No. of Printed Pages : 4

BEE-031

DIPLOMA IN MECHANICAL ENGINEERING (DME)

Term-End Examination

00103 **December, 2018**

BEE-031 : ELECTRICAL TECHNOLOGY

Time : 2 hours *Maximum Marks : 70*

Note : *Attempt **five** questions in all, including question no. **1** which is **compulsory**. Use of scientific calculator is permitted.*

1. (a) Write *True* or *False* for the following statements : *7×1=7*

(i) As per Kirchhoff's Voltage Law (KVL), the sum of voltages in closed network is zero at any instant of time.

(ii) The efficiency of maximum power transfer theorem is 93%.

(iii) DC series motor has highest starting torque.

(iv) Transformer is used to step up or step down the frequency.

(v) Induction motor runs at constant speed.

(vi) Single-phase induction motor is a self-starting motor.

(vii) Synchronous motor operates for lagging power factor only.

(b) Fill in the blanks : $7 \times 1 = 7$

(i) As per KCL, algebraic sum of _____ is zero at a node.

(ii) The output and input relation of linear element always follows _____ and homogeneity principles.

(iii) In case of star connection, line voltage is equal to _____ times the phase voltage.

(iv) Effect of armature flux on the main field flux is called _____ .

(v) No load current is _____ of rated current in case of transformer.

(vi) For induction motor, Rotor Copper loss = _____ × Rotor input.

(vii) _____ motor can be used as a synchronous condenser.

2. (a) Draw the phasor diagrams for the following : *8*

(i) RL circuit
(ii) RC circuit
(iii) RLC series circuit
(iv) RLC parallel circuit

(b) Why is three phase system preferred over single phase system ? Explain. 6

3. (a) State and prove maximum power transfer theorem. 8

(b) Calculate current I as shown in Figure 1. 6

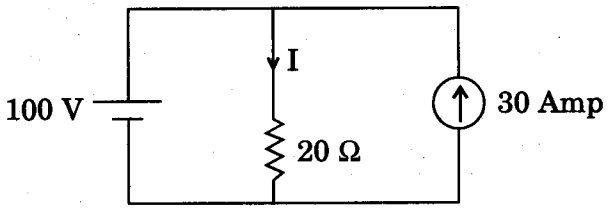

Figure 1

4. (a) Explain functions of the following parts of dc machine : 7

(i) Field system

(ii) Armature

(b) Explain internal and external curves for separately excited DC generator. 7

5. (a) Describe torque-slip curve of three-phase induction motor. 7

(b) A 3-phase induction motor has 2 poles and is connected to 400 V, 50 Hz supply. Calculate the actual rotor speed and rotor frequency when the slip is 4%. 7

6. (a) What are the differences between a synchronous motor and an induction motor ? 7

(b) Explain three-point starter with neat schematic diagram. 7

7. Write short notes on any ***two*** of the following : *2×7=14*

(a) Speed Control of DC Series Motor

(b) Auto Transformer

(c) Hunting and Damper Winding