Enrollment No: _____ Exam Seat No:_____

C. U. SHAH UNIVERSITY
Winter Examination-2022

Subject Name : Electrical Machine - II

Subject Code : 4TE04EMC1 **Branch: B.Tech (Electrical)**

Semester: 4 **Date: 23/09/2022** **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)**

a) In alternator, the rotary part is
(a) core (b) magnetic field poles
(c) armature (d) none of these

b) Which type of single phase induction motor is having highest power factor at full load?
(a) shaded pole type (b) split phase type
(c) capacitor start type (d) capacitor run type

c) The load which can be carried by an Open Δ or V-V transformer bank is _____ percent as compared to Δ- Δ bank is,
(a) 50
(b) 75
(c) 57.7
(d) 73.2

d) Three single phase transformers, each rated 100 MVA, 127/66 kV are connected in Y/ Δ to form a three phase transformer bank. The overall rating of the three phase bank will be:
(a) 100 MVA, 127/66 kV
(b) 100 MVA, 220/66 kV
(c) 300 MVA, 220/66 kV
(d) 300 MVA, 381/198 kV

e) Slip rings are usually made of
(a)copper (b) carbon
(c)aluminum (d) phosphor bronze

f) In circle diagram for induction motor, diameter of circle represents which of the following?
(a) slip (b) rotor current
(c) running torque (d) line voltage

g) A synchronous motor operating at no load in an over excited condition will behave as:
(a) Inductor

(b) Resistor
(c) Capacitor
(d) Rectifier

h) The capacitor in a capacitor-start induction- run ac motor is connected in series with ..... winding.
(a) starting (b) running
(c) squirrel-cage (d) compensating.

i) Power factor of an alternator driven by constant prime mover input can be changed by changing its
(a) Speed
(b) Load
(c) Field current
(d) Phase sequence.

j) The V- curves of a synchronous motor show relationship between
(a)excitation current and back e.m.f.
(b)field current and p.f.
(c)d.c.field current and a.c. armature current
(d)armature current and supply voltage

k) Define : Slip

l) What will be the synchronous speed of a 3-phase, 50 Hz, 6-pole induction machine?

m) Define : Voltage regulation

n) Name a single phase induction motor which will not have a winding on its rotor.

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

Q-2		**Attempt all questions**	**(14)**
	A	Draw the Connection Three phase transformer (Dd6,Yy0,Dy11,Yd1,Yd11 and Yy6).	**07**
	B	Explain the Open Delta connection of Three Phase Transformer.	**07**
Q-3		**Attempt all questions**	**(14)**
	A	Explain different methods of speed control of three phase induction motor.	**07**
	B	A 3-phase,400V induction motor gave the following test readings: No load:400V,1250W,9A, Short circuit:150V,4kW,38A Draw the circle diagram. If the normal rating is 14.9kW, find the circle diagram, the full – load value of current, pf and slip.	**07**
Q-4		**Attempt all questions**	**(14)**
	A	Briefly discuss the concepts of (i) Cogging and (ii) Crawling in 3-phase induction motors.	**07**
	B	A 3-phase induction motor runs at 1000 rpm at no load and 950 rpm at full load, when supplied from a 3-phase, 50 Hz line. Determine: (a) Number of poles of motor (b) percentage slip at full load (c) frequency of rotor currents (d) relative speed between rotor magnetic field and rotor (e) relative speed between rotor magnetic field and stator	**07**

Q-5		**Attempt all questions**	**(14)**
	A	Explain construction and working of universal motor. Where it is used? How can control the speed of universal motor?	**07**
	B	What is Voltage regulation? Write different methods of voltage regulation in alternator and explain any one method.	**07**
Q-6		**Attempt all questions**	**(14)**
	A	Explain the "Double Revolving Field Theory" for a single phase induction motor.	**07**
	B	Give comparison between synchronous motor and induction motor.	**07**
Q-7		**Attempt all questions**	**(14)**
	A	Derive e.m.f. equation for a 3-phase alternator.	**07**
	B	Explain the effect of change in excitation of a synchronous motor giving constant mechanical power output.	**07**
Q-8		**Attempt all questions**	**(14)**
	A	Explain the construction and working principle of Repulsion motor.	**07**
	B	List the types of single phase induction motors. Describe construction and working principle of any one of them.	**07**