Printed Page:- Subject Code:- AEC(101

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: II - CARRY OVER THEORY EXAMINATION - SEPTEMBER 2022

Subject: Basic Electrical and Electronics Engineering

Time: 3 Hours Max. Marks: 100

General Instructions:

1. The question paper comprises three sections, A, B, and C. You are expected to answer them as directed.
2. Section A - Question No- 1 is 1 marker & Question No- 2 carries 2 marks each.
3. Section B - Question No-3 is based on external choice carrying 6 marks each.
4. Section C - Questions No. 4-8 are within unit choice questions carrying 10 marks each.
5. No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.

SECTION A 20

1. Attempt all parts:-

1 The internal voltage drop of a voltage source…..... (CO1) 1

(a) Is independent of load current supplied

(b) Depends upon internal resistance of the source

(c) Does not influence the terminal voltage

(d) Does affect the emf of the source

1 The terminals across the source are ..... if a current source is to be neglected. (CO1) 1

(a) Open-circuited

(b) Short-circuited

(c) Replaced by a capacitor

(d) Replaced by a source resistance

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

(a) directly proportional

(b) indirectly proportional

(c) independent

(d) none of above

1-d. The unit of apparent power is (CO2) 1

(a) KVA

(b) KVAR

(c) KW

(d) Watt

1-e. Which of the following is not a method of earthing. (CO3) 1

(a) Plate Earthing

(b) Pipe Earthing

(c) Earthing through Air Medium

(d) Rod Earthing

1-f. Which of the following losses varies with the load in the transformer? (CO3) 1

(a) Core loss

(b) Copper loss

(c) Both core & copper loss

(d) None of the above

1-g. RMS load current of HWR is……. .(CO4) 1

(a) $\frac{I_m}{4}$

(b) $\frac{I_m}{2}$

(c) I_m

(d) $\frac{I_m}{3}$

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

(a) Lightly doped side

(b) Heavily doped side

(c) n- side

(d) None of these

1-i. Change in output of sensor with change in input is ……. (CO5) 1

(a) Threshold

(b) Slew rate

(c) Sensitivity

(d) None of these

1-j. If we apply a square waveform to a differentiator, then we get …….. at its output (CO5) 1

(a) Cosine Wave

(b) Negative cosine wave

(c) Ramp

(d) Train of impulses

2. Attempt all parts:-

2.a. State the Thevenin's theorem. (CO1) 2

2.b. If the bandwidth of a resonant circuit is 10 KHz and lower half frequency is 120 KHz, Find the upper half frequency and Quality Factor..(CO2) 2

2.c. Mention the advantages of core type transformer. (CO3) 2

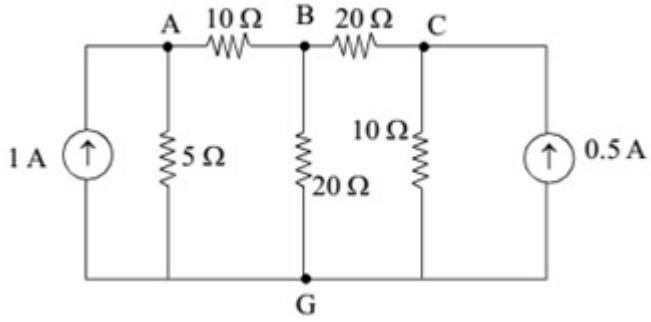
2.d. What will happen on number of electrons in a semiconductor on increasing temperature?(CO4) 2

2.e. Why Operational Amplifier named so? (CO5) 2

SECTION B 30

3. Answer any five of the following:-

3-a. Find current in each branch by using nodal analysis. Also calculate total power loss. (CO1) 6



