

[This question paper contains 2 printed pages]

Roll No.....

Sr. No. of question paper : 2975
Name of Course : **B.Sc. (Prog.) – Physical sciences with electronics
– NEP: UGCF-2022**
Name of the Paper : Advanced Digital Electronics
Semester : IV
Unique Paper Code : 2513512001
Medium of setting the Question paper: English Language

Duration: 2 Hours

Maximum Marks: 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **four** questions in all.
3. **Question No. 1 is compulsory.**
4. All questions carry equal marks.

1. Attempt any five of the following:

(5 × 3 = 15)

- (a) State any three applications of CRO.
- (b) Differentiate between active and passive components with examples.
- (c) Convert $(0.1001)_2$ into decimal equivalent.
- (d) Simplify the expression: $Y = \overline{A.B} + \overline{A} + \overline{B}$.
- (e) The vertical deflection of a signal is 3.6 cm on a CRO and the volts/div setting is 1.5 V/div.
Find the peak-to-peak voltage?
- (f) What is sampling in A–D conversion?

P.T.O

2. (a) Compare D–A and A–D converters in terms of function, applications, and key parameters.

- (b) Design a simple combinational logic circuit using PLA for the function:

$$F(A, B, C) = \Sigma m(1, 3, 5, 6)$$

- (c) Define an integrated circuit. Explain the terms wafer, chip, and monolithic IC.

(7, 5, 3)

3. (a) Explain the working of a decade counter. How does it differ from a 4-bit binary counter?

- (b) A TTL gate has $I_{OH} = -400 \mu A$, $I_{IH} = 40 \mu A$, $I_{OL} = 16 mA$, $I_{IL} = -1.6 mA$. Calculate fan-out for HIGH and LOW states.

- (c) What is meant by SSI, MSI, LSI and VLSI? Give basic definitions. **(7, 5, 3)**

4. (a) What is a monostable multivibrator? Explain its working with circuit diagram. Also draw a neat waveform.

- (b) Define resolution and accuracy of a DAC. Explain their significance in D–A conversion.

- (c) A logic gate draws 2 mA when output is HIGH and 4 mA when output is LOW. Calculate average power dissipation (assume 50% duty cycle) if supply voltage is 5V.

(7, 5, 3)

5. (a) Define PROM. Can it be used for implementing combinational circuits? Justify.

- (b) What is speed-power product? Why is it considered a figure of merit for logic families?

- (c) Explain the working of IC 555 in astable multivibrator mode in brief.

(7, 5, 3)