

“Please check whether you have got the right question paper.”

- i) *Q.No1 and Q. No 6 are compulsory.*
 ii) *Solve any two questions from Q.2 to Q.5.*
 iii) *Solve any two questions from Q.7 to Q.10.*

SECTION-A

- Q.1 Answer the following (any five).
- | | |
|---|----|
| a) Compare auto-transformer with two winding transformer. | 02 |
| b) What are the losses in transformer .How are they reduced? | 02 |
| c) Why is efficiency of transformer highest in all electrical machines. State condition for maximum efficiency? | 02 |
| d) What are the different types of three phase transforms connections? Where are they used? | 02 |
| e) What is Scott connection? Draw its connection diagram. | 02 |
| f) What are the special features of sumo motors? Where are they used? | 02 |
| g) What is the need of parallel operation of transformers? | 02 |
| h) What are the limitations of PM stepper motor as compared with variable reluctance motor? | 02 |
- Q.2 a) Explain the method of finding efficiency and regulation of transformer without loading it. 10
 b) A 50KVA single –phase transformers of 2300V/230V rating has the primary and secondary winding resistance of 2Ω and 0.02Ω respectively . The iron losses equal to 412 Watts .Calculate the efficiency : i)at half full load ii) at full load, when the power factor of the load is 0.8.
- Q.3 a) State the condition for parallel operation of two three –phase transformers . 07
 b) Two single –phase transformers with equal turns have impedances of $(0.5+j3)$ ohm and $(0.6+j10)$ ohm with respect to the secondary . If they operate in parallel , determine how they will share a total load of 100kw at p.f. 0.8 lagging. 08
- Q.4 a) Explain construction and principle of operation of variables reluctance type of stepper motor .Write its applications. 09
 b) Explain consturction and working of D.C servo motor. 06
- Q.5 Write short notes (any three) 15
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| a) Polarity test for transformers . | |
| b) Copper saving in auto-transformers . | |
| c) Burshless DC. Motor . | |
| d) Phasor group and dock notation for three-phare transformers . | |
| e) PMDC Motor. | |

SECTION-B

- Q.6 Answer the following (Any five)
- Draw load characteristics of D.C series generator. Write its applications . 02
 - A 4 pole D.C generator has a lap wound armature having 400 conductors .It generates an emf of 300 V when the flux per pole is 0.02 wba. Find the speed of rotation of its armature. 02
 - What a level compound generator?Where is it used? 02
 - How is unidirectional torque produced in case of D.C motor. 02
 - D.C series motor is never started on no load .Why? 02
 - What is back emf in case of D.C motor . 02
 - Why is starting current of D.C Motor high ? How is it reduced ? 02
 - The armature of d.c motor has a resistance of 0.15 ohm and is connected to a 200V supply. If the armature current is 40A .calculate emf generated . 02
- Q.7
- Explain different power stages of generator, 07
 - A shunt generator has a full-load current of 196 A at 220V. The stray losses are 720w. and shunt field resistance is 55Ω .If it has full load efficiency of 88% find the armature resistance .Also find the load current corresponding to maximum efficiency . 08
- Q.8
- Derive torque equation of D.C motor. 06
 - A d.c shunt machine while running as generator develops a voltage of 250V at 1000rpm on no load .It has armature resistance of 0.5Ω and field resistance of 250Ω .when the machine runs as motor, input to it at no load is 4A at 250V . Calculate the speed and efficiency of the machine when it runs as a motor taking 40A at 250V. Armature reaction weakens the field by 4%. 09
- Q.9
- Explain speed control methods used for D.C series motor . 08
 - Explain any one type of starter used for D.C shunt motor.. 07
- Q.10 Write short notes (Any three) 15
- Solid state starter .
 - Armature reaction in D.C Machine.
 - Causes of bad commutation and remedies in D.C machine
 - Swindle Ruel's test .
 - Construction of D.C machine.