LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **PHYSICS**

FOURTH SEMESTER – **JUNE 2015**

PH 4208 - APPLIED PHYSICS

Date : 03/07/2015 Dept. No. Max. : 100 Marks

Time : 10:00-01:00

PART A

Answer **ALL** the questions (10 × 2 = 20)

1. What are semiconductors? How are n- type and p– type semiconductors produced?
2. What is zener breakdown voltage?
3. What is a photovoltaic cell?
4. What is LCD?
5. List the characteristics of an ideal op-amp and draw its equivalent circuit.
6. An amplifier is used to amplify an input signal to a peak output voltage of 100 mV. What is the maximum operating frequency of the amplifier? (Slew rate = 0.5V/μs)
7. With the block diagram, explain the principle of A/D converter.
8. In the context of D/A converters, explain the terms accuracy and resolution.
9. Mention any two applications of 555 timer?
10. Draw the circuit diagram of a monostable multivibrator.

PART – B

Answer any **FOUR** questions (4 × 7.5 = 30)

11. Describe the transistor action and the modes of operation.
12. Explain the working of Photomultiplier tube.
13. Give an experimental set up to solve the following simultaneous equations: 2x + y = 3 and x – y = 3.
14. Discuss with necessary block diagram, the working of the successive approximation A/D converter.
15. Explain the working of 555 timer connected as Schmitt trigger.

PART – C

Answer any **FOUR** questions (4 × 12.5 = 50)

16. Describe the V-I characteristics of a pn-junction diode in the forward and reverse bias with necessary theory.
17. i) Explain the construction, working and uses of LED. (6.5)
    ii) Write notes on LDR (6)
18. Explain how an op-amp can be used as, i) a differentiator and ii) an integrator. Derive expressions for the output in each case.

19. Explain with a neat circuit diagram, the working of a 4-bit R-2R ladder D/A converter.
20. Explain the working of an op-amp based astable multivibrator and derive an expression for the period of oscillation.