

DAY - 17

SEAT NUMBER

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2025

III

04

1100

V - 53

(E)

**ELECTRONICS**  
**PAPER - I (C-2)**

Time : 3 Hours

4 Pages

Max. Marks : 50

- Instructions :**
- (1) All questions are compulsory.
  - (2) Figures to the right indicate full marks.
  - (3) Draw neat labelled diagrams wherever necessary.
  - (4) 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 \_\_\_\_\_.

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(i)  $f_m$

(ii)  $2 f_m$

(iii)  $3 f_m$

(iv)  $4 f_m$

(b) Loud Speaker is a \_\_\_\_\_ type of transducer.

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(i) Pressure

(ii) Temperature

(iii) Electro acoustics

(iv) None of these

(c) In fax machines for scanning \_\_\_\_\_ are used.

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(i) LEDs

(ii) LCDs

(iii) CCDs

(iv) None of these

(d) \_\_\_\_\_ multivibrator is an oscillator.

- (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,  $R = 15K\Omega$  and  $C = 0.22 \mu F$ . Find the value of  $C$  if pulse width changes to 20 ms. 3

2. (A) Answer **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 its 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 its output voltage. <https://www.maharashtrastudy.com> 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 its working. 3
- (c) In an Op-Amp Inverting adder,  $V_1 = 0.2$  volt,  $V_2 = 0.1$  volt,  $V_3 = 0.4$  volt,  $R_1 = 1 K\Omega$ ,  $R_2 = 2 K\Omega$ ,  $R_3 = 4 K\Omega$ . Find the output voltage if feed back resistance in  $20 K\Omega$ . 3

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

(a) Explain the working of LVDT as a transducer. Draw neat diagram. State its 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 :

(i) UTP

(ii) LTP

(iii) Hysteresis 4

(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 (Cathode 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.

(Frequency Modulation and Amplitude Modulation) 3

(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
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