

Roll No. ....

Total Pages : 3

**CMDQ/D-23**  
**ELECTRONICS-I**

**5124**

Paper-PHY-304B

Time Allowed : 3 Hours]

[Maximum Marks : 60

**Note** : Attempt **five** questions in all, selecting **one** question from each Unit. Question No. **1** is compulsory. All questions carry equal marks.

**Compulsory Question**

1. (a) In a sample-and-hold circuit, OPAMP is used in voltage-follower mode. Why? 3
- (b) What is granular distortion in delta modulation? 3
- (c) Differentiate between connectors and splicer. 3
- (d) List applications of charge-coupled devices. 3

**UNIT-I**

2. (a) Describe the operation of a sample and hold circuit along with its possible practical applications. 6
- (b) Draw the circuit of a square wave generator using a comparator and explain its operation by drawing the capacitor and output voltage waveforms. 6

3. (a) Draw the circuit of an ac voltage follower having a very high input resistance. Also explain its operation. 6
- (b) Sketch the circuit of a fast half wave rectifier and explain its operation. How this circuit is converted into an average detector? 6

**UNIT-II**

4. (a) List the parameters which dictate the range of Radar and hence deduce Radar range equation. 6
- (b) Describe the working a super heterodyne AM receiver with the help of a block diagram. 6
5. (a) Design and discuss the operation of a second-order Butterworth high-pass filter. 6
- (b) Compare digital and analog communication modulation systems. 6

**UNIT-III**

6. (a) What are fiber-optic connectors? List their important applications. 6
- (b) Discuss the vapor-phase deposition technique for the fabrication of glass fiber. 6
7. (a) Explain, in detail, a multimode graded index fiber. 6
- (b) Explain the term numerical aperture (NA) in an optical fibre. Derive an expression for NA in terms of relative refractive index between core and cladding. 6

#### **UNIT-IV**

8. Explain the effect of surface accumulation, surface depletion and inversion in detail with suitable energy band diagrams.  
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9. Draw energy band diagrams and discuss in detail the following :

(a) Tunnel contact

(b) Schottky contact. 12