, y (0.2) = 0.02, y (0.4) =0.0795 y (0.6) = 0.1762

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3E2078

Roll No. _____ Total No of Pages: 2

3E2078

B. Tech. III - Sem. (Back) Exam., Dec. - 2018
Computer Science & Engineering
3CS6.3 (O) Elective – Management Information Systems
CS, IT

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 26

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) Define MIS. Explain the role of MIS in an organization. [8]

(b) What is security and what challenges does it face. Explain in detail. [8]

OR

Q.1 (a) Explain E-business and E-collaboration. [10]

(b) Explain in detail E-communication. [6]

UNIT- II

Q.2 (a) Define decision making. Explain major characteristics of decision making. [8]

(b) Describe object oriented analysis. [8]

OR

Q.2 (a) Explain the role of Business process re-engineering in MIS. [8]

(b) What is knowledge? How it is different from information. [4]

(c) How object oriented technology and MIS related? [4]

UNIT- III

Q.3 (a) Describe role of MIS in Financial Management. [8]

(b) Explain MIS application in service sector with example. [8]

OR

Q.3 (a) Explain the application in manufacturing sector using 'Personal Management'. [8]

(b) Identify distinguishing feature of MIS in service industry as against manufacturing industry. [8]

UNIT- IV

Q.4 (a) Explain the implementation of ERP in brief. [8]

(b) What is EMS? Describe the components of EMS. [8]

OR

Q.4 Explain the application of SAP technology in manufacturing sector. [16]

UNIT- V

Q.5 (a) Explain client server architecture and its implementation. [8]

(b) Write down the various uses and concept of Data Warehouse with the help of diagram. [8]

OR

Q.5 (a) Explain Electronic Payment System and web enabled business management. [8]

(b) Explain architecture of data warehouse in detail. [8]

3E1141

Roll No. _____ Total No of Pages: 3

3E1141

B. Tech. III - Sem. (Main) Exam., Dec. - 2018
BSC Electrical & Electronics Engineering
3EX2 – 01 Advance Mathematics
EE, EX

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

Instructions to Candidates:

Attempt all ten questions from Part A, selecting five questions from Part B and four questions 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 If $f(x) = x^3 - 3x^2 + 5x + 7$, find $\Delta^2 f(x)$ when $x = 1$

Q.2 Prove that –

$$\Delta \log f(x) = \log \left(1 + \frac{\Delta f(x)}{f(x)}\right).$$

Q.3 Find the Laplace transform of sin 2t cos 3t.

Q.4 Find the inverse Laplace transform of $\frac{3(s^2-1)^2}{2s^5}$.

Q.5 Find Fourier sine transform of $\frac{1}{x}$.

Q.6 Find the Z – transform of discrete unit step –

$$U(k) = \begin{cases} 0 & k < 0 \\ 1 & k \geq 0 \end{cases}$$

Q.7 Find the inverse Z – transform of $\frac{1}{z-2}$ when $|z| < 2$.

Q.8 Show that the function $e^x (\cos y + i \sin y)$ is an analytic function.

Q.9 Define Mobius transformation.

Q.10 Show that the function $x^2 - y^2 + 2y$ is harmonic.

PART – B

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

Attempt any five questions

Q.1 Using Lagrange's interpolation formula, find the value of y when x = 10 from the following table –

x	5	6	9	11
y	12	13	14	16

Q.2 Evaluate $\int_0^1 \frac{dx}{1+x^2}$ using Simpson's rule.

Q.3 Find the real root of the equation $x^4 - x - 9 = 0$ by Newton Raphson method, correct to three places of decimal.

Q.4 Find the inverse Laplace transform of $\frac{s}{(s^2+a^2)^2}$.

Q.5 Find Z – transform of sin (3k +5).

Q.6 Find the Fourier transform of $f(x) = \begin{cases} 1 - x^2 & \text{if } |x| < 1 \\ 0 & \text{if } |x| > 1 \end{cases}$

Q.7 Construct the analytic function f (z) of which the real part is $e^x \cos y$.

