* K C - 8 1 2 7 *

KC-8127

B. E. II (Sem. III) (Mech.) Examination

November / December – 2012

Electrical Machine & Electronics

Time : **3** Hours] [Total Marks : **100**

Instructions :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :

☛ B. E. II (SEM. III) (MECH.)

Name of the Subject :

☛ ELECTRICAL MACHINE & ELECTRONICS

☛ Subject Code No. : 8 1 2 7 ☛ Section No. (1, 2,.....) : Nil

Seat No. :

Student's Signature

(2) Attempt all questions.

(3) Assume suitable data if required.

(4) Support your answers with neat sketch.

(5) Figures to the right indicate max. marks.

1 (a) Fill in the blanks : **6**

(1) Transformer works on the principle of _____.

(2) In a d.c. generator the direction of induced emf can be found by applying _____ rule.

(3) In a core type transformer _____ surrounds the considerable parts of _____.

(4) In d.c. generator, A.C. induced emf is converted to D.C. with the help of _____.

(5) The current drawn by a 120 V. d.c. motor of armature resistance 0.5Ω and back emf 110 v is _____ amp.

(6) The main purpose of performing open circuit test on a transformer is to measure its _____ loss.

(b) Match the following List - I and List - II : 4

List-I		List - II	
(1)	D.C. generator	(a)	Mutual induction
(2)	Transformer	(b)	3-point starter
(3)	D.C. motor	(c)	Convert ac to D.C.
(4)	Commutator	(d)	Mechanical to Electrical

(c) Explain the external and internal characteristics of D.C. generator. 5

(d) Explain the construction of 3-phase induction motor. 5

2 (a) Derive the emf equation of transformer and derive the condition to achieve maximum efficiency in transformer. 7

(b) Explain comparison between three phase and single phase induction motor. Explain starting of single phase induction motor by capacitor and shaded pole motor. 8

OR

2 (a) A 4 pole shunt generator has a lap wound armature with 725 conductors, the flux per pole is 25 mwb and the generator supplies two hundred. 110 v, 75 w lamps. Determine the speed of the generator, armature and field winding resistance are 0.075Ω and 110Ω respectively. 7

(b) A 50 Hz, 3-phase, 4-pole, 400 v, 10 kw, slipring motor has full load slip of 5% and its starting torque is equal to full load torque. Determine starting torque if supply voltage is reduced to 375 v. 8

3 Attempt any **three** : 15

(a) Why transformer is rated in kVA ? Explain. Also define the following terms :

(1) Brether

(2) Conservator

(3) Buchholz relay.

(b) Describe the synchronizing procedure of alternator and cooling of alternator.

(c) Explain Universal motor.

(d) Explain speed control of 3-phase induction motor.

(e) Can D.C. supply is given to the transformer ? Justify. Also compare core type, shelltype and spiral transformer.

4 (a) (1) Explain double field revolving theory for single phase induction motor. 8

(2) Starting method of single phase motor.

(b) A particular load is to be driven at about 700 rpm. What should be the number of poles for three phase induction motor when : 4

(1) f = 60 Hz

(2) f = 50 Hz.

Calculate speed in each case if rated slip is 4%.

(c) Explain the induction motor as a transformer. 4

(d) A generating station has connected load of 50 MW and a maximum demand of 35 MW. The unit generated being 65×10^6 per annum. 4

Calculate :

(i) Demand factor

(ii) Load factor.

5 (a) Explain following term : 7

(i) Simple tariff

(ii) Flate rate tariff

(iii) Block rate tariff

(iv) Two part tariff

(v) Maximum demand tariff

(vi) Power factor tariff

(vii) Three part tariff.

(b) Explain the types of substation in brief. 8

OR

5 (a) Explain the costing of Electrical energy in brief. 7

(b) Explain the features of 8085 microprocessor, pin description and interrupt signals in brief. 8

6 Attempt any **three** : **15**

(a) Draw the circuit diagram and waveform only :

(1) Half wave rectifier

(2) Full wave rectifier with centre tape transformers

(3) Full wave bridge rectifier.

(b) Explain logic gate with truth table :

(1) AND (2) OR

(3) NOT (4) NAND

(5) NOR (6) EX-OR

(7) EX NOR.

(c) Write comparison of AC and DC transmission in terms of conductor materials.

(d) Draw the key diagram of 11 kv/400 v indoor substation and write the symbol of equipments used in substation.

(e) Explain the drawbacks of low power factor.
