

Printed Pages 2

Paper Code BEC-01

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B.Tech.

Year 1<sup>st</sup> Semester 1<sup>st</sup>

Major Examination 2016-2017

**FUNDAMENTALS OF ELECTRONICS ENGINEERING**

Time: 3 Hours

M.M.: 40

Note: - Attempt all the questions. Each Question carries equal marks

1. Attempt any three parts from the following. From Unit-1 Q.1(a) is compulsory

(a) A Voltage of  $200 \cos \omega t$  is applied to HWR with load resistance of 5 Kohm. (4)  
Find

- (i) Maximum dc current component
- (ii) rms current
- (iii) Ripple factor
- (iv) Rectifier efficiency

(b) How dynamic resistance of p-n diode can be determined graphically. Derive the expression for the same. (3)

For what voltage will the reverse saturation current in a p-n junction Ge diode reaches 90% of its saturation value at room temperature

(c) Draw the circuit of centre tapped full wave rectifier with  $\Pi$  filter. Derive the expression for ripple factor and efficiency. (3)

(d) Write short notes on any two of the following. (3)

- (i) Transition and diffusion capacitance of p-n junction
- (ii) Clipper circuits
- (iii) Voltage Doublers

2.

Attempt any three parts from the following. From Unit-2 Q.2 (a) is compulsory

(a) Why operating point is not selected near the saturation region? (4)

The CE germanium transistor amplifier circuit uses self bias with parameters  $V_{CC} = 16V$ ,  $R_C = 3K \text{ ohm}$ ,  $R_E = 2K \text{ ohm}$ ,  $R_1 = 56K \text{ ohm}$ ,  $R_2 = 20K \text{ ohm}$  and  $\alpha = 0.985$ . Draw the circuit and calculate.

- (i) Co-ordinates of operating point
- (ii) Stability factor

(b) Draw the input and output characteristic curves of n-p-n transistor in CB configuration and indicate the different regions of operation. Establish the relation for collector current. (3)



- (c) Draw the structure of n-Channel JFET. Explain its operation with Drain and transfer characteristics. Explain the significance of Pinch off. (3)
- (d) Describe the working of P-channel E-MOSFET. Draw its Drain and Transfer curve. What is the significance of Threshold voltage. (3)

3.

Attempt any three parts from the following. From Unit- 3 Q.3 (a) is compulsory

- (a) (i) Convert the following as indicated with procedures. (4)

- (a)  $(397.75)_{10} = ( )_{16}$
- (b)  $(23.AB)_{16} = ( )_{10}$
- (c)  $(101.01)_2 = ( )_{10}$
- (d)  $(62.7)_8 = ( )_{16}$

- (b) Using the K map method obtain the minimal sum of product expression of the following. (3)

~~$F(A, B, C, D) = \sum m(0, 2, 3, 5, 7, 12, 15) + \sum d(1, 4, 8, 11)$~~   
and draw the logic circuit for simplified expression

- (c) Simplify the following logic expression using Boolean algebra. (3)

(i)  $f = AB + A(B + C) + B(B + C)$

(ii)  $f = \overline{A}\overline{B}\overline{C}D + \overline{A}\overline{B}D + B\overline{C}D + \overline{A}B + \overline{B}\overline{C}$

- (d) Explain the operation of OP-AMP as non inverting amplifier. Calculate its voltage gain. How it can be used as unity gain buffer draw the circuit and mention its uses. (3)

4.

Attempt any three parts from the following. From Unit- 4 Q.4 (a) is compulsory

- (a) Draw the schematic diagram of a CRO. Explain how phase and frequency can be measured by using CRO. (4)

- (b) What are digital instruments? Compare analog and digital instruments. Explain the operation of a basic digital multimeter with block diagram. (3)

- (c) Explain the basic principal of digital voltmeter. State the advantage of DVM over analog meter. Draw the block diagram of dual slope A/D converter type DVM (3)

- (d) Explain with diagrams how current and resistance can be measured with digital multimeter (3)