Printed Page:-04 Subject Code:- BEC0102

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NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: I - THEORY EXAMINATION (2023-2024)

Subject: 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. Resistivity of a wire depends on ….. (CO1) 1

(a) length of wire

(b) cross section area

(c) material

(d) all of the mentioned

1-b. The superposition theorem is used when the circuit contains .....(CO1) 1

(a) a single voltage source

(b) a number of voltage sources

(c) passive elements only

(d) none of the above

1-c. The electrons in the outermost orbit are called.....electron. (CO2) 1

(a) Valance electron

(b) Conduction electron

(c) Free electron

(d) New electron

1-d. During reverse bias, a small current develops known as (CO2) 1

(a) Forward current

(b) Reverse current

(c) Reverse saturation current

(d) Active current

1-e. Which of the following is true in construction of a transistor? (CO3) 1

(a) the collector dissipates lesser power
(b) the emitter supplies minority carriers
(c) the collector is made physically larger than the emitter region
(d) the collector collects minority charge carriers

1-f. When does the transistor act like an open switch? (CO3) 1

(a) cut off region
(b) inverted region
(c) saturated region
(d) active region

1-g. Comparing the size of BJT and FET, choose the correct statement?(CO4) 1

(a) BJT is larger than the FET
(b) BJT is smaller than the FET
(c) Both are of same size
(d) Depends on application

1-h. A JFET is a …… controlled device. (CO4) 1

(a) current
(b) voltage
(c) both current and voltage
(d) none of the above

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

(a) Single Stage
(b) Double Stage
(c) Multistage
(d) None of these

1-j. What is the main limitation of a Weighted Register DAC? (CO5) 1

(a) It requires a large number of resistors.
(b) It is prone to non-linearities and integral nonlinearity (INL) errors.
(c) It has limited output voltage range.
(d) It is not suitable for high-speed applications.

2. Attempt all parts:-

2.a. Define Active & Passive elements. (CO1) 2

2.b. What is the PIV for HWR and FWR? (CO2) 2

2.c. Give the various applications of BJT. (CO3) 2

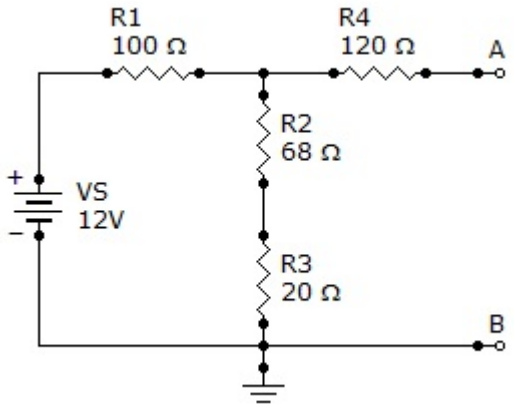
2.d. Justify JFET is voltage controlled device. (CO4) 2

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

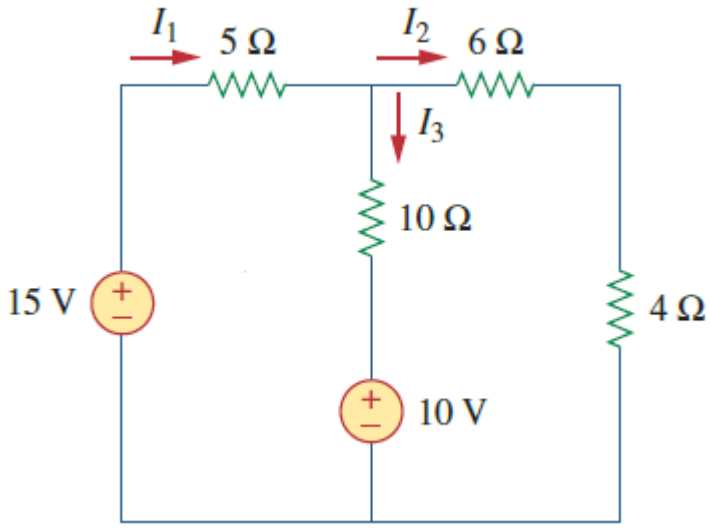
SECTION-B 30

3. Answer any five of the following:-

3-a. Find the Thevenin equivalent (VTH and RTH) between terminals A and B of the circuit given.(CO1) 6



3-b. For the given circuit, find the branch currents I_1, I_2 and I_3 using mesh analysis. (CO1) 6



3-c. Draw and explain the bridge rectifier circuit with output waveform. (CO2) 6

3-d. Explain the following terms: (a) Barrier potential (b) Cut in voltage (c) Forward biasing (d) Reverse biasing (CO2) 6

3.e. Write the Short notes on the following: a. Transistor Construction and operation b. Bias Stabilization. (CO3) 6

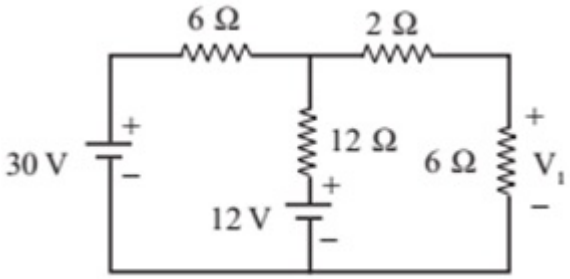
3.f. With the help of necessary diagrams, Explain the operation of an n channel JFET. (CO4) 6

3.g. Explain the charachteristics of an ideal Op-Amp. Give value for these for IC741.(CO5) 6

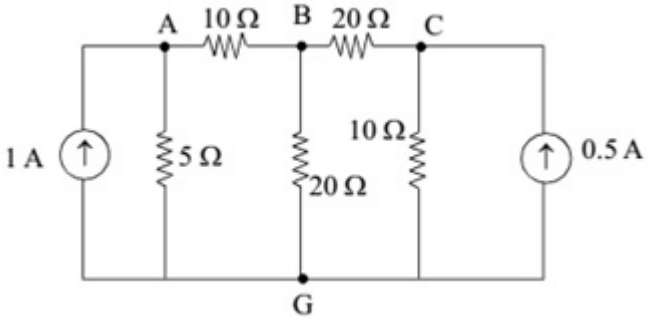
SECTION-C 50

4. Answer any one of the following:-

4-a. Find the voltage V1 across 6 ohm resistance using mesh analysis method. (CO1) 10



4-b. Find current in each branch by using nodal analysis. Also calculate total power loss. (CO1) 10



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

5-a. What are the effect of temperature on the VI characteristics of diode? Draw and explain the VI characteristics of Si diode. (CO2) 10

5-b. Write Short notes on : a) LED b) 7 Segment display. (CO2) 10

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

6-a. Draw and explain the input and output characteristics of common emitter configuration of NPN BJT. (CO3) 10

6-b. Differentiate CB, CE and CC configurations in BJT. (CO3) 10

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

7-a. Define drain and transfer characteristics and sketch the drain and transfer V-I characteristics of N channel JFET. Indicate all the region of operations also. Also define pinch off voltage and mark it on the characteristics. (CO4) 10

7-b. Compare JFET, D MOSFET and E MOSFET.(CO4) 10

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

8-a. Derive expression for inverting configuration. An inverting amplifier has an input voltage of 1V. The input resistance R1=2KΩ and feedback resistance is 20KΩ. Find the output voltage and voltage gain of the amplifier.(CO5) 10

8-b. Explain the operation of successive approximation ADC with neat diagram also write their advantages and limitations. (CO5) 10