University of Mumbai

Examination First Half 2022

Program: _Electrical Engineering

Curriculum Scheme: Rev2019

Examination: TE Semester V

Course Code: EEC501 and Course Name: Electrical A C Machines-2

Time: 2 hour 30 minutes Max. Marks: 80

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Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks 2 Marks each.**
1.	Kd is less than one (1) for
Option A:	Full pitch winding
Option B:	Short pitch winding
Option C:	Distributed winding
Option D:	Concentrated winding
2.	Which of the direct method to calculate regulation of alternator?
Option A:	EMF
Option B:	Load test
Option C:	MMF
Option D:	ASA
3.	In armature reaction, when the armature flux is perpendicular to main flux?
Option A:	Magnetization
Option B:	Demagnetization
Option C:	Cross -Magnetization
Option D:	Magnetization, demagnetization, and cross magnetization
4.	There are two alternators A and B, under which condition there might be a chance of parallel operation, considering other conditions are ideal.
Option A:	Phase sequence of A is RYB and Phase sequence of B is RBY
Option B:	Power rating of A is 20kW and Power rating of B is 10kW
Option C:	Terminal voltage of A is 415 V and Terminal voltage of B is 400 V
Option D:	Frequency of A is 50 Hz and Frequency of B is 60 Hz
5.	Two alternators sharing a common load and are working in parallel. If excitation of any one alternator changes. Which parameter remains unchanged
Option A:	Induced e.m.f.s of each alternator
Option B:	Operating power factors of each alternator
Option C:	Armature currents of each alternator
Option D:	Load current
6.	Synchronizing torque comes into operation under all of the following cases except
Option A:	Phase difference between two voltages
Option B:	Frequency difference between two voltages
Option C:	Voltage difference between two voltages
Option D:	Reduction in exciting current in one of the alternators.
7.	Synchronous motor is not self-starting because
Option A:	Rapidly reversing torque
Option B:	High resistance of field winding
Option C:	High impedance of field winding

Option D:	Low resistance of field winding
8.	Operation of Synchronous Motor at variable load and constant excitation results in
Option A:	V curve
Option B:	Inverted V curve
Option C:	O curves
Option D:	Self-starting
9.	In synchronous machine, abc to dq0 transformation is
Option A:	Three phase to Three phase transformation
Option B:	Two phase to Three phase transformation
Option C:	Three phase to Two phase transformation
Option D:	Two phase to Two phase transformation
10.	The inductance of a stator circuit varies with
Option A:	Rotor resistance
Option B:	Rotor position
Option C:	Stator resistance
Option D:	Stator losses

Q2	**Solve any Four out of Six** **5 marks each**
A	Illustrate with phasor diagram, why OCC is a drooping curve and why short circuit characteristics is a straight line.
B	Illustrate with neat sketches, dark lamp method of synchronizing process.
C	What will happen if a salient pole synchronous motor running under (i) no load condition (ii) full load condition is losing its excitation?
D	Derive equation of active output power of alternator.
E	With neat sketches, illustrate how does damper winding reduce the hunting in synchronous machines
F	Illustrate the Microprocessor/DSP based control scheme of BLDC motor.

Q3	**Solve any Two Questions out of Three** **10 marks each**
A	A 4 pole 1500 rpm, delta connected alternator has 144 slots and on each slots 24 conductors and winding is shorted by 3 slots, determine pitch factor and distribution factor for the winding and induced line voltage, if flux per pole is 0.06wb.
B	Two station generators A and B operate in parallel. Station capacity of A is 50 MW and B is 25 MW. Full load speed regulation of A is 3% and of B is 3.5%. Calculate the load sharing. If the connected load is 50MW and no load frequency is 50Hz.
C	A 1000KV, 1100V, star connected synchronous motor has armature resistance and reactance per phase 3.5 and 40 ohm respectively. Determine induced emf and angular retardation at UPF, 0.8 PF lag, and 0.8 PF lead.

Q4	**Solve any Two Questions out of Three** **10 marks each**
A	Explain effect of variation of field current and prime mover input on parallel operation of alternators.
B	Explain slip test to determine Xd and Xq.
C	Derive equation showing relation between power and power angle relationship and hence draw power angle characteristics.