PART – C

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

Attempt any four questions

Q.1 A slider in a machine moves along a fixed straight rod. Its distance x cm along the rod is given below for various values of the time t second. Find the velocity and acceleration of the slider when t = 0.3 sec.

t (sec):	0	0.1	0.2	0.3	0.4	0.5	0.6
x (cm):	30.13	31.62	32.87	33.64	33.95	33.81	33.24

Q.2 Find real root of the equation $x \log_{10} x = 1.2$ by using Bisection method correct to 3 decimal places.

Q.3 State and prove convolution theorem for Laplace transform.

Q.4 Find the Fourier cosine transform of e^{-x^2} .

Q.5 If f (z) is a regular function of z, then prove that –

$$\left(\frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2}\right) | f(z) |^2 = 4 | f'(z) |^2$$

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3E1142

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3E1142

B. Tech. III - Sem. (Main) Exam., Dec. - 2018
ESC Electrical & Electronics Engineering
3EX3 – 04 Power Generation Process
EE, EX

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

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 the function of combustion chamber in gas power plant?

Q.2 How fertile material can be used for power generation in nuclear plant?

Q.3 Name the different types of solar collector for solar thermal energy conversion system?

Q.4 What is the effect of load factor on unit generation cost?

Q.5 Where are shunt capacitors located?

PART – B

(Analytical/Problem solving questions) **[4×10=40]**

Attempt any four questions

Q.1 Draw key diagram of a thermal (coal fired) power plant? Explain the advantages of pulverized coal.

Q.2 What is breeding ratio for fertile atoms used in nuclear process? Explain any type of nuclear reactor with diagram indicating name of components.

Q.3 What is the necessity of long and short term load forecasting? Write the differences between chronological load curve and load duration curve?

Q.4 How can most economic power factor and KVAR of capacitor be calculated? Compare the advantages and disadvantages of using a synchronous condenser and a capacitor for power factor improvement.

Q.5 Discuss the role of load factor on the cost of electrical energy. Why should the total generation cost per unit of thermal energy depend on the station load factor? Draw a typical curve showing this variation and justify its shape.

Q.6 Discuss the factors which tend to limit the size of units in steam plants. Distinguish between operating reserve and spinning reserve.

PART – C

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

Attempt any two questions

Q.1 Explain the functions of various components of a thermal power plant?

Q.2 Explain causes and effects of low power factor and advantages of power factor improvements.

Q.3 Explain Indian energy scene and give detail of planning for conservation of natural resources and sustainable energy systems.

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3E1143

B. Tech. III - Sem. (Main) Exam., Dec. - 2018

PCC Electrical & Electronics Engineering

3EX4-05 Electrical Circuit Analysis

EE, EX

: 3 Hours Maximum Marks: 120

uctions to Candidates:

Attempt all ten questions from Part A, selecting five questions from Part B and four questions 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)

L 2. NIL

PART – A

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

All questions are compulsory

Define effective or RMS values of AC circuit. [2]

Explain initial and final conditions in network element. [2]

Explain Norton's theorem in network. [2]

Define and explain coupling coefficient between two mutually coupled coils. [2]

Define the concept of duality and dual networks. [2]

Derive an interrelationship between Z – parameter is terms of h – parameter. [2]

Q.7 Write the condition of symmetry and reciprocal network for ABCD and h – parameter. [2]

Q.8 Write the necessary condition of stability of a network function. [2]

Q.9 Write a short note on a series RLC circuit resonance. [2]

Q.10 State and explain maximum power transfer theorem. [2]

PART – B

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

Attempt any five questions

Q.1 In the fig (1) shown below switch k is closed at position A at t = 0, the switch is moved to position B. Find the current in both the cases. [8]

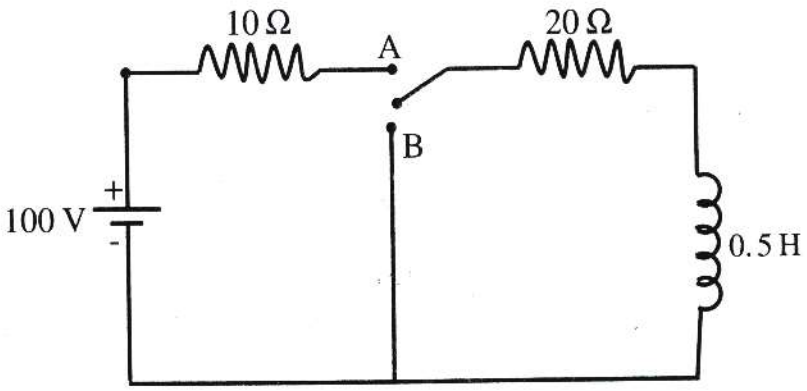

Fig (1)

