BME-021

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

Term-End Examination

00602 **June, 2019**

BME-021 : PRINCIPLES OF ELECTRICAL AND ELECTRONICS SCIENCE

Time : 3 hours   *Maximum Marks : 70*

*Note :   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)   An electrical network with 6 independent nodes will have 5 loop equations.

   (b)   The reluctance of a material is defined as its ability to conduct magnetic flux.

   (c)   The average value of the alternating quantity is more than the rms value.

(d) The eddy current losses in the transformer occur in the core.

(e) At start, the slip of the induction motor is zero.

(f) The emitter of a transistor is doped heavily.

(g) The most commonly used transistor circuit arrangement is common emitter.

SECTION A

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

2. (a) What are the factors affecting the resistance of a conductor ? How do they affect its value ?   7

    (b) State and explain Kirchhoff's current and voltage laws.   7

3. (a) A flux density of 1.2 Wb/m^2 is required in the 2 mm air gap of an electromagnet having an iron path 1 metre long. Calculate the magnetising force and current required if the electromagnet has 1273 turns. Assume relative permeability of iron is to be 1500.   7

    (b) Give the comparison between STAR and Delta connected systems.   7

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

    (a) Torque-slip Characteristics of Induction Motor

    (b) OC and SC Tests of Transformer

    (c) Single-phase Induction Motor

    (b) AC Servomotor

SECTION B

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

5. (a) Draw the symbol, structure and equivalent circuit of TRIAC and IGBT. 7

   (b) Draw the circuit diagram of Common-Emitter Amplifier and also derive the expression for the voltage gain. 7

6. (a) State and explain the De Morgan's theorem with diagrams. 7

   (b) Draw the TTL NAND Gate circuit and also explain its operation. 7

7. (a) What is the difference between volatile and non-volatile memory ? 7

   (b) What are the various registers in 8085 ? Name the 16 bit registers. 7

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