Printed Page:-04

Subject Code:- BEC0102

2.202

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA (An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: I - THEORY EXAMINATION (2024- 2025)

Subject: Electronics Engineering

Time: 3 Hours 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

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SECTION-A

1. Attempt all parts:-

- 1-a. Resistivity of a wire depends on (CO1) (K1)
 - (a) length of wire
 - (b) cross section area
 - (c) material
 - (d) all of the mentioned
- 1-b. A bilateral element is.....(CO1) (K1)
 - (a) Resistor
 - (b) Inductor
 - (c) Capacitor
 - (d) All of these

1-c. The energy gap is much more in silicon than in germanium because (CO2) (K1)

- (a) It has less number of electrons
- (b) It has high atomic mass number
- (c) Its valence electrons are more tightly bound to their parent nuclii
- (d) Its crystal has much stronger bonds called ionic bonds

1-d. How many junction/s do a diode consist? (CO2) (K1)

- (a) 0
- (b) 1
- (c) 2

Max. Marks: 100

20

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- (d) 3
- Which of the following is true in construction of a transistor? (CO3) (K1) 1-e.
 - the collector dissipates lesser power (a)
 - (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. If the emitter-base junction is forward biased and the collector-base junction is reverse biased, what will be the region of operation for a transistor? (CO3) (K1)

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- cut off region (a)
- saturated region (b)
- inverted region (c)
- active region (d)
- If the reverse bias on the gate of a JFET is increased, then width of the conducting 1-g. 1 channel (CO4) (K1)
 - is decreased (a)
 - is increased (b)
 - remains the same (c)
 - (d) none of the above
- A MOSFET can be operated with(CO4) (K1) negative gate voltage only 1-h.
 - (a)
 - positive gate voltage only (b)
 - positive as well as negative gate voltage (c)
 - (d) none of the above
- 1-i. The Op-Amp is consider as a (CO5) (K1)
 - single stage amplifier. (a)
 - multistage amplifier (b)
 - RC coupled circuit (c)
 - Positive feedback circuit (d)

What is the basic principle of operation of a Weighted Register DAC?(CO5) (K1) 1-j. 1

- It uses a weighted sum of binary inputs to produce an analog output. (a)
- It uses a counter to generate binary codes for the analog output. (b)
- It employs a feedback loop to continuously adjust the output voltage. (c)
- It utilizes a series of resistors to convert digital codes to analog voltages. (d)
- 2. Attempt all parts:-

2.a.	Define Linear and non-linear elements. (CO1) (K1)	2
2.b.	Explain PIV for FWR (Bridge type). (CO2) (K1)	2
2.c.	Why BJT is called a current controlled device? (CO3) (K1)	2
2.d.	Why JFET is known as unipolar device? (CO4) (K1)	2

Page 2 of 4

2.e. Define the concept of common-mode rejection ratio (CMRR) in op-amps.(CO5) 2 (K2)

SECTION-B

3. Answer any five of the following:-

3-a. Find the current in R2 of the given circuit, using the superposition theorem.(CO1) 6 (K3)



3-b. Calculate currents in all the resistance of the circuit using nodal analysis method.(CO1)(K2)



- 3-c. Draw and explain the bridge rectifier circuit with output waveform. (CO2) (K2)
- 3-d. How Zener diode work as voltage regulator? (CO2) (K2)
- 3.e. What do you understand by "Transistor biasing"? The emitter current of a transistor is 10mA. If $\alpha = 0.99$ and ICBO = 10^A . Calculate the value of IC and IB. (CO3) (K2)
- 3.f. Sketch the V-I characteristics of JFET. Define pinch off voltage and mark it on the 6 characteristics. Explain its importance. (CO4)(K2)
- 3.g. Write and discuss the key parameters of op-amps including slew rate. (CO5) (K2) 6

SECTION-C

- 4. Answer any one of the following:-
- 4-a. Find the voltage V1 across 6 ohm resistance using mesh analysis method. (CO1) 10 (K3)



4-b. State and prove maximum power transfer theorem. (CO1) (K3)

Page 3 of 4

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- 5. Answer any <u>one</u> of the following:-
- Explain the formation of Depletion layer. (CO2) (K2) 5-a. 10 5-b. Write Short notes on : a) LED b) 7 Segment display. (CO2) (K2) 10 6. Answer any one of the following:-Explain with neat diagram the CE, CC, CB Configuration for BJT. (CO3) (K2) 10 6-a. 6-b. Draw the circuit diagram of a voltage divider bias circuit and explain its working 10 with mathematical expressions to find the operating point. (CO3) (K3) 7. Answer any one of the following:-7-a. Define drain and transfer characteristics and sketch the drain and transfer V-I 10 characteristics of N channel JFET. Indicate all the region of operations also. Also define pinch off voltage and mark it on the characteristics. (CO4) (K3) 7-b. Explain the construction and working of N type-EMOSFET with their symbol. 10 (CO4) (K3) 8. Answer any one of the following:-8-a. Derive output expression for non inverting amplifier. A non-inverting amplifier 10 has an input voltage of 0.5V. The input resistance $R_1=1K\Omega$. and feedback resistance is $10K\Omega$. Find the output voltage and voltage gain of the amplifier.
 - (CO5) (K3)
- 8-b. Provide a comprehensive explanation of how a Single Slope ADC works, 10 including the roles of the comparator, integrator, and reference voltage. What are its application and disadvantages?(Draw suitable diagram) (CO5) (K3)