Printed Page:-04 Subject Code:- AEC0201

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NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: II - THEORY EXAMINATION (2024 - 2025)

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. The internal voltage drop of a voltage source…..... (CO1,K1) 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-b. An electric circuit contains ..... (CO1,K1) 1

(a) active elements only

(b) passive elements only

(c) both active and passive elements

(d) none of the abov

1-c. In case of Inductive circuit, Frequency is _____ Proportional to the Current.(CO2,K1) 1

(a) Directly

(b) Inversely

(c) No effect

(d) None of the above

1-d. Average value of a sinusoidal alternating signal is ————-for a full cycle.(CO2,K1) 1

(a) Infinite

.

(b) Maximum
(c) Minimum
(d) Zero

1-e. Earth leakage circuit breaker is also known as…(CO3,K1) 1

(a) Residual current circuit breaker
(b) Miniature case circuit breaker
(c) oil control breaker
(d) Moulded circuit breaker

1-f. Purpose of Backup Protection is-(CO3,K1) 1

(a) To guard against failure of primary
(b) To increase the speed
(c) To leave no blind spot
(d) None of the above

1-g. The efficiency of the full wave rectifiers is _____(CO4,K1) 1

(a) 1
(b) 0.2224
(c) 0.812
(d) 0.742

1-h. The clipper circuit are used for……(CO4,K1) 1

(a) Rectification
(b) Removal of a part from the applied waveform
(c) Shifting of DC level
(d) None of these

1-i. CMRR value indicates the capability to reject …… (CO5,K1) 1

(a) Power supply variation
(b) Difference of signal
(c) Common mode signal
(d) None of these

1-j. Basic building blocks of digital multimeter are _____. (CO5,K1) 1

(a) oscillator, amplifier
(b) diode, op amp
(c) rectifier, schmitt trigger
(d) A/D, attenuator, counter

2. Attempt all parts:-

2.a. What do you mean by constant voltage source? Name some of them. (CO1,K1) 2

2.b. The polar form of the following waveform, $V_1 = 16 \sin (wt + 35°)$ V ,$V_2 = 32 \sin (wt – 55°)$ V is (CO2,K1) 2

2.c. What are the two components of no load current in a transformer?(CO3,K1) 2

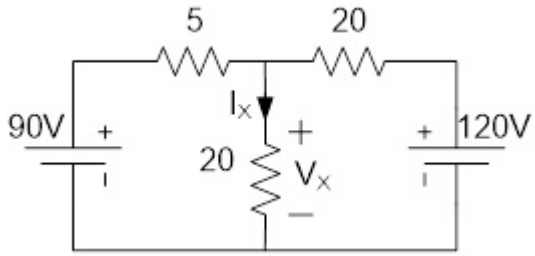
2.d. Explain the Intrinsic and Extrinsic semiconductors.(CO4,K1) 2

2.e. Define the slew rate of Op-Amp. (CO5,K1) 2

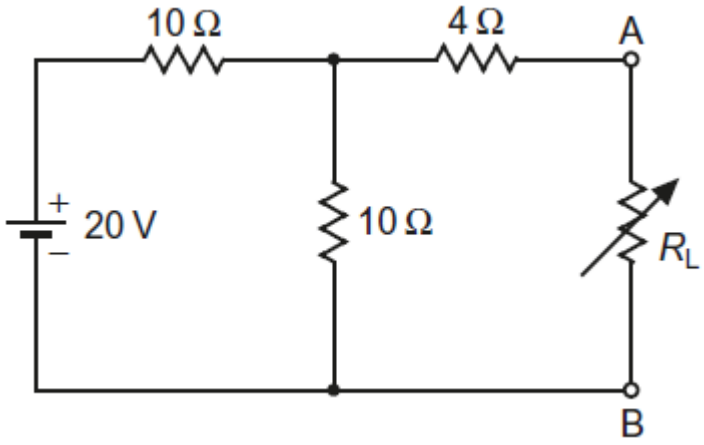
SECTION-B 30

3. Answer any five of the following:-

3-a. Find the current I_x and V_x in the circuit using Norton' Theorem. (CO1,K2) 6



