

Roll No.

78614

M. Sc. Physics 4th Sem. (New)

Examination – May, 2014

ELECTRONICS - II (New)

Paper : XVII (Spl-i) opt (ii)

Time : Three hours]

[Maximum Marks : 80

Before answering the question, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

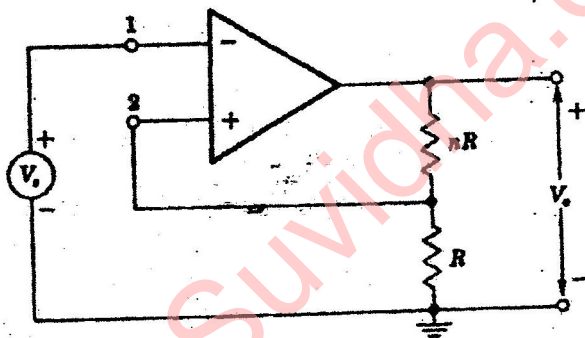
Note : Attempt five questions in all, selecting one question from each Unit. Question No. 1 is compulsory.

1. (a) Explain external photoelectric effect. $4 \times 4 = 16$
- (b) Briefly describe Pulse Amplitude Modulation (PAM).
- (c) Draw an IC OP - AMP in block diagram form and identify each stage by function.
- (d) Describe the use of op-amp as logarithmic amplifier.

- (b) Explain why CMRR is infinite if a true constant current source is used in a symmetric emitter coupled differential amplifier. 10

UNIT - IV

8. (a) For the differential amplifier assume infinite input resistance, zero output resistance and finite differential gain $A_v = V_0 / (V_1 - V_2)$: 8
- (i) Obtain the expression for the A_{vf}
- (ii) Show that $\lim_{A_v \rightarrow \infty} A_{vf} = n + 1, A_v \rightarrow \infty$.



- (b) Describe binary weight resistor Digital to Analog converter using op-amp. 8

9. (a) Sketch a regenerative comparator system and explain its operation. What parameters determine the loop gain and hysteresis. Sketch the transfer characteristics and indicate the hysteresis. 8

- (b) Describe OP-AMP as integrator and differentiator. 8

UNIT - I

2. (a) Describe the construction and working of Photo multiplier tubes. 10

(b) Discuss Avalanche photodiode. 6

3. Explain the following:

(a) P-N junction photodiode. 8

(b) What is LED ? Give its principle of working, construction and its application. 8

UNIT - II

4. (a) Describe Pulse coded modulation (PCM). 6

(b) A carrier wave is amplitude modulated at audio frequency. Deduce an expression to show two side band are produced. What is the relative power in each side band when modulation index is 0.5 ? 10

5. (a) What is balance modulator ? Illustrate with circuit diagram. 10

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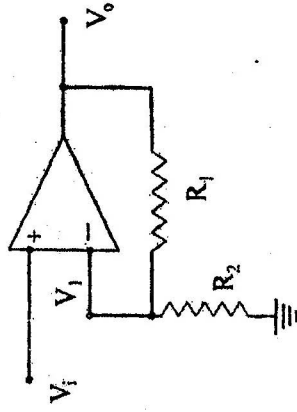
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(b) Describe the advantages and disadvantages of SSB transmission. 6

UNIT - III

6. (a) Draw the circuit of OP - AMP as Summing amplifier and explain its operation. 5

(b) Find the output V_0 in the circuit below with $A = 105, V_1 = -1 \text{ V}, R_1 = 125 \text{ k}\Omega$ and $R_2 = 25 \text{ k}\Omega$. Also find V_1 at amplifier input. 5



(c) Draw the circuit of OP-AMP as voltage to current converter with grounded load and explain its operation. 6

7. (a) Draw the schematic diagram of an ideal non-inverting OP-AMP with voltage series feedback and derive the expression for the voltage gain. 6