



RN-6129

B. E. - II (Sem. III) (Chemical) Examination
May / June - 2010
Electrical Technology

Time : 3 Hours]

[Total Marks : 100

Instructions :

(1)

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| 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) (Chemical)"/> | <input type="text"/> |
| Name of the Subject : | <input type="text"/> |
| <input type="text" value="Electrical Technology"/> | <input type="text"/> |
| Subject Code No. : <input type="text" value="6"/> <input type="text" value="1"/> <input type="text" value="2"/> <input type="text" value="9"/> | <input type="text"/> |
| Section No. (1, 2,.....) : <input type="text" value="1&2"/> | |
| Student's Signature | |

- (2) Attempt **all** questions.
(3) Figures to the right indicate full marks.
(4) Draw figures wherever necessary.

SECTION - I

- 1 (a) Answer in short : (each 2 marks) 10
- (i) What are the advantages of slip ring induction motor w.r.t squirrel cage induction motor.
- (ii) How can we change the direction of rotation of induction motor?
- (iii) On which side of Transformer are OC and SC tests performed? Why?
- (iv) What is the function of Conservator and Airbreather for a transformer?
- (v) Why does induction motor not rotate at synchronous speed?
- (b) Explain the construction and principle of induction motor in detail. 6

- 2 (a) Derive the equivalent circuit of induction motor. 8
How can the parameters of the equivalent circuit be found out? Explain the tests in detail.
- (b) Calculate the values of approximate equivalent circuit referred to LV side of a single phase 5 kVA 220 / 440 V 60 Hz transformer of which following are the test results. Also draw the equivalent ckt.
Open Circuit : 220 V, 0.8 A, 90 W on the L.V.
Short Circuit : 18 V, 8A, 80W on the H.V.

OR

- 2 (a) Draw the complete vector diagram of a transformer 6
for (i) Unity and (ii) Lagging power factor.
- (b) Draw the circle diagram for a 11 kW 400 V, 50 Hz 10
3 phase star connected induction motor from the following data :
- No load test : 400 V, 8A, 1000 W
Short circuit test : 100 V, 25 A, 1750 kW
From the circle diagram find the current and p.f. at full load.
- 3 Attempt any **three** : 18
- (a) Draw the speed torque characteristics of Induction Motor and explain it in detail.
- (b) Differentiate between Shell Type and Core Type transformers.
- (c) Describe various losses taking place in a transformer and what are the methods to reduce the losses.
- (d) Derive the equation of efficiency and maximum efficiency of a transformer.
- (e) Write a short note on : Methods of Starting of 3 phase induction motor.

SECTION - II

- 4 (a) Answer the following questions : 10
- (i) What are the different types of armature windings commonly used in dc machines?
 - (ii) What is the function of armature in the dc generator?
 - (iii) What is meant by eddy current losses?
 - (iv) What is voltage regulation of dc generator.
 - (v) In which type of generator field and armature voltages are same?
 - (vi) How can the direction of rotation of dc motor be determined?
 - (vii) What is the necessity for chording in the armature winding of a synchronous machine?
 - (viii) What is the other name for distribution factor?
 - (ix) What is the maximum speed of 50 Hz alternator?
 - (x) What is the function of metal frame in dc machine?
- (b) Explain different parts of dc machine. 5
- (c) A dynamo has a rated armature current at 250 A. 5
What is the current per path of the armature if armature winding is simplex wave wound or simplex lap wound? The machine has 12 poles.

OR

- (b) Calculate the voltage induced in the armature winding of a 4-pole lap wound dc machine having 728 active conductors and running at 1800 rpm. The flux per pole is 30 mWb. 5
- (c) Derive the equation of torque for dc motor. 5
- 5 (a) Explain the principle of operation of motor. 7
- (b) The power input to a 230 V dc shunt motor is 8.477 kW. The field resistance is 230 Ω and armature resistance is 0.28 Ω . Find the input current, armature current and back emf. 8

OR

- 5 (a) A 4-pole, 220 V shunt motor has 540 lap wound conductors. It takes 32 A from the supply mains and develops output power of 5.595 kW. The field winding takes 1 A. The armature resistance is 0.9Ω and the flux per pole is 30 mWb. Calculate (i) speed (ii) the torque developed in N-m. 7
- (b) Explain Ampere-Turn method of regulation of alternator. 8
- 6 Attempt any **three** : 15
- (i) Derive the equation of distribution factor K_d .
- (ii) Power stages of alternator.
- (iii) Effects of varying excitation on armature current and power factor of syn. motor.
- (iv) Explain
- (a) Starting torque
- (b) Running torque
- (c) Pull in torque
- (d) Pull out torque.
- (v) V and inverted-V curves of synchronous motor.
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