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**RN-6163**

**B. E. - II (Sem. III) (EC / IC / CO) Examination**

**May / June - 2010**

**Electrical Machine**

Time : 3 Hours]

[Total Marks : 100

**Instructions :**

(1)

नीचे दृशविवेक निशानीवाणी विगतो उत्तरवडी पर अवश्य लपवी. Fillup strictly the details of signs on your answer book.	Seat No. :
Name of the Examination :	<input type="text"/>
<input type="text" value="B. E. - 2 (Sem. 3) (EC/IC/CO)"/>	<input type="text"/>
Name of the Subject :	<input type="text"/>
<input type="text" value="Electrical Machine"/>	<input type="text"/>
Subject Code No. : <input type="text" value="6"/> <input type="text" value="1"/> <input type="text" value="6"/> <input type="text" value="3"/>	<input type="text"/>
Section No. (1, 2,.....) : <input type="text" value="1&amp;2"/>	<input type="text"/>
	Student's Signature

- (2) Attempt all questions.
- (3) Make necessary assumption if required.
- (4) Figures to the right indicate full marks.

**SECTION - I**

- 1 (a) Give answer in short. **10**
- (i) What are different method of finding out voltage regulation in alternator?
- (ii) Define armature reaction.
- (iii) Define eddy current losses.
- (iv) Why Swinburn's test cannot be performed on D.C. series machine?
- (v) Why armature of D.C. machine is laminated?
- (b) Derive the expansion for generated emf of D.C. generator. **5**
- (c) Explain losses in D.C. machine. **5**

- 2 (a) Define voltage regulation of alternator and explain syn. imp. method. 7
- (b) A 3- $\phi$  star connected alternator is rated at 1500 kVA. 12000 V the armature effective resistance and synchronous reactance are 2  $\Omega$  and 35  $\Omega$  respectively per phase. Calculate the percentage regulation for a load of 1200 kW at power factor of (i) 0.8 lagging (ii) 0.8 leading. 8

OR

- 2 (a) Explain V. curve of synchronous motor. 7
- (b) A 4-pole D.C. generator is delivering 20 A to a load of 10  $\Omega$ . If the armature resistance is 0.5  $\Omega$  and the shunt field resistance is 50  $\Omega$ . Calculate the induced e.m.f. and the efficiency of machine. Allow a drop of 1V per brush. 8
- 3 Attempt any **three** : 15
- (i) Explain Swinburn test on D.C. machine.
- (ii) Draw and compare external and internal characteristics of D.C. shunt and separately excited generator.
- (iii) Working principle of Syn. motor.
- (iv) Explain 3 point starter.

## SECTION - II

- 4 (a) Fill in the blanks : 5
- (i) No load test of an induction motor is equivalent to \_\_\_\_\_ test on a transformer.
- (ii) Open circuit test is generally performed on \_\_\_\_\_ voltage.
- (iii) Rotor of an induction motor runs in \_\_\_\_\_ direction of rotating M.M.F.
- (iv) Losses of ideal transformer are \_\_\_\_\_.
- (v) Value of transformation ratio K is \_\_\_\_\_ than unity for step up transformer.

- (b) Answer in brief : 5
- (i) Why transformer core is laminated?
- (ii) Which test is carried out to determine iron losses of transformer?
- (iii) How many cores are there in a single phase shell type transformer?
- (iv) 415V, 50 Hz, 4 pole, three phase induction motor is rotating 1440 on full load. Find out the value of percentage slip of induction motor.
- (v) Which induction motor is used for traction application?
- (c) Explain construction of a transformer. 5
- (d) Describe various losses in a transformer. 5
- 5 (a) Explain working principle of three phase induction motor. 7
- (b) A 10 kVA, 400/200 V, 50 Hz single phase transformer has a maximum efficiency of 92% at 80% of full load at unity power factor. Determine the efficiency at full load at 0.8 power factor lagging. 8

**OR**

- 5 (a) Explain open circuit and short circuit test for the transformer. 5
- (b) Draw the circle diagram for a 3.73 kW, 200 V, 50 Hz, 4 pole, 3 phase star connected induction motor from the following test No-load : 200 V, 5A, 350 W. 10
- Blocked rotor test : 100 V, 26 A, 1700 W
- Calculate from the circle diagram for full load condition, the line current, power factor and maximum torque in terms of full load torque.
- The rotor copper loss at standstill is half the total copper loss.

**6** Attempt any **three** :

**15**

- (a) Explain various methods of starting in the case of three phase induction motor.
  - (b) Write a short note on speed control of three phase induction motor.
  - (c) Write a short note on stepper motor.
  - (d) Compare three phase induction motor with three phase slip ring induction motor.
  - (e) Derive e.m.f. equation of a single phase transformer.
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