No. of Printed Pages : 4

BME-021

B.Tech. MECHANICAL ENGINEERING (COMPUTER INTEGRATED MANUFACTURING) / B.Tech. (AEROSPACE ENGINEERING) (BTAE)

Term-End Examination

June, 2016

00938

BME-021 : PRINCIPLES OF ELECTRICAL AND ELECTRONICS SCIENCE

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt* ***five*** *questions. Question no.* ***1*** *is* ***compulsory****. Answer any* ***two*** *questions from Section A and any* ***two*** *from Section B. Use of scientific calculator is allowed.*

1. State whether the following statements are *True* or *False* : *7×2=14*

(a) The resistance of a conductor increases, if its length decreases.

(b) The power consumed by a pure inductance connected to AC source is zero.

(c) The unit of magnetic flux intensity (H) is AT/m.

(d) The frequency of voltage at the secondary of a transformer is less than that of the primary.

(e) BJT can be used as a switch as well as an amplifier.

(f) Flip-flop is a basic memory element used in sequential circuits.

(g) The barrier potential is equal to 0·7 V for silicon.

SECTION A

*Attempt any **two** questions from this section.*

2. (a) State and explain Kirchhoff's laws applied to DC circuits. 7

(b) Find the resistance at 20°C of 2 km of copper wire of cross-sectional area of 0·1 cm^2, if the specific resistance of copper at this temperature is $17{\cdot}3 \times 10^{-9}$ Ω m. What would be its resistance at 35°C, if $\alpha = 0{\cdot}0043°C$? 7

3. (a) Deduce the analogy between magnetic and electric circuits. What are the major points of difference between them ? 7

(b) State the maximum power transfer theorem. And prove that $P_{max} = \frac{V_{Th}^2}{4R_{Th}}$ for maximum power transfer theorem. 7

4. Write short notes on the following : $4 \times 3\frac{1}{2} = 14$

(a) DC servomotor

(b) Series resonance for AC circuit

(c) Magnetic hysteresis

(d) Quality factor

SECTION B

*Attempt any **two** questions from this section.*

5. (a) What are intrinsic and extrinsic semiconductors ? Draw and explain I – V characteristic of a diode. 7

(b) Draw the block diagram of IC Timer 555 and its various operating modes. 7

6. (a) State the De Morgan's theorems with the help of logic gate and truth tables. 7

(b) Write a short note on DAC and ADC. 7

7. (a) Draw the circuit of R – S flip-flop with NOR gates and discuss the behaviour of this circuit. 7

(b) Write short notes on the following : 7

(i) Piezo-electrical Transducers

(ii) MOSFET