Q.2 In the fig (2) shown below find the following – [8]

(a) Current

(b) Voltage across each element

(c) Power factor of the circuit

(d) Power consumed [2]

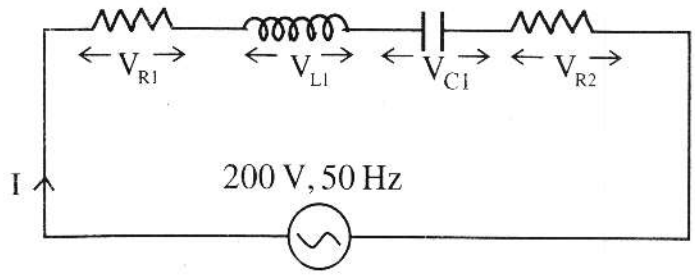

Fig (2)

Q.3 Use superposition theorem to determine the voltage 'V' in the circuit as shown in fig (3). [8]

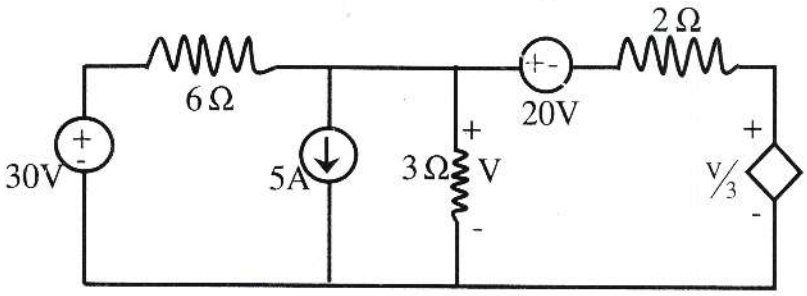

Fig (3)

Q.4 Find the resonant frequency for the parallel circuit shown in fig (4) [8]

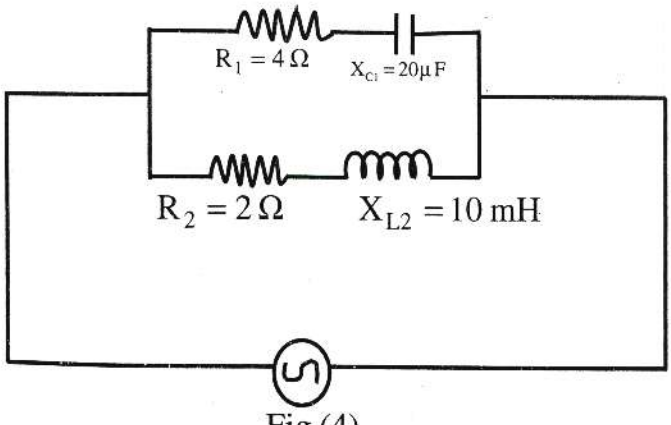

Fig (4)

Q.5 Find the current in a series R – L circuit having R = 2 Ω and L = 10 H while a DC voltage of 100 V is applied. What is the value of current after 5 sec of switching on? [8]

Q.6 The Z – parameter of a two port network are Z_{11} = 10 ohms, Z_{22} = 20 ohms, $Z_{12} = Z_{21}$ = 5 ohms. [8]

(a) Find ABCD parameter of this two port network.

(b) Also find its equivalent T – network.

