

(i) Printed Pages : 4

Roll No.

(ii) Questions : 9

Sub. Code :

3	7	0	5
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Exam. Code :

0	4	7	2
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**M.Sc.Physics 1st Semester
(2123)**

ELECTRONICS-I

Paper—PHY-8014

Time Allowed : Three Hours]

[Maximum Marks : 60

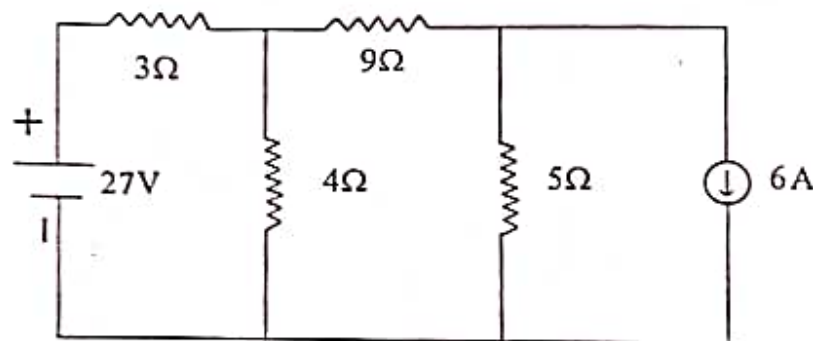
Note :— Attempt FIVE questions in all, selecting ONE question from each unit (Unit I to Unit IV). Question No. 9 of the Unit-V is compulsory.

UNIT-I

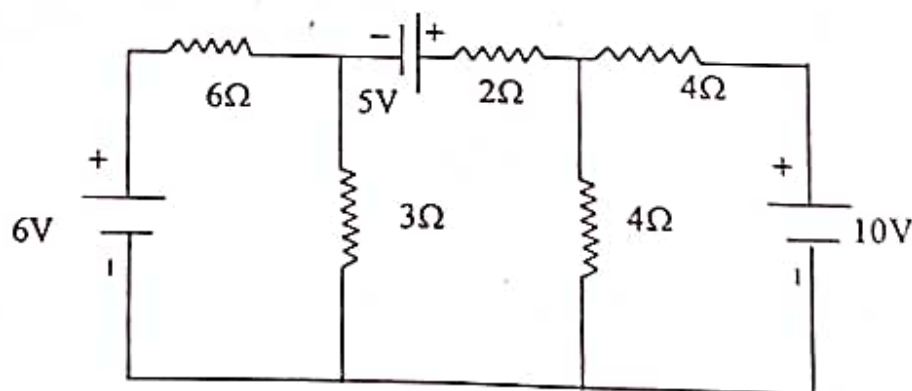
1. (a) Discuss the effect of the temperature and doping of carrier concentration on mobility. 6
- (b) Discuss the fabrication and qualitative description of the current flow at the P-N junction. 6
2. (a) What is the difference between photodiode and solar cell ? Give mechanism and I-V characteristics of photodiode and solar cell. 7
- (b) Discuss the negative resistance region of the Gunn diode with suitable diagrams. 5

UNIT-II

3. (a) What is Nodal analysis ? Explain how it helps in calculating branch current in circuit containing resistance and independent voltage sources. 6
- (b) Calculate the voltage drop across 9 ohm resistance using nodal analysis. 6



4. (a) Using the Mesh resistance matrix, calculate the current flowing through 2 ohm resistance. 6



- (b) Explain the working and circuit diagram of All Pass (AP), Band Pass (BP) and Band Reject (BR) filter network. 6

UNIT-III

5. (a) Discuss the application of operational amplifier as logarithmic and antilogarithmic amplifier. 8

- (b) Design an adder circuit using op-amp to get the output expression as :

$$V_o = -(0.1 V_1 + 5 V_2 + 10 V_3)$$

where V_1 , V_2 and V_3 are inputs for above adder. 4

6. (a) Discuss circuit diagram and working of one shot multivibrator using 555 timer. Also draw the wave forms for the output. 6

- (b) Discuss the IC operational amplifier with different stages. Discuss some of parameters of operational amplifier. 6

UNIT-IV

7. (a) What are the SCR devices ? Give its trigger application. 6

- (b) What is frequency modulated wave ? Discuss generation of FM wave in the communication system. 6

8. Give short notes on the following in communication system :

- (a) Code Division Multiple Access (CDMA)

- (b) Frequency Shift Keying (FSK). 6,6

UNIT-V

9. Give the point answers of following questions :

- (a) What is difference between direct and indirect types of semiconductor ? Give examples.
- (b) Define the transmission matrices for the two port network.
- (c) What are uses of poles for stability of circuit ?
- (d) Define CMRR in operational amplifier. Give its significance.
- (e) Output of voltage step input of 10 V peak is exponential which changes to 0.25 V in 0.1 μ s. What is the slew rate of op-amp ?
- (f) Find the percentage power saving when carrier and one of side band is suppressed in AM wave modulated to depth of 50 percent.

$$6 \times 2 = 12$$