

(i) Printed Pages: 3

Roll No.

(ii) Questions : 7

Sub. Code :

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Exam. Code :

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B.A./B.Sc. (General) 5th Semester

(1129)

PHYSICS

Paper B : Electronics and Solid State Devices-I

Time Allowed : Three Hours]

[Maximum Marks : 22

Note :— (i) Attempt **FIVE** questions in all, selecting at least **TWO** questions from each Unit-I and II.

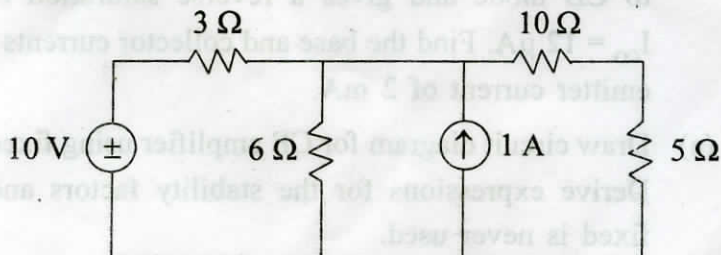
(ii) Unit-III is compulsory.

(iii) Use of non-programmable calculator is allowed.

UNIT—I

1. (a) Draw the block diagram of Cathode Ray Oscilloscope (CRO) and explain its working. Obtain the expression for the electrostatic deflection sensitivity and deflection sensitivity. 3

(b) For a circuit shown below, find the current in $5\ \Omega$ resistor using Norton's theorem. 1½



2. (a) Explain the V-I characteristics of a pn junction. Obtain the expression for diode equation to show that forward current increases exponentially with forward voltage and reverse current is independent of reverse voltage. 3
- (b) A Zener diode is specified as having breakdown voltage 9.1 V, with a maximum power dissipation of 364 mW. What is the maximum current that the diode can handle ? $1\frac{1}{2}$
3. Write short notes on (i) Direct and indirect semiconductors and (ii) Construction and working of solar cell. — $4\frac{1}{2}$

UNIT—II

4. What is rectification ? How a PN junction diode be used as rectifier ? Discuss the working of centre tap full wave rectifier with circuit diagram and obtain the values of its average d.c. current, peak voltage and efficiency. $4\frac{1}{2}$
5. (a) Discuss the input and output characteristics of a common base transistor circuit. Explain the active, saturation and cut off regions. 3
- (b) The current gain α of a transistor is 0.98. It is connected to CB mode and gives a reverse saturation current $I_{CO} = 12 \mu A$. Find the base and collector currents for an emitter current of 2 mA. $1\frac{1}{2}$
6. (a) Draw circuit diagram for CE amplifier using fixed bias. Derive expressions for the stability factors and why fixed is never used. 3

- (b) An ac signal of 50 V and frequency 60 Hz is applied to a half wave rectifier. If the load resistance $R_L = 500 \Omega$ and $R_f = 50 \Omega$. Then find (i) ripple factor and (ii) efficiency of the rectifier. $1\frac{1}{2}$

UNIT—III

7. Attempt any **EIGHT** parts :

- (a) What is the function of time base circuit in CRO ?
- (b) Define voltage and current source.
- (c) Distinguish between avalanche and Zener breakdown.
- (d) What are photodiodes ?
- (e) State Thevenin's theorem.
- (f) Out of Germanium and Silicon which has larger conductivity at room temperature and why ?
- (g) What are biased and unbiased clipper circuits ?
- (h) What do you mean by Early effect in transistor ?
- (i) What are h parameters in transistor ?
- (j) Why common emitter mode configuration is preferred over other configuration in amplifiers ? $\frac{1}{2} \times 8 = 4$