BOARD QUESTION PAPER: MARCH 2025
Electronics Paper - I

Time: 3 Hours **Max. Marks: 50**

Instructions:

i. All questions are compulsory.
ii. Figures to the right indicate full marks.
iii. Draw neat labelled diagrams whenever necessary.
iv. Use of logtable is allowed.

1. (A) Select correct alternatives from the following sub-question and rewrite the complete sentences.

(a) In a full wave bridge rectifier the ripple frequency is _____. (1)

(i) fin (ii) 2 fin
(iii) 3 fin (iv) 4 fin

(b) Loud Speaker is a _____ type of transducer. (1)

(i) Pressure (ii) Temperature
(iii) Electro acoustics (iv) None of these

(c) In fax machines for scanning _____ are used. (1)

(i) LEDs (ii) LCDs
(iii) CCDs (iv) None of these

(d) _____ multivibrator is an oscillator. (1)

(i) Astable (ii) Bistable
(iii) Monostable (iv) None of these

(B) Attempt **any two** of the following:

(a) Explain the working of centre-tap full wave rectifier with neat diagram and wave-form. (3)

(b) Explain the following parameters of an operational amplifier: (3)

(i) Input bias current
(ii) CMRR
(iii) Drift

(c) Calculate the output pulse width for the timer used as monostable multivibrator. Given, R = 15KΩ and C = 0.22 μF. Find the value of C if pulse width changes to 20 ms. (3)

2. (A) Attempt **any two** of the following:

(a) Draw labelled diagram of Cathode Ray Tube (CRT) and explain each electrode in it. (3)

(b) Explain with the help of circuit diagram, working of Inductor input filter, when it is connected across the output terminals of a full-wave rectifier. Draw it's output wave-form. (3)

(c) Draw block diagram IC 555. Explain function of each block. (3)

(B) Attempt **any one** of the following:

(a) Draw a circuit diagram of an Inverting amplifier using Op-amplifier. Explain concept of virtual ground and hence derive the expression for it's output voltage. (4)

(b) What is Amplitude Modulation? State the expression for modulated wave and draw the waveform of modulated wave. (4)

3. (A) Attempt **any two** of the following:

(a) With the help of Block diagram, explain the working of function Generator. (3)

(b) Draw the circuit diagram of a voltage regulator using Zener diode, explain it's working. (3)

(c) In an Op-Amp Inverting adder, $V_1 = 0.2$ volt, $V_2 = 0.1$ volt, $V_3 = 0.4$ volt, $R_1 = 1$ KΩ, $R_2 = 2$ KΩ, $R_3 = 4$ KΩ. Find the output voltage if feed back resistance is 20 KΩ. (3)

(B) Attempt **any one** of the following:

(a) Explain the working of LVDT as a transducer. Draw neat diagram. State it's two applications. (4)

(b) What do you mean by Network Topology? Explain Star, Ring and Bus Topology. (4)

4. (A) Attempt **any two** of the following:

(a) State any three front panel controls of CRO and give use of each control. (3)

(b) Explain with diagram and wave form working of R-C filter for reducing ripple. (3)

(c) Explain the working of differentiator circuit using operational amplifier. Derive expression for output voltage. (3)

(B) Attempt **any one** of the following:

(a) Draw basic circuit for Schmitt trigger using Op-Amp. and explain the terms: (4)

(i) UTP

(ii) LTP

(iii) Hysteresis

(b) Draw a block-diagram showing basic elements of a Fiber Optical Communication System. Explain function of each block in brief. (4)

5. (A) Attempt **any two** of the following:

(a) Explain electro-static focussing system of a CRT (Cathodes Ray Tube). (3)

(b) In Full Wave Rectifier, if primary of transformer is connected to 230V, 50 Hz and secondary voltage is 12-0-12V. (3)

Calculate:

(i) Output DC voltage

(ii) PIV of the diode

(iii) Output ripple frequency

(c) Give any three advantages of FM over AM. (3)

(Frequency Modulation and Amplitude Modulation)

(B) Attempt **any one** of the following:

(a) State Active Transducers. Explain Optocoupler. (4)

(b) How Op-amplifier can be used as a Subtractor? (4)

OR

5. (A) Attempt **any two** of the following:

(a) Explain the use of CRO for measurement of phase. (3)

(b) Explain how Op-amplifier is used as a Buffer. Draw suitable circuit diagram. (3)

(c) Explain how IC 555 can be used as a Pulse Position Modulator (PPM). (3)

(B) Attempt **any one** of the following:

(a) Explain any four characteristics of a Power Supply. (4)

(b) Draw general block-diagram of a pulsed radar and explain function of each block in brief. (4)