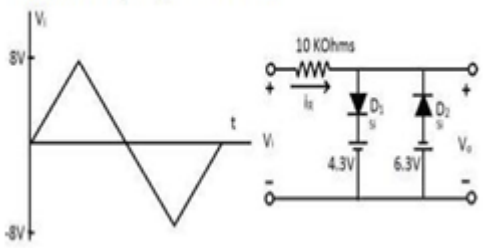
3-b. Derive the expression for Star to Delta transformation.(CO1) 6

3-c. A non- inductive resistance of 10 Ω is connected in series with an inductive coil across 200V, 50Hz ac supply, the current drawn by the series combination is 10A. The resistance of the coil is 2Ω. Determine (i) inductance of coil. (ii) Power factor. (iii) Voltage across the coil.(CO2) 6

3-d. Derive the relationship between phase and line voltage in 3- ϕ star connection system.(CO2) 6

3.e. Derive the condition for maximum efficiency in the transformer. (CO3) 6

3.f. Sketch I_R and V_O for the input figure shown below. (CO4) 6

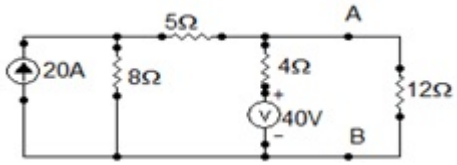


3.g. Explain the working of ultrasonic sensor with its applications. (CO5) 6

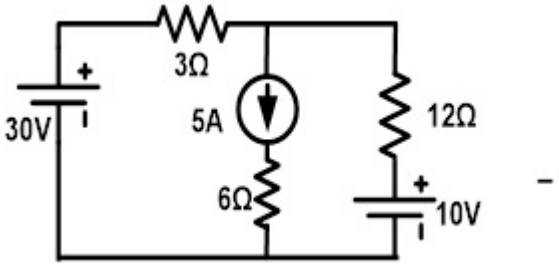
SECTION C 50

4. Answer any one of the following:-

4 Determine the Norton's equivalent circuit across A-B and determine current flowing through 12Ω Resister for the network shown below. (CO1) 10



4 Find the current in 3Ω using superposition theorem. (CO1) 10



5. Answer any one of the following:-

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

5 An iron cored choke coil has resistance of 4ohm when measured by dc supply.On a 240V,50Hz mains it dissipated 500W.Current taken being 10A.Calculate (i)impedance (ii)power factor (iii)iron loss (iv)inductance of coil.(CO2) 10

6. Answer any one of the following:-

6 Explain (i) SFU (ii)MCCB (iii) ELCB in detail. (CO3) 10

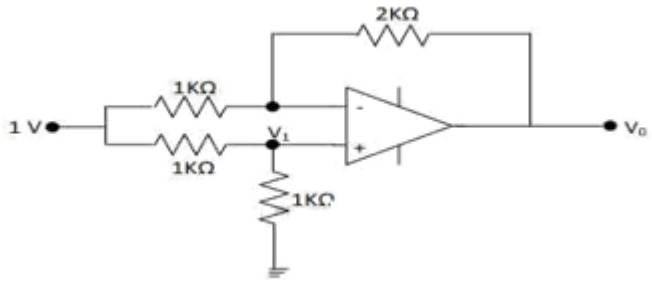
6 An 2000/400 V, 10kVA, Single Phase transformer has primary resistance and reactance 5.5 Ω and 12 Ω respectively. The secondary resistance and reactance are 0.2 Ω and 0.45 Ω respectively. Calculate (i) Primary winding resistance and reactance referred to secondary side. (ii) Equivalent resistance and reactance referred to secondary. (CO3) 10

7. Answer any <u>one</u> of the following:-

7	How does a 7-segment display work? Draw circuit. What are the applications of seven segment display? (CO4)	10
7	Why Silicon is used in Zener Diode? Draw and explain the V-I characteristic of a zener diode. (CO4)	10

8. Answer any <u>one</u> of the following:-

8-a.	For the Op-Amp circuit shown, what will be the value of Vo? (CO5)	10



8-b.	Explain the working of DMM with its block diagram. Also mention its advantages and disadvantages. (CO5)	10