3-b. In the network shown in Figure , determine the value of load resistance load resistance to give maximum power transfer and the power delivered to the load. (CO1) 6



3-c. Derive the equation of resonant circuit in parallel resonance. (CO2) 6

3-d. Find the relationships between line current and phase current in a delta connected three phase system (CO2) 6

3.e. Expalin the difference between ELCB and MCCB.(CO3) 6

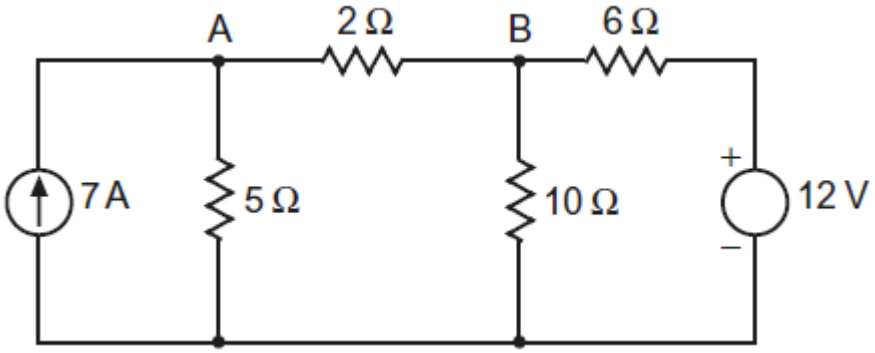
3.f. Explain the Liquid Crystal Display (LCD) with neat diagram.(CO4) 6

3.g. What is role of sensors in IoT? List the types of sensors used in IoT.(CO5) 6

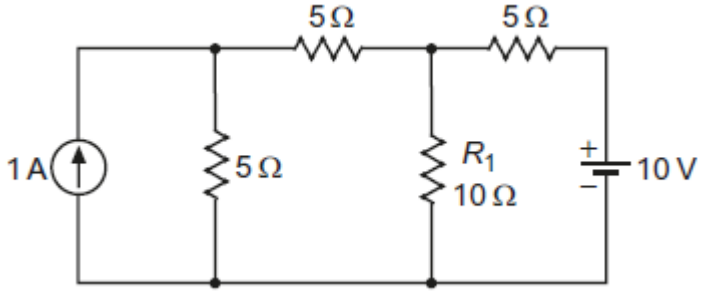
SECTION-C 50

4. Answer any one of the following:-

4-a. Using Thevenin's theorem, determine current and voltage in 2-Ω resistor in the circuit shown in Figure. (CO1) 10



4-b. Using mesh equation method, find current in the resistance R_1 of the network shown in Figure (CO1) 10



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

5-a. A three phase voltage source has a line voltage of 400 V and supplies star connected load having impedance (8+ j6) Ω per phase, calculate line current, power factor and total three phase power supplied to the load. (CO2) 10

5-b. For an AC circuit expression of voltage and current are given as v = 200 Sin (377t) V and i = 8 Sin (377t – 30o) A respectively. Find:(a)Power Factor (b) True Power (c)Apparent Power (d)Reactive Power (CO2) 10

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

6-a. Explain why hysteresis and eddy current losses occur in transformer. How does change in efficency affect the operation of given transformer?(CO3) 10

6-b. What is the importance of earthing? Discuss the difference between pipe earthing and rod earthing.(CO3) 10

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

7-a. Difference between unregulated power supply and regulated power supply and How Zener diode act as a voltage regulator? (CO4) 10

7-b. Explain the Light Emitting Diodes (LED) with neat diagram. Write its Advantages and Disadvantages and its application in Brief. (CO4) 10

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

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

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