

Roll No.

78603

**M. Sc. (Physics) 4th Semester
Examination – December, 2014**

ELECTRONICS - II

Paper : XVII (C2)

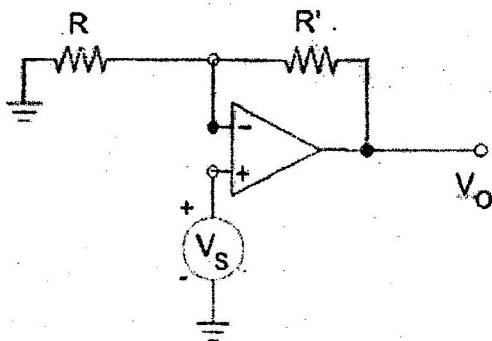
Time : Three Hours]

[Maximum Marks : 80

Before answering the questions, 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*. All questions carry equal marks.

1. (a) Briefly describe avalanche photodiode. $4 \times 4 = 16$
- (b) Describe the frequency spectra in amplitude modulation.
- (c) Explain OP-AMP as summing amplifier.
- (d) Describe use of OP-AMP as Sample & hold circuit.



- (b) Explain the transfer characteristics of differential amplifier and hence show that the maximum trans-conductance is $I_o/4V_T$. 8

UNIT - IV

8. (a) Explain how OP-AMP can be used to find the solution of differential equation 8

$$d^2v/dt^2 + K_1 dv/dt + K_2 v - v_1 = 0$$

where v_1 is given function of time and K_1, K_2 are positive constants.

- (b) Discuss OP-AMP as square wave generator. 8
9. (a) Discuss antilog amplifier. 5
- (b) Explain first order low pass filter circuit using op-amp. 6
- (c) Describe OP-amp as integrator 5

UNIT - I

2. (a) Explain the construction & working of solar cell. Find its open circuit voltage, short circuit current & fill factor. 10
- (b) Discuss P-I-N photodiode. 6

3. Explain the following :

- (a) Phototransistor 8
- (b) Light emitting diode 8

UNIT - II

4. (a) Describe product detector. Illustrate with circuit diagram. 6
- (b) Describe Balanced modulator ? Explain how the circuit produces side bands without carriers. 10
5. (a) An AM amplifier, at 100% modulation has a radio frequency output of 53 W with 10 W internal losses. 8

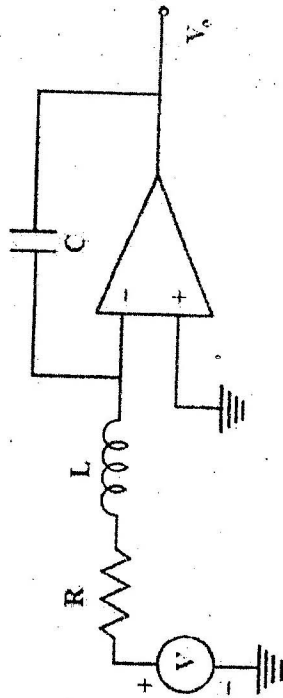
- (i) What is the unmodulated carrier power output ?
- (ii) What power output is required from the modulator ?

(iii) If only 75% modulation is required what modulator power output is needed ?

- (b) Define demodulator. How the side band information is extracted from the AM wave. 8

UNIT - III

6. (a) Find the output voltage as the function of time, assume $A_v \rightarrow \infty$ 6



- (b) Draw the circuit of OP-AMP as voltage to current converter with floating load and explain its operation. 5
- (c) Describe use of OP-AMP as Bridge amplifier. 5
7. (a) OP-AMP having infinite input resistance, zero output resistance and a voltage gain A_v . For the given circuit, find the gain with feedback (A_{vf}). 8