

Total No. of printed pages = 5

**RETEST EXAMINATION – 2022**

Semester : 3rd (Old)

Subject Code : Et-304

**ELEMENTS OF ELECTRONICS ENGINEERING**

Full Marks – 70

Time – Three hours

The figures in the margin indicate full marks for the questions.

**Instructions :**

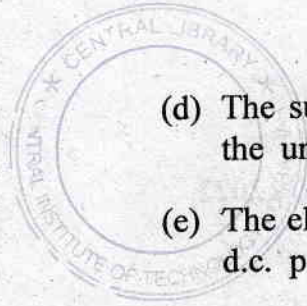
1. *All* questions of PART – A are compulsory.
2. Answer any *five* questions from PART – B.

**PART – A**

Marks – 25

1. Fill in the blanks : 1×10=10
  - (a) A pure semiconductor is called \_\_\_\_\_.
  - (b) A vacuum diode can be used as a \_\_\_\_\_.
  - (c) When the outermost orbit of an atom has exactly four valence electrons, the material is generally a \_\_\_\_\_.

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- (d) The suppressor grid in a pentode eliminates the undesirable effect of \_\_\_\_\_.
- (e) The electronic device which convert a.c. into d.c. power is called \_\_\_\_\_.
- (f) Semiconductors have \_\_\_\_\_ temperature coefficient of resistance.
- (g) For proper operation of transistor, base-emitter junction should be \_\_\_\_\_ and collector-base junction \_\_\_\_\_.
- (h) The maximum efficiency of a full wave rectifier is \_\_\_\_\_.
- (i) A circuit which produces electrical oscillations of any desired frequency is known as \_\_\_\_\_.
- (j) An oscillator employs \_\_\_\_\_ feedback.

2. Write true or false : 1×10=10

- (a) A semiconductor diode has one P-N junction.
- (b) In N-type semiconductor, electrons are the minority carriers.
- (c) A Zener diode is used as a rectifier.
- (d) Negative feedback reduces gain.

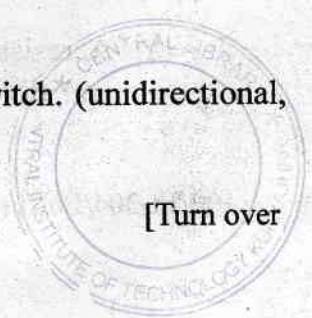
- (e) Positive feedback is used in high amplifiers.
- (f) A collpitt's oscillator uses a tapped capacitor.
- (g) A triac is equivalent to two SCRs in parallel.
- (h) The function of a transistor is to do amplification.
- (i) The input resistance of a transistor is much more than its output resistance.
- (j) A forward biased diode will act as an open switch.

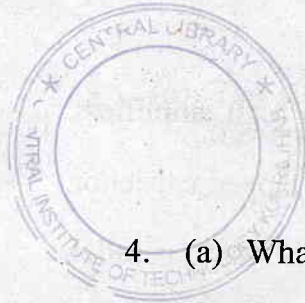
3. Choose the correct answer : 1×5=5

- (a) In a semiconductor, the energy gap between valence band and conduction band is nearly \_\_\_\_\_. (1eV, 1.5eV, 0.7eV)
- (b) The addition of trivalent impurity creates \_\_\_\_\_. (holes, free electrons)
- (c) The base of a transistor is \_\_\_\_\_ doped. (lightly, heavily, moderately)
- (d) A FET is a \_\_\_\_\_ transistor. (unipolar, bipolar)
- (e) An SCR is a \_\_\_\_\_ switch. (unidirectional, bidirectional)

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**PART – B**

Marks – 45

4. (a) What is a P-N junction? 1
- (b) Explain the formation of potential barrier in a P-N junction. 4
- (c) Draw and explain the V-I characteristics of a P-N junction. 4
5. (a) What is a Zener Diode? 1
- (b) With a neat sketch, explain the working of Full-Wave Bridge Rectifier. 4
- (c) Derive an expression for the efficiency for a Half-Wave Rectifier. 4
6. (a) What is multistage amplifier? How many types of coupling is used in amplifier circuit? Name them. 4
- (b) With a neat circuit diagram explain the working of transformer-couple transistor amplifier. 5
7. (a) A resistor is coded with red, yellow, violet and silver. What is the value of the resistor? 4



- (b) Define  $\alpha$  and  $\beta$ . Deduce the relation between  $\alpha$  and  $\beta$ . 5
8. (a) Draw the symbol of N-P-N and P-N-P transistor. 1
- (b) Draw Common Emitter, Common Base and Common Collector configuration for N-P-N and P-N-P transistor. 3
- (c) With proper circuit diagram explain the working of a Common Emitter transistor connection. 5
9. (a) Explain the operation of a tank circuit with neat diagram. 5
- (b) Discuss the essentials of an oscillator. 4
10. Write short notes on any *two*:  $4\frac{1}{2} \times 2 = 9$
- (i) Hartley Oscillator
- (ii) Voltage divider bias method
- (iii) Class A, Class B, Class C and Class AB power amplifiers.

