Printed Page:- Subject Code:- AEC0101

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech.

SEM: I - CARRY OVER THEORY EXAMINATION (2020 - 2021)

Subject: Basic Electrical and Electronics Engineering

Time: 03:00 Hours Max. Marks: 100

General Instructions:

- All questions are compulsory. It comprises of three Sections A, B and C.
- Section A - Question No- 1 is objective type question carrying 1 mark each & Question No- 2 is Very short type questions carrying 2 marks each.
- Section B - Question No- 3 is Long answer type - 1 questions carrying 6 marks each.
- Section C - Question No- 4 to 8 are Long answer type -2 questions carrying 10 marks each.

SECTION A 20

1. Attempt all parts:-

1-a. A 12 mA current source has an internal resistance, R_S, of 1.2 kΩ The equivalent voltage source is…... (CO1) 1

1. 144 V
2. 14.4 V
3. 7.2 V
4. 72 mV

1-b. Three equal resistances of value R are connected in star. If this star is converted into equivalent delta, the resistance value of delta networks will be.....(CO1) 1

1. R/3
2. Zero
3. 3R
4. None of the above

1-c. The capacitive reactance is ….. of frequency (CO2) 1

1. directly proportional
2. indirectly proportional
3. independent
4. none of above

1-d. If v = 200 sin (377t+30) V and I= and i = 8 sin (377t – 30) A. What will be phase angle (CO2) 1

1. 30
2. 60
3. 0
4. 90

1-e. The no-load current drawn by transformer is usually _____. (CO3) 1

1. 0.2% to 0.5%
2. 2% to 5%
3. 12% to 15%
4. 20% to 30%

1-f. A 1000/100 V Transformer is supplied by 220 V ,50 Hz AC. Output frequency will be...(CO3) 1

1. 0.5 Hz
2. 0.005 Hz
3. 500 Hz
4. 50 Hz

1-g. The ripple factor of HWR is …….(CO4) 1

1. 1.21
2. 0.48
3. 1.5
4. None of these

1-h. Depletion region always penetrates more in the……..(CO4) 1

1. Lightly doped side
2. Heavily doped side
3. n- side
4. None of these

1-i. The unit of Slew Rate is …….. (CO5) 1

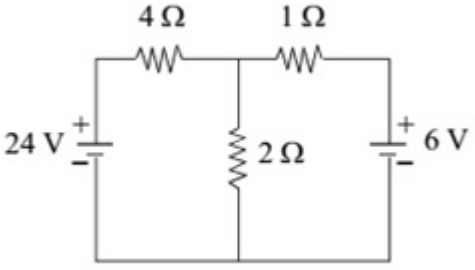
1. dB
2. mV/s
3. μV/V
4. V/μs

1-j. Op - Amp is a …… amplifier. (CO5) 1

1. Single Stage
2. Double Stage
3. Multistage
4. None of these

2. Attempt all parts:-

2-a. Find current in 2 Ω. (CO1) 2



2-b. Explain the term form factor and peak factor with respect to different types of signals? 2

(CO2)

2-c. Explain principle of transformer on load. (CO3) 2

2-d. What do you mean by depletion layer? (with respect to p-n Junction) (CO4) 2

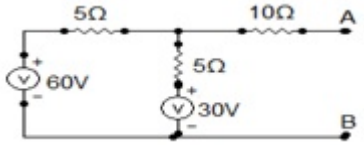
2-e. The slew rate is generally measured in V/μs. Is this statement True? (CO5) 2

SECTION B 30

3. Answer any five of the following-

3-a. State and prove maximum power transfer theorem. (CO1) 6

3-b. Find the Thevenin's equivalent circuit of the given network. (CO1) 6



3-c. Three sinusoidal voltages acting in series are given by V_1 = 10 sin (440t+30), V_2 = 105 sin (440t – 45) and V_3 = 20 cos(440t+30). Find the expression of resultant voltage. Also calculate frequency and RMS value of resultant voltage.(CO2) 6

3-d. Derive the relationship between phase and line current in 3- ϕ Delta connection. (CO2) 6

3-e. Explain battery backup system with the help of its block diagram. (CO3) 6

3-f. Write Short notes on : (CO4) 6

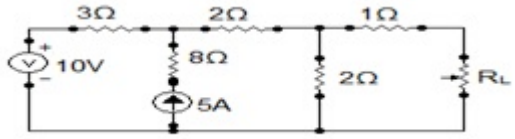
1. Transition Capacitance
2. Diffusion Capacitance

3-g. Explain the working of ultrasonic sensor with its applications. (CO5) 6

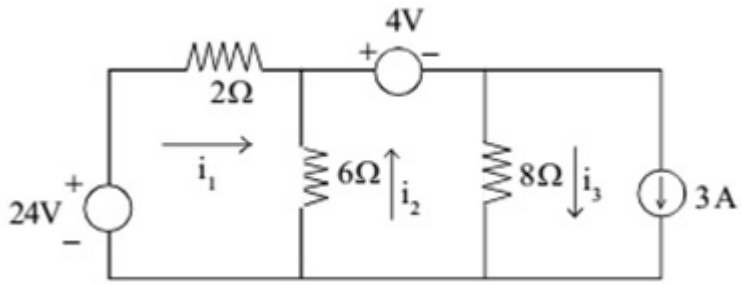
SECTION C 50

4. Answer any one of the following-

4-a. Using maximum power transfer theorem, find the value of the load resistance for the maximum power flow through it in the network shown in the figure. (CO1) 10



4-b. State and explain Kirchhoff's Law. What are the limitations and applications of Kirchhoff's Law in circuit theory? Determine i_1, i_2 and i_3 using Nodal Analysis for a given circuit shown in figure below. (CO1) 10



5. Answer any one of the following-

5-a. A balance 3 phase star connected load is fed from 400V, 3-phase, 50 Hz supply. The 10

current per phase is 25A (lagging) and the total power absorbed by the load is 13.856kW. Find (a) resistance and inductance of load per phase (b) total reactive power (c) total apparent power.(CO2)

5-b. With suitable phasor diagram show the power factor, impedance triangle and power consumed in case of series RLC circuit.(CO2) 10

6. Answer any one of the following-

6-a. Calculate the Electricity bill of the house for the month of June with following load data of one day: a. A Kettle of 2000 W is operated for 900 Seconds. b. A Washing Machine of 300 W is operated for 45 Minutes. c. A Toaster of 750 W is operated for 15 Minutes. d. Two Fluorescent light of 40 W each is operated for 5 Hours and 6 Hours respectively. e.Three Fans of 60 W is operated for 4 Hours, 6 Hours and 12 hours respectively.f.A Refrigerator of 250 W is operated for 24 Hours (8hrs-on)(Use the cost per unit of electricity as Rs 7 in your calculations) (CO3) 10

6-b. Explain the need of earthing and different methods of earthing. Also list the limitations of each method. (CO3) 10

7. Answer any one of the following-

7-a. Explain the Bridge rectifier with diagram and calculate Ripple Factor (derive) for various rectifiers. (CO4) 10

7-b. What is the working principle of Light Emitting Diode? Give its advantages and Disadvantages. (CO4) 10

8. Answer any one of the following-

8-a. For the inverting amplifier if the input voltages are 2V, 4V and 6V and corresponding resistances are 2K, 4K and 6K respectively and feed back resistor is 3K. Calculate the output voltage. (CO5) 10

8-b. Show that how input voltage gets reversed using operational amplifier. Also derive the expression for voltage gain using inverting amplifier. (CO5) 10