

**B.Tech. MECHANICAL ENGINEERING
(COMPUTER INTEGRATED
MANUFACTURING) /
B.Tech. (AEROSPACE ENGINEERING) (BTAE)
Term-End Examination**

June, 2018

00353

**BME-021 : PRINCIPLES OF ELECTRICAL AND
ELECTRONICS SCIENCE**

Time : 3 hours

Maximum Marks : 70

Note : Answer seven questions in all. Answer any three questions from Section A and any three questions from Section B. Question no. 1 is compulsory.

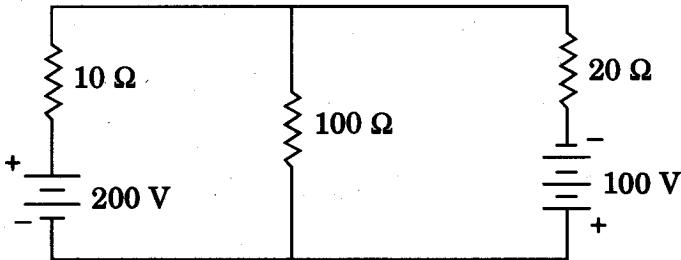
1. State whether the following statements are *True* or *False* : *10×1=10*
- (a) The temperature coefficient of resistance is negative in case of insulators and electrolytes.
 - (b) A Norton's equivalent is a parallel circuit.
 - (c) The capacitance of the air capacitor decreases when the air is replaced by some dielectric material.

- (d) Ferromagnetic substances have the highest magnetic permeability.
- (e) The amplitude factor of sinusoidal current is 1.11.
- (f) In a star-connected system, the phase difference between line and phase voltage is 30° .
- (g) The efficiency of the transformer is independent of power factor.
- (h) The stator core of an induction motor is made of silicon steel stamping.
- (i) The emitter of a transistor is doped heavily.
- (j) An OP-AMP cannot be used as a clamper circuit.

SECTION A

Answer any **three** questions from this section.

2. (a) State and explain Norton's Theorem with example. 5
- (b) For the network shown below, calculate the current in $100\ \Omega$ resistor and p.d. across the $10\ \Omega$ resistor. 5



3. (a) What do you understand by temperature coefficient of a resistor? Name the materials whose resistance decreases with rise of temperature. 5
- (b) Distinguish between Self and Mutual Inductance. 5
4. (a) Draw and explain the hysteresis loop. 5
- (b) Define the coefficient of coupling and show that $K = M / \sqrt{L_1 L_2}$. 5

5. (a) The series resonant circuit is often regarded as the acceptor circuit and parallel circuit as the rejector circuit. 5
- (b) Write the difference between Star-connected system and Delta-connected system. 5
6. (a) Explain the principle and working of a transformer. 5
- (b) What are the different methods of starting of an induction motor ? Explain one method with diagram. 5

SECTION B

Answer any **three** questions from this section.

7. (a) Explain semi-conductors in terms of energy band diagrams. 5
(b) Discuss in brief the operation of IGBT. 5
8. (a) Explain the working of a full wave bridge rectifier with diagrams. 5
(b) Discuss the working of J-K flip-flop with truth table. 5
9. (a) Draw the TTL NAND gate circuit and explain its working. 5
(b) Explain the various flags used in 8085 microprocessor. 5
10. (a) Draw the diode ROM matrix and a basic RAM cell. 5
(b) What is the difference between Synchronous and Asynchronous counters? 5
11. Write short notes on any **two** of the following : $2 \times 5 = 10$
(a) MODEM
(b) 8085 Microprocessor
(c) Semi-conductor Memories
(d) ADC Converter
-