

M.Sc. DEGREE (C.S.S.) EXAMINATION, JANUARY/FEBRUARY 2017**First Semester**

Faculty of Science

Branch II—Physics-A-Pure Physics

PH 1C 04—ELECTRONICS

(2012 Admission onwards)

Time : Three Hours

Maximum Weight : 30

Part A*Answer any six questions.**Weight 1 each.*

1. Why op-amp called operational amplifier ?
2. Using a neat schematic diagram explain how op-amp can be used as a voltage follower.
3. Define the term CMRR and explain what will be the condition for CMRR to be infinite.
4. Discuss current to voltage convertor.
5. What is an instrumentation amplifier ? Give two applications.
6. Define slew rate.
7. Differentiate between wide band reject filter and narrow band reject filter.
8. What is an all pass filter ? Where and why is it needed ?
9. Differentiate between a basic comparator and the Schmitt trigger.
10. What is the principle of phase discriminator ?

(6 × 1 = 6)

Part B*Answer any four questions.**Weight 2 each.*

11. For a given op-amp, CMRR = 10^5 and differential gain $A_d = 10^5$. Determine the common mode gain A_{cm} of the op-amp.
12. Differentiate between inverting and non-inverting amplifiers.
13. Write a note on voltage to current convertor with grounded load.
14. Design a summing amplifier to add three dc input voltages. The output of this circuit must be equal to two times the negative sum of the inputs.

Turn over

15. Design a second order low pass filter at a high cut off frequency of 1 KHz.
16. Write a note on superhetrodyne receiver.

(4 × 2 = 8)

Part C

Answer all questions.

Weight 4 each.

17. (a) Explain the structure, characteristics and frequency dependence of FET devices. Mention its applications.

Or

- (b) Draw the schematic diagram of an ideal non-inverting amplifier with feedback. Derive expressions for closed loop voltage gain, input resistance and output resistance.

18. (a) Write an essay on offset voltages and currents.

Or

- (b) Compare and contrast integrator and differentiator using op-amp. Give one application for each.

19. (a) Define a filter ? How are filters classified ? Explain first order low pass butter worth filter. Discuss its frequency response.

Or

- (b) With neat circuit diagrams explain the principle and operation of a square wave generator and a triangular wave generator.

20. (a) Compare and contrast voltage to frequency and frequency to voltage converters.

Or

- (b) Explain with neat block diagram the operating principle of phase locked loop. Give two applications of IC 565 PLL.

(4 × 4 = 16)