C.U.SHAH UNIVERSITY
Summer Examination-2020

Subject Name: Electrical Machines & Electronics
Subject Code: 4TE03EMN1   **Branch: B.Tech (Mechanical)**
Semester: 3   **Date: 27/02/2020**   **Time: 02:30 To 05:30**   **Marks: 70**

Instructions:
  (1) Use of Programmable calculator & any other electronic instrument is prohibited.
  (2) Instructions written on main answer book are strictly to be obeyed.
  (3) Draw neat diagrams and figures (if necessary) at right places.
  (4) Assume suitable data if needed.

Q-1   **Attempt the following questions:**   **(14)**

1)   A dc generator converts mechanical power into electrical power.

  A) True   B) False

2)   Which one of the below is not a core or magnetic loss?

  A) Hystersis Loss   B) Eddy Current Loss   C) Copper Loss   D) All of the above

3)   Which one of the below parameter can control the speed of DC motor?

  A) Armature Voltage B) Field Flux   C) Armature resistance   D) All of the above

4)   A DC shunt motor has field winding in series with its armature winding.

  A) True   B) False

5)   The rating of transformer is given by _____ unit.

  A) kVAr   B) kVA   C) kw   D) None of the above

6)   A step up transformer increases_____.

  A) Frequency   B) Current   C) Power   D) Voltage

7)   The speed of an induction motor is directly propotional to its stator supply frequency.

  A) True   B) False

8)   If the rotor resistance of an induction motor is increased, troque _____

  A) Decreases   B) Remains constant   C) Increases

9)   The frequency of voltage generated by an alternator having 4-poles and rotating at 1800 rpm is _____hertz.

  A) 7200   B) 60   C) 120   D) 450

10)   At leading power factor, the armature flux in an alternator _____rotor flux.

A) Opposes   B) Distorts   C) Adds   D) Does not affect

11) A rectifier converts _____ power into _____ power.

A) AC to DC   B) DC to AC

12) Give any two disadvantages of low power factor.

13) Give any four advantages of HVDC transmission.

14) Draw the pin diagram of 741 IC.

Attempt any four questions from Q-2 to Q-8

Q-2	**Attempt all questions**	**(14)**
(a)	Give the functions of the below parts of a DC generator.	**07**

i) Yoke   ii) Pole Core and Pole shoes   iii) Armature core   iv) Commutator

v) Brushes

(b) Draw and explain the magnetizing characteristics of separately excited DC   **07**
generator.

Q-3	**Attempt all questions**	**(14)**
(a)	Derive the equation of armature torque for a DC motor	**07**
(b)	Explain any two speed control methods of DC shunt motor.	**07**

Q-4	**Attempt all questions**	**(14)**

(a) Derive the emf equation $E = 4.44N\phi B_m Af$ for a transformer.   **07**

(b) A single phase transformer has 400 primary and 1000 secondary turns. The net   **07**
cross sectional area of the core is 60 cm^2. If the primary winding be connected to a
50 Hz supply at 230 V. Calculate,

(i) The peak value of flux density in the core.

(ii) Voltage induced in the secondary winding

Q-5	**Attempt all questions**	**(14)**

(a) Explain the concept of rotating magnetic field in a 3 phase induction motor.   **07**

(b) What is voltage regulation of an alternator? Explain synchronous impendence   **07**
method.

Q-6	**Attempt all questions**	**(14)**

(a) Compare the volume of the conducting material required for a D.C. two wire with   **07**
one conductor earthed and D.C. two wire system with mid point earthed.

(b) Give any seven comparison of indoor and outdoor substation.   **07**

Q-7   **Attempt all questions**   **(14)**

(a)   Give the types of TARIFF. Explain any three types of TARIFF.   **07**

(b)   Explain how no load losses (core loss) is determined by open circuit test of   **07**
           transformer.

Q-8   **Attempt all questions**   **(14)**

(a)   Draw the circuit diagram and waveforms of half wave rectifier and explain its   **07**
           operation.

(b)   Draw the symbol and truth table of below logic gates. Give the boolean equation   **07**
           for each logic gate

           i) NAND Gate   B) OR Gate   C) XOR Gate