

[4]

Or

Explain the construction, working and characteristics of photo transistor.

3. Draw schematic block diagram of the basic OP-amp with investing and non-investing inputs. Sketch their equivalent circuit.

Or

Sketch the circuit diagram of non-investing amplifier with feedback and determine the expression for closed loop voltage gain, input resistance of OP-amp with feedback and output resistance with feedback.

4. Describe the functions of an OP-amp as a summing scaling and averaging amplifiers.

Or

Describe OP-amp circuits for monostable multivibrator. Explain their operation.

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G-3/342/21

Roll No.....

III Semester Examination, April-2021

M.Sc.

PHYSICS

Paper IV

(Electronics Photonics and OP AMP)

Time : 3 Hours]

[Maximum Marks : 80

Note : All questions are compulsory. Question Paper comprises of 3 sections. **Section A** is objective type/Multiple Choice questions with no internal choice. **Section B** is short answer type with internal choice. **Section C** is long answer type with internal choice.

SECTION 'A'

(Objective Type Questions)

Choose the correct answer :

1 × 8 = 8

1. Photo conductive device uses :

- (a) metallic conductors
- (b) semiconductors
- (c) good quality insulators
- (d) none of these

2. An LED is :

- (a) an ohmic devices
- (b) a display device
- (c) a voltage regulated device
- (d) all the above

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3. Phototransistor is usually used in :

- (a) CB mode (b) CE mode
- (c) CC mode (d) any one of these modes

4. A photocell solar cell is actually a device which utilises :

- (a) photoconductive effect
- (b) photovoltaic effect
- (c) photoemissive effect
- (d) photoresistive effect

5. An ideal OP AMP has :

- (a) unity open loop gain
- (b) infinite bandwidth
- (c) infinite output impedance
- (d) zero input impedance

6. CMRR of a good OP AMP is :

- (a) less than 1 (b) very large
- (c) equal to 1 (d) equal to common mode gain

7. The phase in the integrator and differentiator circuit respectively are :

- (a) $+90^\circ$ and $+90^\circ$ (b) $+90^\circ$ and -90°
- (c) -90° and $+90^\circ$ (d) -90° and -90°

8. If a square wave is applied to the input of an OP AMP integrator circuit, the output would be :

- (a) sine wave (b) triangular wave
- (c) pulse (d) ramp

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SECTION 'B'

6 × 4 = 24

(Short Answer Type Questions)

Note : Answer the following questions in 250 words.

1. Explain radiative and non-radiative transitions.

Or

Write the advantages and disadvantages of LEDs.

2. Derive the expression for gain of the photoconductive detector.

Or

Write the advantages and limitations of Solar cells.

3. Draw the basic circuit of a differential amplifier.

Or

What are common mode and differential mode signals.

4. Discuss the two applications of summing amplifiers.

Or

Discuss the operation of an OP-amp integrators.

SECTION 'C'

12 × 4 = 48

(Long Answer Type Questions)

Note : Answer the following questions in 500 words.

1. Explain briefly the construction, characteristics and principle of operation of LDR.

Or

Who is LED ? Give its construction, principle of working and applications.

2. Describe the construction and working of a solar cell.