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78614

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

**ELECTRONICS - II (New)**

Paper : XVII (Spl-I) Opt (ii)

Time : Three Hours ]

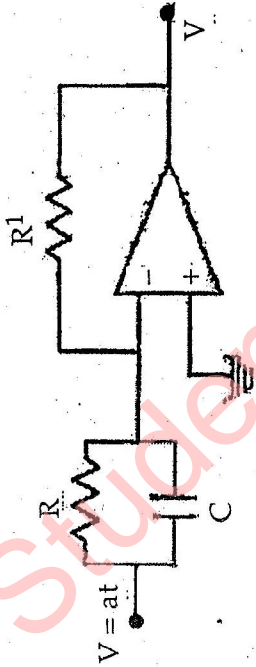
[ Maximum Marks : 80

*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 questions from each Unit. Question No. 1 is compulsory. All questions carry equal marks.*

1. (a) Describe internal photo electric effect.  $4 \times 4 = 16$
- (b) What are the advantages of FM over AM ?
- (c) Show the biasing arrangement for inverting and non-inverting operational amplifier.
- (d) Show that output for the circuit shown is :

$$V_0 = -\alpha.R'C - \alpha \frac{R'}{R}t$$



### UNIT - I

2. (a) What is Phototransistor ? How does it differ from ordinary transistor and Photodiode ? How can it be converted into a photodiode ? 10
- (b) Explain PIN photodiode. 6

3. Explain the following :

- (a) Vacuum Photodiode 7
- (b) Explain the construction & working of solar cell. Find its open circuit voltage, short circuit current & fill factor. 9

### UNIT - II

4. (a) A wireless transmitter radiates 4 KW with an unmodulated carrier wave and 5.2 kW with modulated wave. Assume negligible distortion calculate percentage distortion. 4
- (b) Explain Pulse Position Modulation (PPM). 5
- (c) Explain frequency conversion and Illustrate with circuit diagram. 7

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5. (a) If a class C modulated RF amplifier generates a carrier frequency power of 1.6 kW at an efficiency of 60%, calculate the output of the modulator to modulate the carrier with 100% modulation. 4
- (b) Define demodulator. How the side band information is extracted from the AM wave. 5
- (c) Explain Product detector. Illustrate with circuit diagram. 7

### UNIT - III

6. (a) Draw the circuit of OP-AMP as Bridge amplifier and AC-coupled amplifier. Explain their operation. 8
- (b) Define : 8
  - (i) Input bias current,
  - (ii) Input offset current,
  - (iii) Input offset voltage,
  - (iv) Output offset voltage,
  - (v) Power supply rejection ratio,
  - (vi) Slew rate and,
  - (vii) CMRR of operational amplifier.

7. (a) Draw the schematic diagram of an ideal inverting OP-AMP with voltage series feedback and drive the expression for the voltage gain. 6
- (b) Draw the circuit of an emitter coupled differential amplifier and explain why CMRR  $\rightarrow \infty$  for a symmetrical circuit with  $R_e \rightarrow \infty$ . 10

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## UNIT – IV

8. (a) Sketch using operational amplifier to solve the differential equation  $\frac{dv}{dt} + 0.5v + 0.1 \sin wt = 0$ .

An oscillator is available which will provide a signal  $\sin wt$ . Use only resistor and capacitors. 8

- (b) Explain the use of square wave generator. 8

9. (a) Describe Analog to Digital converter using op-amp. 6

- (b) Explain Sample and hold circuit and why it is required. 4

- (c) Describe OP-AMP as temperature compensated logarithmic amplifier. 6