ECE 101

B. Tech. Ist SEMESTER EXAMINATION, 2025-26

Bachelor of Technology

(ECE & IT)

8911

Basic Electronics Engineering

Time : Three Hours] [Maximum Marks : 75

Note: There are **three** sections (**A**, **B** and **C**) and candidate has to attempt questions from all sections. Marks are indicated against each section.

Section-A

1. Attempt all parts of the following : 5×3=15

   (a) What do you mean by the depletion region in a P-N junction diode ?

   (b) What is a semiconductor ? Draw its energy band-diagram and give two examples.

   (c) Find the current gain α in CB configuration of a BJT if $\beta = 101$.

   (d) Give the definitions for slew rate and CMMR of an operational amplifier.

   (e) Define modulation index.

Section-B

Note: Attempt all questions : 4×5=20

2. (a) Explain the V-I characteristics of a P-N junction diode under forward and reverse bias condition.

Or

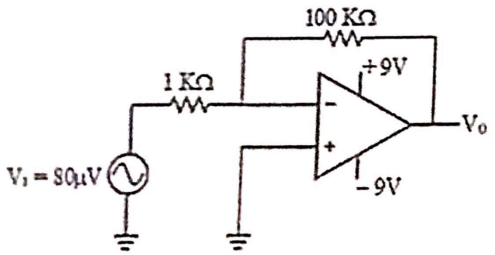
(b) Describe zener and avalanche breakdown mechanism in a semiconductor diode.

3. (a) What is meant by pinch-off voltage in a JFET? Explain it using a characteristic curve.

Or

(b) Explain the construction and working of depletion type MOSFET with a diagram.

4. (a) Find the output voltage for the given circuit.



Or

(b) Draw and discuss the integrator circuit using op-amp.

5. (a) Define the term modulation and demodulation in communication system. Also classify the different modulation scheme.

Or

(b) An AM transmitter outputs 8KW without modulation and 10KW when modulated. Find the modulation index.

Section-C

Note: Answer any **two** questions of the following : 2×20=40

6. (a) Explain the diode capacitance. Also discuss its types in detail.

(b) Explain the construction and working principle of light emitting Diode (LED) in detail.

7. (a) Draw a BJT in common-emitter mode and explain its operation along with input and output characteristics.

(b) Explain the construction of n-channel JFET and draw its transfer and drain characteristics.

8. (a) What is an operational amplifier ? Draw its block diagram. Write the characteristics of an ideal operational amplifier.

(b) What is an inverting and non-inverting op-amp ? Derive their expression for voltage gain.

9. (a) Illustrate the block diagram of a CRO and explain the function of each block.

(b) (i) Discuss the element of communication system with the help of block diagram.

(ii) Am radio transmitter radiates 20KW power when modulation percentage is 60% calculate the carrier power.

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