(2 Hours) **Total Marks: 60**

i) Question No. 1 is compulsory.
ii) Attempt any three questions from remaining.
iii) Assume suitable data (mention the same) wherever necessary.
iv) Figures to the right indicate full marks.

Q.1	Attempt **any 3** questions	**Marks**
A	Why does a DC motor draw very high current only at the moment it starts, but much less current once it reaches full speed? Name the internal voltage responsible for this and derive its formula.	**5**
B	Describe efficiency and voltage regulation of single-phase transformer.	**5**
C	What are conditions for successful parallel operation of three phase transformer?	**5**
D	Explain principle of shaded pole induction motor.	**5**
E	A 12-pole, 3-phase alternator driven at a speed of 500 r.p.m. supplies power to an 8-pole, 3-phase induction motor. If the slip of the motor, at full-load is 3%, calculate the full-load speed of the motor.	**5**
Q.2		
A	Explain armature reaction in DC machines with suitable diagram.	**08**
B	Explain the equivalent circuit and its parameters of a single-phase transformer.	**07**
Q.3		
A	A d.c. series motor takes 40 A at 220 V and runs at 800 r.p.m. If the armature and field resistance are 0.2 Ω and 0.1 Ω respectively and the iron and friction losses are 0.5 kW, find the torque developed in the armature. What will be the output of the motor?	**08**
B	Explain the double-field revolving theory for a single-phase induction motor with the help of a suitable diagram.	**07**
Q.4		
A	Explain the open delta (V-V Connection) used in transformers.	**07**
B	The power input to the rotor of a 440 V, 50-Hz, 6-pole, 3-phase induction motor is 100 kW. The rotor electromotive force is observed to make 120 cycles per minute, Calculate (i) the slip (ii) the rotor speed (iii) mechanical power developed and (iv) the rotor copper loss per phase.	**08**
Q.5		
A	Draw the power flow diagram of a 3-phase induction motor and explain the various power stages from the stator input to the shaft output.	**08**
B	Describe the rotor resistance starter for three phase induction motor.	**07**
Q.6	Write short note on **any three**	
A	Speed control methods of 3-phase induction motor	**05**
B	Phasor groups in 3 Phase transformers	**05**
C	OC and SC Test on 1-phase Transformer	**05**
D	Speed control of DC motors	**05**

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