### Dec.-22-0118
### EC-101 (Fundamentals of Electronics Engineering)
### B. Tech. 2nd (CBCS)

**Time : 3 Hours**                                        **Max. Marks : 60**

*The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.*

**Note :** Attempt five Questions in all. Selecting One Question from each section A, B, C and D. Section E is Compulsory.

### SECTION - A

1. Differentiate semiconductor, conductor and insulators on the basis of band gap. (10)

2. (a) Define current conduction in semiconductor. (5)

   (b) With the help of a circuit diagram explain the working of a half-wave rectifier. (5)

### SECTION - B

3. Explain the BJT characteristics in CE configuration. Explain the behaviour of the transistor in active, cut-off and saturation mode. (10)

4. (a) Explain the construction and operation of enhancement type MOSFET. (5)

   (b) Compare the features of BJT and FET. (5)

### SECTION - C

5. Define the following:-

   (a) RC phase shift oscillator

   (b) Calpitt oscillator (10)

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6. Draw the circuit of an adder operational amplifier using inverting amplifier configuration. Write an equation for the output voltage of this circuit. (10)

### SECTION - D

7. What are universal gates? Implement all basics gates using universal gates. (10)

8. (a) Describe the operation of CRO with neat block diagram. (5)

   (b). Discuss the importance of 1's and 2's compliment numbers. (5)

### SECTION - E (Compulsory)

9. (i) What are the charge carriers in n- type and p-type semiconductor?

   (ii) Define term photodiode.

   (iii) What is ripple factor?

   (iv) Explain why BJT's are called bipolar devices and FET's are called unipolar devices?

   (v) How is drain current controlled in a JFET.

   (vi) What is an oscillator? How does it differ from an amplifier?

   (vii) Define unit gain amplifier.

   (viii) Convert the hexadecimal number into decimals A13B.

   (ix) What is the purpose of triggering circuit in CRO?

   (x) Define XNOR gate. (10×2=20)