Q.7 Find the net impedance for the central mesh and then find the input impedance of the circuit shown in fig 5. [8]

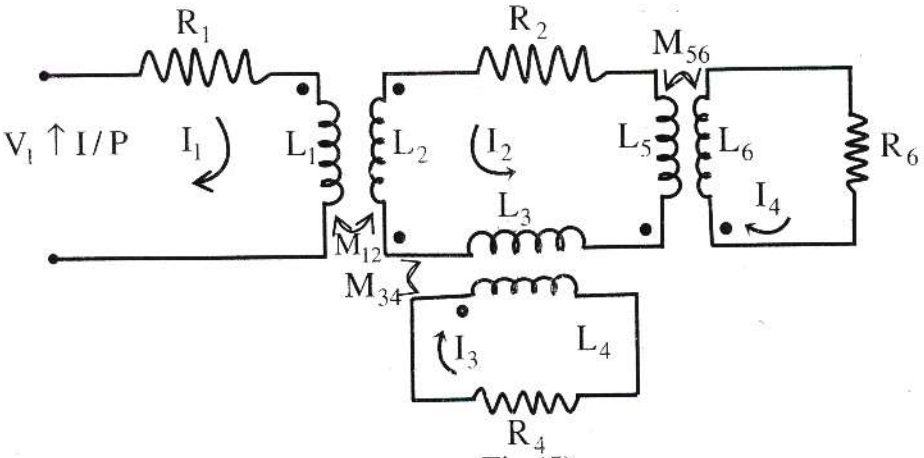

Fig (5)

PART – C

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

Attempt any four questions

Q.1 State and explain Thevenin's theorem. Find the current through 1.6 Ω resistor using Thevenin's theorem. [15]

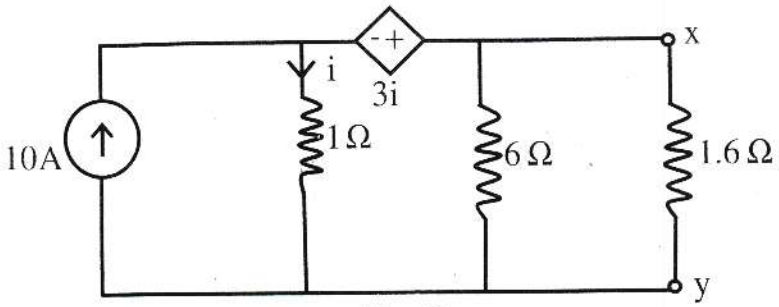

Fig (6)

Q.2 (a) Find the transient responses of series RL and RC circuit having sinusoidal excitation. [7]

(b) Consider the RLC parallel circuit shown in fig (7) below. I_s = 2A: R = $\frac{1}{16}\Omega$; L = $\frac{1}{16}$H ; C = 4 F. Determine $v(o^+)$, $\frac{dv(o^+)}{dt}$, $\frac{d^2v(o^+)}{dt^2}$ and v(+). [8]

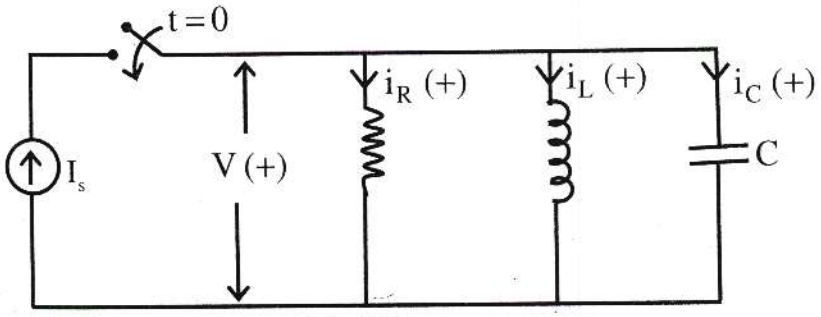

Fig (7)

Q.3 (a) Describe briefly the generation of alternating voltage and current and deduce the equation for alternating emf. [7]

(b) Find the conductively coupled equivalent circuit as shown in fig (8). [8]

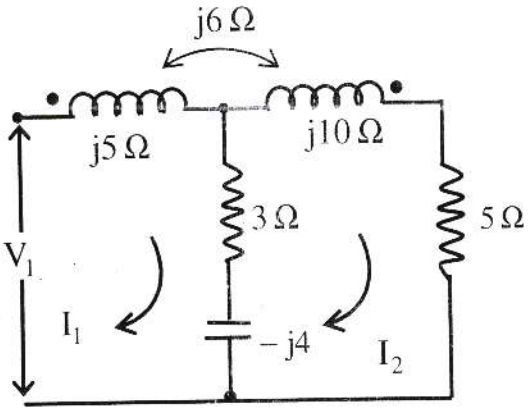

Fig (8)

