

[This question paper contains 2 printed pages.]

Sr. No. of Question Paper : 6871

D

Your Roll No.....

Unique Paper Code : 222575

Name of the Course : B.Sc. (Physical Science/Applied Physical Science)

Name of the Paper : ELCT-501 : Electronics Circuits

Semester : V

Duration : 3 Hours

Maximum Marks : 75

**Instructions for Candidates**

1. Write your Roll No. on the top immediately on receipt of this question paper.
  2. Attempt **five** questions in all.
  3. All questions carry equal marks.
- 
1. (a) Explain bridge rectifier along with the diagram. Derive expression for rectification efficiency, ripple factor for full-wave rectifier with resistive load. (10)
  - (b) In a centre-tap full wave rectifier, the load resistance  $R_L = 1k\Omega$ . Each diode has a forward-bias dynamic resistance  $r_d$  of  $10\Omega$ . The voltage across half the secondary winding is  $220 \sin 314t$ . Find (a) the peak value of current, (b) the dc or average value of current, (c) the rms value of current, (d) the ripple factor, and (e) the rectification efficiency. (5)
  2. (a) What do you mean by transistor biasing ? Why it is needed ? (5)
  - (b) Describe self bias method for transistor biasing. State its advantages. (10)
  3. (a) Explain the following regions in a transistor (i) active (ii) saturation (iii) cut-off for CE configuration. Define  $\beta$  and  $\alpha$  of a transistor and obtain relationship between them. (10)
  - (b) What is meant by a clamping circuit ? Give different types of clamping circuits along with their output waveforms and explain one circuit operation of any. (5)

P.T.O.

4. (a) Simplify the following Boolean expression

$$(i) Y = (A + B + C).(A + B)$$

$$(ii) Y = AB + ABC + ABC\bar{C}$$

$$(iii) Y = 1 + A(\bar{B}\bar{C} + BC + \bar{B}\bar{C}) + A\bar{B}C + AC \quad (9)$$

(b) Add the following : (2)

$$(i) 00001111 + 00110111$$

$$(ii) 00010100 + 00101001$$

(c) Subtract  $(14)_{10}$  from  $(46)_{10}$  using 2's complement arithmetic. (2)

(d) Determine X in the following :

$$(i) (3A9E.B0D)_{16} = (X)_2$$

$$(ii) (11011.101)_2 = (X)_{10} \quad (2)$$

5. Write the truth table and minimize the following expression using k-map and draw simplified circuit diagram

$$Y = \sum m(0, 2, 5, 7, 8, 10, 13, 15) + d(6, 14)$$

where d represents don't care conditions. (15)

6. (a) Explain construction and working of binary ladder type D/A converter. (10)

(b) How it is better than resistive type D/A converter ? (2)

(c) What are the output voltages caused by each bit in a 5 bit ladder if the input level are 0 = 0 V and 1 = + 10V ? (3)

7. (a). What is the difference between the Synchronous and Asynchronous counter ? (3)

(b) Explain construction and working of a mod-8 ripple counter. Draw the waveform chart/timing cycle also. (12)

8. Write a short note on any of the three :

(a) ROM

(b) T Flip Flop

(c) De-multiplexer

(d) C Filter (15)