BRAINWARE UNIVERSITY

Term End Examination 2023
Programme – B.Tech.(EE)]-2021
Course Name – Electric Machine-I
Course Code - PCC-EE401
(Semester IV)

Full Marks : 60   **Time : 2:30 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question)   1 x 15=15

1. *Choose the correct alternative from the following :*

(i) Identify voltage equation of a dc motor is

    a) V = Eb + IaRa   b) Eb = V + IaRa
    c) V = Eb/IaRa   d) V = Eb + Ia2Ra

(ii) Recognize the constant speed motor

    a) Series motor   b) Shunt motor
    c) Cumulatively compound motor   d) All of the above

(iii) Identify a DC series motor is best for driving

    a) Lathes   b) Cranes and hoists
    c) Shears and punches   d) Machine tools

(iv) The speed of a motor falls from 1100 r.p.m. at no-load to 1050 r.p.m. at rated load. Estimate the speed regulation of the motor is

    a) 2.36%   b) 4.76%
    c) 6.77%   d) 8.84%

(v) State the disadvantage of hopkinson's test for finding efficiency of shunt dc motors is that it

    a) Requires full load power   b) Ignores any change in iron loss
    c) Needs one motor and one generator d) Requires two identical shunt machines

(vi) Choose the most economical method of finding no losses of a large dc shunt motor is

    a) Hopkinson's test   b) Swinburn's test
    c) Retardation test   d) Field's test

(vii) In a dc generator, the generator, the change of generated emf is directly proportional to the

    a) field current   b) pole flux
    c) number of armature parallel paths d) number of dummy coils

(viii) State the essential condition for stable parallel operation of two dc generators having similar characteristics is that they should have

    a) same kilowatt output ratings   b) dropping voltage characteristics
    c) same percentage regulation   d) same no load and full load speed

(ix) Determine during short-circuit test, iron losses are negligible because

    a) the current on the secondary side is negligible

    b) the voltage on the secondary side does not vary

    c) the voltage applied on the primary side is low

    d) full-load current is not supplied to the transformer.

(x) The D.C. series motor should always be started with load. Explain

    a) at no load, it will rotate at dangerously high speed.

    b) it will fail to start.

    c) it will not develop high starting torque.

    d) all are true.

(xi) Identify the value of flux involved in the emf equation of a transformer is

    a) rms value

    b) rms value

    c) Maximum value

    d) Instantaneous value

(xii) Explain the use of starters in D.C. motors

    a) these motors have high starting torque

    b) these motors are not self-starting

    c) back e.m.f. of these motors is zero initially

    d) to restrict armature current as there is no back e.m.f. while starting

(xiii) Describe of the following properties is not necessarily desirable in the material for transformer core

    a) Mechanical strength

    b) Low hysteresis loss

    c) High thermal conductivity

    d) High permeability

(xiv) Determine the induced emf in the armature conductors of a dc motor

    a) Sinusoidal

    b) Trapezoidal

    c) Rectangular

    d) Alternating

(xv) Express the frequency of the secondary voltage of a transformer will be.....

    a) less than frequency of the primary voltage

    b) equal to the primary voltage

    c) greater than the frequency of the primary voltage

    d) much greater than the frequency of the primary voltage

Group-B
(Short Answer Type Questions)
3 x 5=15

2. The efficiencies of transformers compared with that of electric motors of the same power are high. Explain (3)

3. Identify the types of rotating electrical machines? (3)

4. Express why the secondary of a current transformer is always short-circuited under operating conditions (3)

5. Explain why Series Motor Cannot Be Started On No-load (3)

6. Explain commutations (3)

OR

Explain the properties of ideal transformer (3)

Group-C
(Long Answer Type Questions)
5 x 6=30

7. compare with proper diagram Lap and wave winding in DC machine. (5)

8. A 250 volt DC shunt motor has armature resistance of 0.25 ohm on load it takes an armature current of 50A and runs at 750rpm. If the flux of the motor is reduced by 10% without changing the load torque, determine the new speed of the motor (5)

9. Describe the operating Principle of the DC Motor with a diagram. (5)

10. Explain the effects of armature reaction. (5)

11. Compute the efficiency of 100 kW, 250-V, 6-pole, 1000 rpm long shunt compound (5) generator. The generator has the following parameters Armature resistance Ra = 0.015 Ω Series field resistance Rs = 0.010 Ω Shunt field resistance Rf = 100.0 Ω Total rotational losses = 4000 W Assume stray losses to be 1% of the output and a brush drop of 2 volts.

12. Explain the vector and phasor diagram: I.Dd6 II.Dy11 (5)

OR

Explain factors which are the affecting torque? (5)

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