314322

24225
3 Hours / 70 Marks

Seat No. ☐☐☐☐☐☐☐

Instructions – (1) All Questions are *Compulsory.*

(2) Answer each next main Question on a new page.

(3) Illustrate your answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

(6) Use of Non-programmable Electronic Pocket Calculator is permissible.

(7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. **Attempt any FIVE of the following :**   **10**

a) State the function of following in D.C. generator.

   i)   Commutator

   ii) Pole shoe

b) State fleming's left hand rule.

c) State working principle of lph transformer.

d) State importance of 'K' factor of transformer.

e) State any two advantages of lph Autotransformer over two winding transformer.

f) Justify 'Transformers rating is in KVA'.

g) State features of Isolation transformer.

Marks

2.   **Attempt any <u>THREE</u> of the following :**   **12**

   a) State and explain flux control method of speed control of DC series motor.

   b) Explain with diagram working of the brushless DC motor.

   c) Draw and explain phasor diagram of single phase transformer supplying load at lagging P.F.

   d) Draw and explain external characteristics of DC Generator.

3.   **Attempt any <u>THREE</u> of the following :**   **12**

   a) Draw the equivalent circuit of transformer refered to primary. State the meaning of each term related to equivalent circuit.

   b) Draw a circuit diagram of different connections of 3ph transformer.

   c) Explain with the neat diagram Scott connection scheme of transformer.

   d) Explain the construction of single phase shell type transformer.

4.   **Attempt any <u>THREE</u> of the following :**   **12**

   a) A 500 V DC shunt motor takes a current of 5A on No load. The resistance of the armature and field circuits are $0.5\,\Omega$ and $250\,\Omega$ respectively. Calculate the efficiency when motor takes a current of 100 A.

   b) Derive EMF equation of transformer.

   c) Explain following parameters of pulse transformer

   i)   Overshoot

   ii) Peak value (Vm)

   iii) Rise time (Tr)

   iv) Fall time (Tf)

   d) Explain need of starter for DC motor. Also state different types of starters used for DC motor.

e) Compare ordinary efficiency and all day efficiency on.

  i) Type of efficiency

  ii) Defination

  iii) Effect of loading

  iv) Use

5.   Attempt any TWO of the following :   **12**

a) i) State the application of seperately excitated and shunt DC generator.

  ii) A DC generator has an armature emf of 200 V when the useful flux per pole is 40 mwh and the speed 800 rpm Calculate the generated emf.

   1) With the same flux and speed of 1000 rpm

   2) With the flux per pole of 48 mwb and a speed of 900 rpm.

b) A 200 V, 4 pole, lap wound dc shunt motor has 800 conductors of armature winding. Armature and field winding resistance are 0.5 Ω and 200 Ω respectively. The motor takes 21 A and flux per pole is 30 mwb. Find speed and torque developed.

c) Explain and draw following characteristics of DC compound motor.

  i) Torque = Armature Current

  ii) Speed = Armature Current

Marks

6.   **Attempt any TWO of the following :**   **12**

a) Al ph, 50 KVA, 2400/120 V, 50 Hz transformer gave following test results.

O.C. Test (on LV side) :- 120 V, 9.85 A, 396 W

S.C. Test (on HV side) :- 92 V, 20.8 A, 810 W

Calculate :-

i)   Equivalent circuit constant

ii)   Efficiency at rated KVA and p.f. 0.8 lag

iii)   Voltage regulation

b) i)   State the need of Parallel operation of 3ph Transformer

ii)   List the conditions for parallel operation of three phase transformer.

c) Give the criteria for selection of power transformer as per IS : 10028 (Part - I)

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