Printed Page:- 05 **Subject Code**:- **AEC0201**

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B. Tech

SEM: II - THEORY EXAMINATION (2022-2023.)

Subject: Basic Electrical and Electronics Engineering

Time: 3 Hours **Max. Marks: 100**

General Instructions:

IMP: *Verify that you have received the question paper with the correct course, code, branch etc.*

1. *This Question paper comprises of* **three Sections -A, B, & C.** *It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.*

2. *Maximum marks for each question are indicated on right -hand side of each question.*

3. *Illustrate your answers with neat sketches wherever necessary.*

4. *Assume suitable data if necessary.*

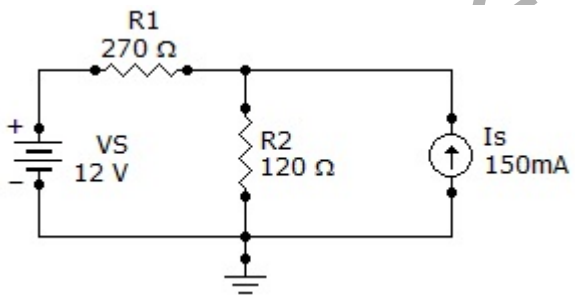
5. *Preferably, write the answers in sequential order.*

6. *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-a. Find the current through R_2 of the given circuit. (CO1) 1



(a) 30.7 mA

(b) 104 mA

(c) 74 mA

(d) 134 mA

1-b. 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-c. What is the form factor of a square wave(CO2) 1

(a) 1

(b) 2

(c) 1.1

(d) 3

1-d. To transmit the same amount of power over fixed distance 3phase ckt needs....the weight of Cu as compared to 1 phase (CO2) 1

(a) 3 times

(b) 3/4 times

(c) 2 times

(d) 0.5 times

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

(a) 0.5 Hz

(b) 0.005 Hz

(c) 500 Hz

(d) 50 Hz

1-g. The clipper circuit are used for.....(CO4) 1

(a) Rectification

(b) Removal of a part from the applied waveform

(c) Shifting of DC level

(d) None of these

1-h. The value of η = ... for Si.(CO4) 1

(a) 2

(b) 4

(c) 1

(d) 0

1-i. 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

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

(a) dB

(b) mV/s

(c) μV/V

(d) V/μs

2. Attempt all parts:-

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

2.b. Explain Band-Width and Quality Factor of series R-L-C circuit.(CO2) 2

2.c. Why Transformer does not work on DC supply? (CO3) 2

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

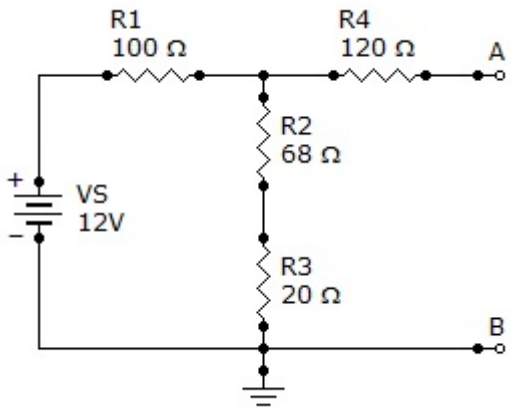
2.e. Define differential and common mode gain. (CO5) 2

SECTION B **30**

3. Answer any <u>five</u> of the following:-

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

3-b. Find the Thevenin equivalent (V_{TH} and R_{TH}) between terminals A and B of the circuit given.(CO1) 6



3-c. A 100V, 60W lamp is to be operated on 220V, 50Hz supply. Find the value of (i) Non inductive resistance (ii) pure Inductance in series with the lamp so that the lamp is not Over run, which would be preferable.(CO2) 6

3-d. Explain Frequency vs Current graph in series resonance and explain different 6

zones.(CO2)

3.e. Discuss the no load operation of transformer and also draw the no load equivalent circuit of transformer. (CO3) 6

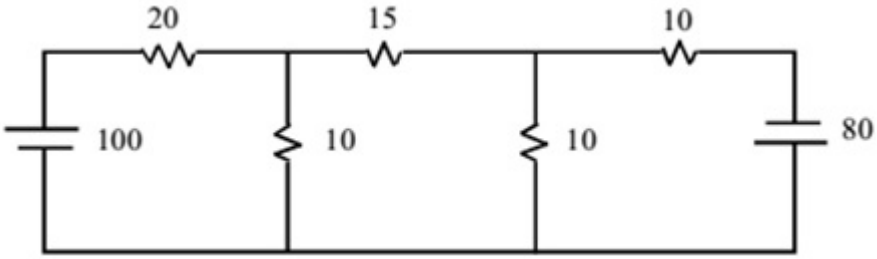
3.f. Describe Avalanche and Zener Breakdown in a zener diode. (CO4) 6

3.g. Give an introduction to IoT and its application. What are the main Challenges of Internet of Things (IoT)? (CO5) 6

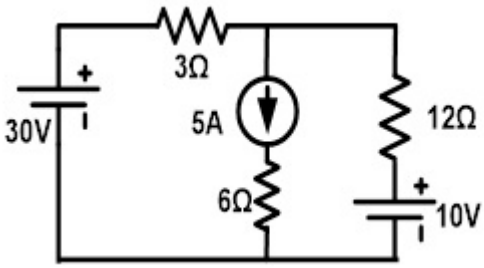
SECTION C **50**

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

4-a. Find the current in various branches of circuit. Using mesh Analysis. (CO1) 10



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



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

5-a. Two impedances given by $Z_1 = 5 + j10\ \Omega$ and $Z_2 = 10 - j15\ \Omega$, are connected in parallel. If the total current supplied is 20 A, then find (i) current taken by each branch, (ii) power factor, (iii) power consumed in each branch.(CO2) 10

5-b. 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 <u>one</u> of the following:-

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

6-b. In a 50 KVA, 3300/230 V, 50 Hz transformer, full load iron losses & copper losses are 500W & 650W respectively. Find the efficiency at half load, 0.6 p.f . Also find the max efficiency. (CO3) 10

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

7-a. Draw reverse Bias Characteristic of Zener Diode. For a zener regulator: I_Z (min)=1mA, I_Z(max)=15mA, V_Z=5Volt, Rs=1 kΩ, R_L=1kΩ. Assume Diode Resistance is Zero. Determine the range of input voltage over which the output remains constant. (CO4) 10

7-b. Write Short notes on : (CO4) 10

1. LED Display
2. LCD
3. OLED
4. 7-Segment Display

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

8-a. An Op-amp is used in following modes with R_1= 1kΩ and R_F= 100KΩ, V_i=10mV and V_{CC}=±12V. Find Vo in each case (i) Inverting mode (ii)Non-inverting mode. Draw output waveforms if V_i is sinewave. (CO5) 10

8-b. What do you mean by sensors? How they differ from transduces? What are the different types of sensors? (CO5) 10