

This question paper contains 3 printed pages]

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S. No. of Question Paper : 98

Unique Paper Code : 222575

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Name of the Paper : ELCT-501 : Electronic Circuits

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

Semester : V

Duration : 3 Hours

Maximum Marks : 75

*(Write your Roll No. on the top immediately on receipt of this question paper.)*

Attempt Five questions in all.

All questions carry equal marks.

1. (a) What is rectification ? Explain working of full wave rectifier with the help of a circuit diagram. Derive expression for ripple factor and efficiency for full wave rectifier. 1,3,6
- (b) What do you understand by voltage regulation or stabilisation ? Explain the working of capacitor filter with the help of circuit diagram. 2,3
2. (a) Describe the self-biasing method of transistor in CE configuration with necessary circuit analysis. 8
- (b) What is meant by a clipper circuit ? Explain the circuit operation of positive clipper with output waveform. 2,5
3. (a) Draw circuit diagram for obtaining the input and output characteristics of transistor in CB-configuration and explain the I-V characteristics. 2,4,4

P.T.O.

- (b) What do you understand by d.c. load line ? Draw the d.c. load line for CE configuration when collector-emitter voltage  $V_{CE}$  is 12.5 V and load resistance  $R_C$  is 2.5 K $\Omega$ . 2,3
4. (a) State and prove De-Morgan's theorem with logic circuit. 3
- (b) Subtract  $(48)_{10}$  from  $(24)_{10}$  using 2's complement method. 3
- (c) Prove expression : 3
- $$(A + B)(A + \bar{B})(\bar{A} + C) = AC.$$
- (d) Give the logic circuit and truth table of Half Adder. 2
- (e) Add BCD numbers 00010110 + 00010101. 2
- (f) Convert decimal number 65,535 in hexadecimal and binary number system. 2
5. (a) Draw a neat diagram along with truth table for J-K flip-flop. Explain the problem faced by it. How was this problem resolved in master slave J-K flip-flop ? 3,3,4
- (b) What is meant by clamping circuit ? Give different types of clamping circuits along with their output waveforms. 5
6. Obtain the truth table and K-map simplification for the following expression. Draw the circuit diagram in terms of NAND gates : 15

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

where  $d$  represents don't care conditions.

7. (a) Write the difference between synchronous and asynchronous counter. 2
- (b) Draw a neat diagram for 3-bit synchronous counter. Explain its working with the help of truth table and waveform chart/timing cycle. 3,10
8. Write short notes on any *three* of the following : 3×5
- (a) RAM
- (b) Drawbacks of resistive type D/A converter
- (c) Multiplexer
- (d) Common emitter amplifier.