Q.4 (a) Find the expression for step response for RL series circuit. [7]

(b) A function in Laplace domain is given by $F(s) = \frac{2(s+4)}{(s+3)(s+8)}$. Find the initial and final value by initial and final value theorem. [8]

Q.5 (a) Determine the Laplace transform of the periodic square waveform. [7]

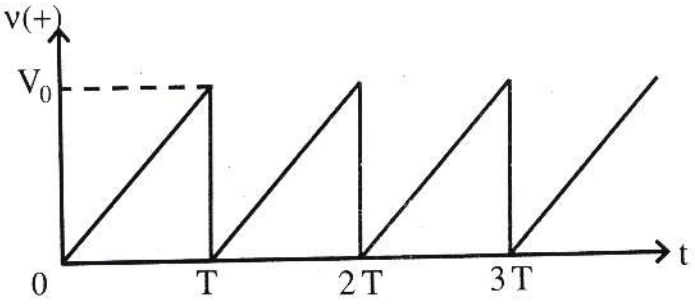

Fig (9)

(b) In the network of fig (10), Find [8]

(i) Z – parameter

(ii) Y – parameter

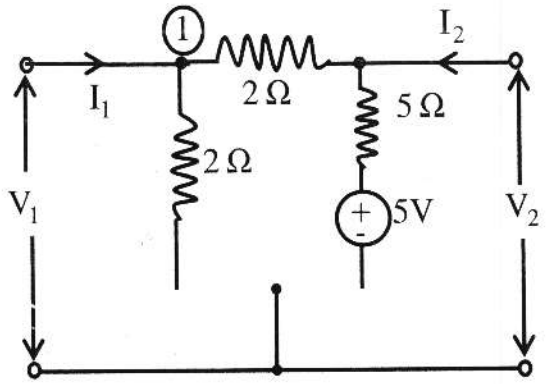

Fig (10)

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3E1144

Roll No. _____ Total No of Pages: 4

3E1144

B. Tech. III - Sem. (Main) Exam., Dec. - 2018
PCC Electrical & Electronics Engineering
3EX4 – 06 Analog Electronics
EE, EX

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

Instructions to Candidates:

Attempt all ten questions from Part A, selecting five questions from Part B and four questions 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 On the basis of electronic properties, how can you differentiate between Si & GeAs. [2]

Q.2 With reference to semiconductor diode, explain depletion layer & knee voltage. [2]

Q.3 What are the 3-regions of operations of MOS-transistor? [2]

Q.4 Explain Slew rate & Band-width for Ideal OP-AMP. [2]

Q.5 What are the limitations of open loop configuration of OP-AMP for linear applications? [2]

Q.6 What is a feedback? [2]

Q.7 Differentiate Oscillator & amplifier. [2]

Q.8 What is the Q-point in transistor? [2]

Q.9 Compare the active & passive filters. [2]

Q.10 Why is collector wider than emitter? [2]

PART – B

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

Attempt any five questions

Q.1 What is P-N function? How it is formed. Draw & explain the V-I characteristics of function diode. [8]

Q.2 Draw the circuit of full-wave rectifier using 2-diodes & calculate- [8]

(a) Idc

(b) Irms

(c) PIV rating of diode.

Q.3 What is Early effect? Explain how it effects the BJT characteristics in CB configuration. [8]

Q.4 Explain the following regions in a transistor- [8]

(a) Active

(b) Saturation

(c) Cut-off.

