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BEE-031

DIPLOMA IN MECHANICAL ENGINEERING (DME)

00824

Term-End Examination

June, 2013

BEE-031 : ELECTRICAL TECHNOLOGY

Time : 2 hours *Maximum Marks : 70*

Note : *Answer **five** questions in all. Question no. **1** is **compulsory**.*

1. Select the correct answer from the given alternatives : **7x2=14**

(a) RMS value of fully rectified sinwave is :

(i) $V_m/2$ (ii) $2\ V_m/\pi$

(iii) V_m/π (iv) $V_m/\sqrt{2}$

(b) Which of the following motor is suitable for Traction ?

(i) DC shunt motor

(ii) DC compound motor

(iii) DC series motor

(iv) None of above

(c) Maximum efficiency of transformer occurs when :

(i) Iron loss = 0

(ii) Copper loss = 0

(iii) Iron loss = Copper loss

(iv) None of above

(d) At resonance frequency, a R-L-C series circuit has :

(i) Zero lagging power factor

(ii) Zero leading power factor

(iii) Unity power factor

(iv) None of above

(e) A Reciprocal network is consists of :

(i) Only unilateral elements

(ii) Only bilateral elements

(iii) both unilateral and bilateral elements.

(iv) None of above

(f) A 3-phase Induction motor developed maximum torque when slip is :

(i) $S = 0$

(ii) $S = 1$

(iii) $S = \infty$

(iv) $S = \frac{R_2}{X_2}$

here R_2 and X_2 are Rotor resistance and reactances.

(g) A transformer has negative voltage regulation only at :

(i) Lagging power factor loads

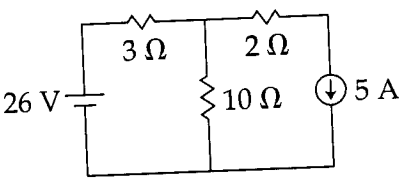
(ii) Leading power factor loads

(iii) Unity power factor loads

(iv) All of the above.

2. (a) Derive resonance frequency for R - L - C series circuit. Write significance of power factor. 7

(b) Find current in 10Ω resistor using Superpositon Theorem. 7



3. (a) Define the following 6

(i) Armature Reaction

(ii) Back EMF

(b) A DC shunt motor connected with 250 Volt DC supply takes 20 A current and running at 1000 r.p.m. When a resistance of 2Ω is inserted in armature circuit calculate its speed, Assume armature resistance of motor is 0.5 Ω. 8

4. (a) Draw and explain phasor diagram of real transformer at 0.8 pf leading load. 7

(b) Explain working principle and applications of Auto transformer 7

5. (a) Draw Torque - slip characteristics of 3 - phase Induction motor using suitable torque relations 7

(b) Discuss various methods of speed control used for 3 phase Induction motor. 7

6. Discuss the following : **4x3½=14**

(a) Armature reaction in Alternators

(b) MMF method of voltage regulation calculation

(c) 3 phase rotating magnetic field

(d) Synchronous condenser

7. Write short notes on ***any two*** of the following : **7x2=14**

(a) V - curves of synchronous motor

(b) Parallel operation of Alternators

(c) Starters for 3-phase Induction motor