LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

FOURTH SEMESTER – **APRIL 2014**

PH 4208 - APPLIED PHYSICS

Date : 01/04/2014   Dept. No.   Max. : 100 Marks
Time : 01:00-04:00

PART A

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

1. What are intrinsic and extrinsic semiconductors?

2. What is Fermi level?

3. Write down the operating principle of a vacuum phototube.

4. How does an optocoupler function?

5. What are the characteristics of an ideal op-amp?

6. Define common mode rejection ratio.

7. What are the disadvantages and advantages of parallel comparator A/D converter?

8. What is meant by A/D converter? Draw the block diagram.

9. How the comparator outputs affect the RS flip-flop in 555 timer?

10. Draw the circuit diagram of a Schmitt trigger.

PART – B

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

11. Explain the I-V characteristics of Zener diode. Mention its uses.

12. Explain the construction, working and uses of solar cell.

13. Construct a non-inverting operational amplifier. Derive an expression for its voltage gain.

14. Explain with circuit, the working of a 4-bit binary weighted D/A converter.

15. Explain the working of 555 timer as monostable vibrator.

PART – C

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

16. i) Discuss the transistor current components.   (4)

    ii) Discuss in detail the working of a Transistor CE amplifier with a neat circuit diagram. (8.5)

17. Describe briefly the different types of photodiodes and Photo transistors.

18. Solve the following simultaneous equations: x + y =3 and x - y = 3 using operational amplifiers.

19. Draw the block diagram of the dual slope A/D converter. Explain the principle of operation. Mention its advantages and disadvantages.

20. Draw the circuit of an astable multivibrator using 555 timer and explain its working. Draw the wave forms at the output and across the capacitor.