Q.5 What is differential amplifier? Why are differential amplifiers preferred over single ended amplifier? [8]

Q.6 Design a Wein bridge Oscillator that will oscillate at 2KHZ. [8]

Q.7 Explain the working of a MOSFET along with its construction with neat sketch. [8]

PART – C

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

Attempt any four questions

Q.1 (A) A Si diode has a saturation current of 5μA at room temperature of 300°k. Determine its value at 400°K. [7]

(B) Draw the characteristics of a p-n function diode with proper Voltage and Current labels & regions of forward & reverse bias. [8]

Q.2 (A) A BJT has a base current of 200μA & emitter current of 20mA. Determine collector current & β. [8]

(B) Draw the Ckt diagram of CE configuration. Sketch the o/p characteristics & indicate the active, saturation & cut-off region. [7]

Q.3 (A) Define 'Current Controlled device' & 'Voltage Controlled device'. [7]

(B) Define the following electrical parameters- [8]

(i) I/P offset voltage

(ii) CMRR

(iii) Slew Rate

(iv) I/P bias current

Q.4 (A) Design a wide band pass filter with f_L = 200HZ, f_H = 1KHZ & passband gain = 4 [5]

(B) Draw the frequency response plot of this filter. [5]

(C) Calculate the value of Q for the filter. [5]

Q.5 (A) What is the difference between A/D & D/A converters? Give one application of each. [7]

(B) Design a phase shift Oscillator so that f_O = 1KHZ. [8]

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3E1145

Roll No. _____ Total No of Pages: 3

3E1145

B. Tech. III - Sem. (Main) Exam., Dec. - 2018
PCC Electrical & Electronics Engineering
3EX4 – 07 Electrical Machine - I
EE, EX

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

Instructions to Candidates:

Attempt all ten questions from Part A, selecting five questions from Part B and four questions 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 is mmf and flux?

Q.2 State Bio-Savart law.

Q.3 What is the importance of electromagnet in machine?

Q.4 What is working principle of DC motor?

Q.5 Explain the B-H curve of magnetic materials.

Q.6 Enumerate the advantages and disadvantages of armature voltage control method.

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Q.7 Enumerate various losses in d.c. machines.

Q.8 Explain the working of commutator in d.c. machine.

Q.9 What is autotransformer and its applications?

Q.10 What is harmonics in transformer?

PART – B

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

Attempt any five questions

Q.1 Enumerate the influence of highly permeable material on the magnetic flux lines.

Q.2 Discuss the energy stored in the magnetic circuit.

Q.3 Explain the basic construction of D.C. machine with relevant diagram.

Q.4 Find the active and reactive components of no load current, and the no load current of a 440/220 V single phase transformer if the power input to the high voltage winding is 80 w. The low voltage winding is kept open. The power factor of the no load current is 0.3 lagging.

Q.5 Describe the operation of single phase transformer, explaining clearly the functions of the different parts. Why are the core laminated?

Q.6 Draw and explain torque-speed characteristics of dc series motor.

Q.7 Enumerate the comparison of autotransformer with two winding transformers.

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PART – C

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

Attempt any four questions

Q.1 Discuss the visualization of magnetic fields produced by a bar magnet and a current carrying coil through air and through a combination of iron and air.

Q.2 Compare linear and non-linear magnetic circuit and also discuss the flux linkage versus current characteristics of magnetic circuits.

Q.3 What is armature reaction? Describe the effect of armature reaction on the operation of dc machines. How the armature reaction is minimized.

Q.4 Draw and explain speed-current, torque-current and speed-torque characteristics of dc shunt motor.

Q.5 Draw the complete phasor diagram of an ideal transformer on load when load power factor is lagging and derive the emf equation of transformer.

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3E1146

Roll No. _____ Total No of Pages: 3

3E1146

B. Tech. III - Sem. (Main) Exam., Dec. - 2018
PCC Electrical & Electronics Engineering
3EX4-08 Electromagnetic Field
EE, EX

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

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 Find the unit vector along the line joining point (2, 4, 4) to point (- 3, 2, 2). [2]

Q.2 Express the following points in cylindrical coordinates : [2]

(a) P (1, - 4, - 3)

(b) Q (3, 0, 5)

Q.3 State Gauss's law. [2]

Q.4 State Biot Savart's law. [2]

Q.5 Write down Maxwell's equations for time – varying fields. [2]

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PART – B

(Analytical/Problem solving questions) **[4×10=40]**

Attempt any four questions

Q.1 (a) State the gradient, divergence and curl theorems along with their implications. [5]

(b) Check the stock's theorem for the function – [5]

$\vec{F} = xy\,\hat{x} + 2yz\,\hat{y} + 3\,zx\,\hat{z}$ Using a triangular area whose corners are located at (0, 0, 0), (0, 2, 0) and (0, 0, 2)

Q.2 (a) Derive an equation for calculating the capacitance of a coaxial cable. [5]

(b) Write short note on method of Images. [5]

Q.3 In free space, the magnetic flux density is – [10]

$$B = y^2\,ax + z^2\,ay + x^2\,az\ wb/m^2$$

(a) Show that B is a magnetic field.

