

Electrical Machines - I
3K-CSN-06

Time : 3 Hrs.

M.M. : 100

1. Part 'A' may be attempted in first 6 pages of Answer Sheet.
भाग 'क' के सभी उत्तर, उत्तर-पुस्तिका के प्रथम छः पृष्ठों में ही करने हैं।
2. Part 'B' in rest of the Sheets of Answer Sheet.
भाग 'ख' के उत्तर, उत्तर-पुस्तिका के अगले शेष पृष्ठों में लिखिये।
3. Answers may be given in English or Hindi.
प्रश्नों के उत्तर अंग्रेजी अथवा हिन्दी में दीजिये।

Part A**1. Attempt any Ten question.****(10x2 = 20)**

- (a) What is meant by statically induced EMF ?
- (b) Define efficiency of transformer.
- (c) Specify the roles of interpoles in DC machine?
- (d) Write the induced emf equation when the machine acts as a DC generator.
- (e) What is back emf?
- (f) Specify the techniques used to control the speed of DC shunt motor for above rated speed
- (g) Why DC series motor is suited for traction applications?
- (h) Why transformer ratings are in KVA?
- (i) Define voltage regulation of a transformer?
- (j) What are the current components of a transformer under no load?
- (k) What is inrush current in a transformer?
- (l) Mention the role of tertiary winding in transformer?
- (m) Specify the application of autotransformer ?
- (n) List the different types of 3 phase transformer connections?

2. Attempt any five questions.**(5x4 = 20)**

- (a) What is the commutator pitch of a 4 - pole DC armature having 49 commutator bars?
- (b) Explain the effects of armature reaction?
- (c) Mention the various speed control methods of DC compound motors?
- (d) Draw the circuit diagram for conducting Swinburne's test in a dc machine?
- (e) Draw the equivalent circuit of a transformer?
- (f) Explain the torque is developed in dc motor.
- (g) Explain function of commutator. ✓
- (h) State the necessary condition for satisfactory parallel operation of two three phase transformers?

Part - B

(3x20 =60)

Attempt any three questions.

3. (a) Explain hysteresis and eddy current losses in electrical machines? ✓
(b) Explain the different methods used for the speed control of DC shunt motor? ✓
4. (a) Determination of efficiency of DC motor by swinburns test? ✓
(b) With neat sketch explain the working of a 3 point starter? ✓
5. (a) Explain in detail the various methods of speed control in DC series motor?
(b) Explain the working principle of transformer on different loads ?
6. (a) Derive emf equation of transformer. ✓
(b) Explain the construction and operation of three phase transformers? ✓
7. Write short notes on any Two.
 - (a) Electro-Magnetically induced EMF
 - (b) Performance characteristics of various DC motors
 - (c) Mutual and Leakage flux
 - (d) On load tap changer

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