17999

BRAINWARE UNIVERSITY

Term End Examination 2025-2026
Programme – Dip.EE-2024
Course Name – Electrical Machine I
Course Code - DEE30102
(Semester III)

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) Identify the type of loss which is not present in transformer

a) Copper loss b) Eddy current loss
c) Frictional loss d) All of these

(iii) Identify which generator whose field resistance is of low value

a) series b) shunt
c) all of the these d) none of these

(iv) If a D.C. motor is to be selected for lift, identify the motor which would be preferred

a) Series motor b) Shunt motor
c) Differentially compound motor d) Cumulative compound motor

(v) Identify the type of DC machine which is generally used in high current application

a) Lap wound b) wave wound
c) both of the previous two options d) none of these

(vi) Identify the purpose of using starter in D.C. motors

a) high starting torque b) 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. at starting

(vii) Determine in D.C. shunt motors as load is reduced

a) the speed will increase abruptly b) the speed will increase in proportion to reduction in load
c) the speed will remain almost constant d) the speed will reduce

(viii) Select the function of pole shoes in a D.C. machine

a) To reduce eddy current loss
b) To support the field coils
c) To spread out flux for better unifor-mity
d) To reduce the reluctance of the magnetic path

(ix) Select the correct consequence if a D.C. motor is connected across the A.C. supply, it will

a) run at normal speed
b) not run
c) run at lower speed
d) burn due to heat produced in the field winding by eddy currents

(x) Choose the correct answer: silicon steel is used for making the transformer core to reduce

a) Hysteresis loss
b) Eddy current loss
c) Copper loss
d) None of these

(xi) In D.C. machines, fractional pitch winding is employed

a) to improve cooling
b) to reduce copper losses
c) to increase the generated e.m.f.
d) to reduce the sparking

(xii) Identify the trans ratio of step-up transformer is

a) less than 1
b) equal to 0
c) equal to 1
d) greater than 1

(xiii) Select the main advantage of an auto-transformer over a two-winding transformer

a) Hysteresis losses are reduced
b) Saving in winding material
c) Copper losses are negligible
d) Eddy's current losses are totally eliminated.

(xiv) Select that, electrical power is transferred from primary to secondary in a transformer

a) Through air
b) By magnetic flux
c) Through insulating medium
d) None of these

(xv) Select the part of transformer tank which stores the expanded oil during enhanced load

a) conservator
b) explosion vent
c) breather
d) none of these

Group-B

(Short Answer Type Questions) 3 x 5=15

2. Explain Why the field of a D.C. shunt motor should not be open at running condition. (3)
3. Explain that the residual magnetism helps to produce initial voltage in forming open circuit characteristic in DC shunt generator. (3)
4. Describe the function of the armature in the DC machine. (3)
5. Describe the function of commutator and brush arrangement. (3)
6. Explain about the different types of tests perform in transformer. (3)

OR

Explain the core type of transformer construction. (3)

Group-C

(Long Answer Type Questions) 5 x 6=30

7. A 8-pole, wave-connected armature has 600 conductors and is driven at 625 RPM. If the flux per pole is 20mWb. Measure the generated e.m.f. (5)
8. Explain the E.M.F Equation of DC Generator. (5)
9. Discuss about the rating of a transformer and its losses. (5)
10. A 8-pole, wave wound armature has 600 conductors and is driven at 625 RPM. If the flux per pole is 10mWb. Measure the generated voltage at output. (5)
11. A 11 kV/400 V distribution transformer takes a no-load primary current of 1 amp at a power factor of 0.24 lagging. Compute the core loss current, the magnetizing current, the iron loss. (5)
12. Write the essential parts of DC machine. (5)

OR

Express how to design the number of brushes for a dc machine? (5)

****