(b) Find the magnetic flux through $x = 1,\ 0 < y < 1,\ kz < 4$.

(c) Calculate J.

Q.4 Derive the expression for attenuation constant & phase constant for Lossy dielectric that is – [10]

$$\propto = w\sqrt{\frac{\mu\epsilon}{2}\left[\sqrt{\left[1+\frac{\sigma}{\omega\epsilon}\right]^2}-1\right]}$$

$$B = w\sqrt{\frac{\mu\epsilon}{2}\left[\sqrt{\left[1+\frac{\sigma}{\omega\epsilon}\right]^2}+1\right]}$$

Q.5 State and explain Ampere's Law. A solid cylindrical conductor of radius R has a uniform current density. Derive expression for H both inside and outside of the Conductor. Plot the variation approximately of H as a function of radial distance from the Centre of wire. [10]

Q.6 Derive modified Maxwell's equation as – [10]

$$\nabla \times E = -\frac{\partial B}{\partial t}$$

$$\nabla \times H = J + \frac{\partial D}{\partial t}$$

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PART – C

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

Attempt any two questions

Q.1 A manufactures produces a ferrite material with $\mu = 750\,\mu_0$, $\epsilon = 5\,\epsilon_0$, and $\sigma = 10^{-6}$ s/m at 10 MHz - [15]

(a) Would you classify the material as lossless, lossy, or conducting?

(b) Calculate β and λ.

(c) Determine the phase difference between two points separated by 2m.

(d) Find the intrinsic impedance.

Q.2 (a) What is uniform plane waves? Show that the field in the uniform plane wave is independent of two dimensions. [8]

(b) What is the continuity equation? Derive it from the basics and describe all its forms. [7]

Q.3 (a) Derive the expression for the field intensity due to a circular sheet charge and then extend it to find the field due to an infinite plane sheet charge. [8]

(b) Determine the value of electric flux density from a uniformly charged sphere and sketch the $\vec{D}$ versus r. [7]

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3E1641

Roll No. _____ Total No of Pages: 4

3E1641

B. Tech. III - Sem. (Main / Back) Exam., Dec. - 2018
Electronic Instrumentation & Control Engineering
3EI1 Electronic Devices & Circuits
Common to EE, EC & EIC

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 24/26

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) Sketch the energy – band picture for- [6]

(i) An intrinsic

(ii) An N – type,

(iii) A p – type semiconductor. Indicate the positions of the fermi, the donor, and acceptor levels.

(b) Find the conductivity of intrinsic Ge at 300° K. If donor type impurity is added to the extent of 1 impurity atom in 10^7 germanium atoms, find the conductivity. Give that n_i at 300° K is $2.5\times10^{13}/cm^3$ and μ_n and μ_p in germanium are 3800 and 1800 cm^2/v-s respectively and the concentration of Ge atoms = 4.41×10^{22} cm^{-3}. [10]

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OR

Q.1 (a) Explain Hall Effect in semiconductors. [5]

(b) Write the equation of continuity for electrons. Explain the physical meaning of each term. [5]

(c) In an N – type semiconductor, the Fermi – level lies 0.3 ev below the conduction band at 27°C. If the temperature is increased to 55° C, find the new position of the Fermi – level. [6]

UNIT- II

Q.2 (a) Explain the following term in context with a semiconductor diode- [2×4=8]

(i) Potential barrier

(ii) Depletion layer

(iii) Break down

(iv) Peak inverse layer

(b) A half – wave rectifier uses a diode with a forward resistance of 100 Ω. If the input ac voltage is 220 V (rms) and the load resistance is of 2 kΩ, determine: [2×4=8]

(i) Peak inverse voltage when the diode is ideal

(ii) Load output voltage

(iii) Ripple factor

(iv) Rectification efficiency.

