

**Code: D-06 Subject: BASIC ELECTRONICS**

**Time: 3 Hours Max. Marks: 100**

**NOTE: There are 11 Questions in all.**

**Question 1 is compulsory and carries 16 marks. Answer to Q. 1. must be written in the space provided for it in the answer book supplied and nowhere else.**

**Answer any THREE Questions each from Part I and Part II. Each of these questions carries 14 marks.**

**Any required data not explicitly given, may be suitably assumed and stated.**

**Q.1 Choose the correct or best alternative in the following: (2x8)**

a. Which of the following doping will produce a p-type semiconductor

(A) Germanium with phosphorus. (B) Silicon with Germanium.

(C) Germanium with Antimony. (D) Silicon with Indium.

b. The majority charge carriers in the emitter of an NPN transistor are

(A) pentavalent atoms. (B) trivalent atoms.

(C) electrons. (D) holes.

c. An ideal differential amplifier has CMRR equalling

(A) Unity. (B) -1 (minus unity)

(C) Infinity. (D) Zero.

d. Which of the following is an active device

(A) an electric bulb. (B) a diode.

(C) a BJT. (D) a transformer.

e. Which configuration has unity voltage gain (ideal)

(A) a Common Collector (CC) (B) a Common Emitter (CE)

(C) a Common Base (CB) (D) CE followed by CB

f. JFET is a

(A) Current controlled device with high input resistance.

(B) Voltage controlled device with high input resistance.

(C) Current Controlled Current Source (CCCS)

(D) Voltage Controlled Voltage Source (VCVS)

g. The depletion region in a Junction Diode contains

(A) only charge carriers (of minority type and majority type).

(B) no charge at all.

- (C) vacuum, and no atoms at all.  
 (D) only ions i.e. immobile charges.

h. Photo-electric emission current is proportional to

- (A) frequency of the incident light.  
 (B) incident light flux.  
 (C) work function of photo- cathode.  
 (D) angle of incidence of radiation.

### PART I

Answer any THREE Questions. Each question carries 14 marks.

Q.2 a. Explain the conduction of current in a good conductor. Why does a conductor has low resistance? (7)

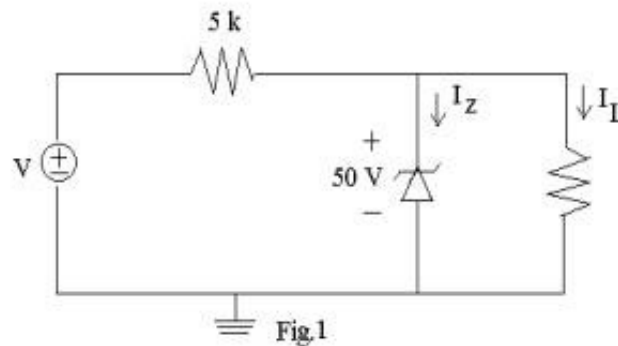
b. What is Intrinsic semiconductor. How do we make it Extrinsic semiconductor, and why so? (7)

Q.3 a. Explain the Zener and Avalanche effects. Give differences between them. (7)

b. Determine the range (7)

$$0 \leq I_L \leq 4 \text{ mA}$$

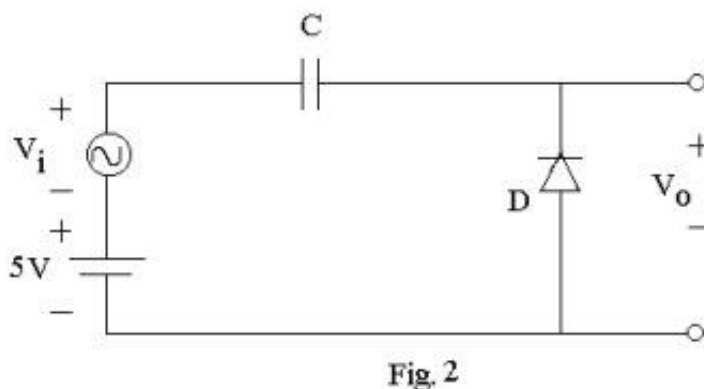
$$\text{data } 2 \leq I_Z \leq 8 \text{ mA}$$



Q.4 a. With help of a neat diagram, explain the operation of a Bridge Rectifier. what is PIV for the diode used here? (7)

b. Explain the functioning of a capacitor filter used with the rectifiers. (7)

Q.5 a. For the circuit shown in Fig.2 draw the waveform of output voltage  $V_o$ . Assume ideal diode D and lossless capacitor C. (7)



b. Define static and dynamic resistances for a diode. What are their uses? (7)

**Q.6** Write short notes on any **TWO** of the following :

- (i) Differentiation between Passive and Active components.
- (ii) IC resistors.
- (iii) Op-amp as an Adder. (14)

## PART II

**Answer any THREE Questions. Each question carries 14 marks.**

**Q.7** a. Name the various types of emissions. Explain in detail the photoelectric emission. (7)

b. Explain the operation of a Liquid Crystal Display (LCD). Where are LCDs used? (7)

**Q.8** a. Explain in detail, the operation of a JFET. (7)

b. Draw the circuit of a full-wave phase controlled rectifier using SCR. Explain its working. What are its advantages over a diode rectifier circuit? (7)

**Q.9** Using an OP-amp, explain the circuits for

- (i) an Integrator
- (ii) a unity gain amplifier (with least components)
- (iii) a current to voltage converter. (14)

**Q.10** a. By using a common collector NPN transistor configuration, explain how we obtain (i) voltage gain (ii) current gain (iii) impedance matching. (10)

b. How is a BJT biased for stability? (4)

**Q.11** Write short notes on any **TWO** of the following:

- (i) Operation of a Uni junction Transistor (UJT) and its uses.
- (ii) FET used as a switch and its limitations.
- (iii) IC Fabrication.
- (iv) Differential amplifier. Explain also CMRR. (14)