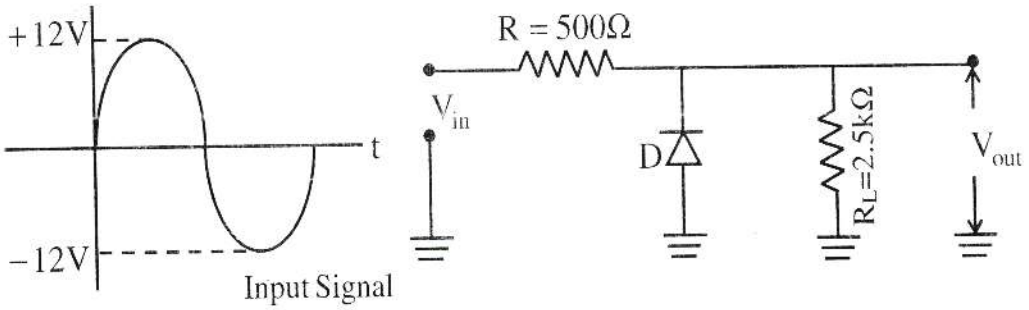
OR

Q.2 (a) Show how zener diode can be used in a voltage regulator circuit. Explain the voltage regulating capability of the circuit. When- [8]

(i) the load resistance increases and

(ii) the input voltage decreases.

(b) Determine the peak output voltage for a negative shunt clipper circuit shown in fig. below. The input signal is sinusoidal of peak value of 12 V, the barrier voltage for silicon diode is 0.7 V, series resistance is of 500 Ω and load resistance is of 2.5 kΩ. [8]



UNIT- III

Q.3 (a) Determine input impedance, current gain, voltage gain, and output impedance of a transistor in terms of its h – parameters. [8]

(b) Draw the Ebers – Moll model and explain. [8]

OR

Q.3 (a) What do you understand by thermal run – away? In what situations it can occur? Derive an expression for stability factor for a fixed bias circuit. [8]

(b) Assume that a silicon transistor with $\beta_O = 50$, $V_{BE} = 0.6$ V, and $V_{CC} = 20$ V and $R_C = 4.7$ kΩ is used in a self – biased circuit. It is desired to establish a Q – point at $V_{CE} = 8$ V and $I_C = 2$ mA and stability factor $S \leq 5.0$, Design the circuit with all component values. [8]

UNIT- IV

Q.4 (a) Describe the construction and operation of a JFET. How does it differ from a MOSFET. Draw the equivalent circuit for a JFET amplifier and explain its biasing. [8]

(b) For an N – channel JFET I_{DSS} = 8.7 mA, V_P = -3V, V_{GS} = -1V. Find the values of- [8]

(i) Drain current

(i) Transconductance for $V_{GS} = 0$

(iii) Transconductance

OR

Q.4 (a) Distinguish between enhancement type and depletion type MOSFETs. Draw the cross – section of a P – channel enhancement MOSFET. Explain its characteristics with a neat circuit diagram showing the self – biasing arrangement of a MOSFET used as an amplifier. [10]

(b) An N – channel E – MOSFET has the following parameters:
$I_{D(ON)}$ = 5 mA at V_{GS} = 8 V and V_{GST} = 4 V. Determine the drain current when V_{GS} = 6 V. [6]

UNIT- V

Q.5 (a) Why do you cascade the amplifiers? Draw a transistor version of an R – C coupled amplifier, show that the gain bandwidth product of the amplifier is fixed by device parameters. [8]

(b) Draw the direct – coupled transistor amplifier circuit and explain its working. Derive the expression for overall voltage gain. [8]

OR

Q.5 (a) Draw a Darlington emitter follower. Why the input impedance is higher than that of a single – stage emitter follower. [4]

(b) Give a circuit for differential amplifier. How the drift is reduced in such type of amplifier. [4]

(c) Write short note on Miller's theorem and its uses. [4]

(d) A 3 – stage amplifier has voltage gains of 50, 100 and 200 for first, second, and third stage. Find the overall voltage gain of the amplifier in decibels. [4]
