

Electrical Machine

Set - 3

- (A) Answer all. $2 \times 10 = 20$ marks.
- (i) What are the advantages of salient pole type synchronous machine?
- (ii) Explain the role of damper winding in synchronous machine.
- (iii) Calculate the pitch factor for the under given winding 36 stator slots, 4 poles and coil span 1 to 8.
- (iv) What is the relation between electrical degree and mechanical degree?
- (v) Why do cylindrical rotor alternator operate with steam turbines?
- (vi) Write down the equation for frequency of emf induced in an alternator.
- (vii) Write 2 application of alternator.
- (ix) Write the 3 types of 3- ϕ induction motor.
- (x) What is ideal transformer?

- (B) Answer any six. $(6 \times 5 = 30)$ marks
- (i) Properties of various insulating material used in electrical engg.
- (ii) Classify Dc motor.
- (iii) Explain the construction of AC series motor.
- (iv) Explain the principle of development of rotating magnetic field in the stator.
- (v) Explain Auto transformer. (Construction).
- (vi) State the procedure for care and maintenance of 1- ϕ transformer.
- (vii) comparison of Auto transformer with an two winding transformer.
- (viii) Difference between ac generator and dc motor.

Q (C) Answer any 2 = $(2 \times 10) = 20$ marks.

- (i) Explain and draw the equivalent circuit of an induction motor.
- (ii) Write the power balance equation of induction motor.
- (iii) Write the working and construction of $1-\phi$ transformer.
- (iv) Derive the ^{emf} equation of dc generator, and working of dc generator.

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- (A) Answer all. $(2 \times 10) = 20$ marks.
- (i) Write 2 application of an alternator.
 - (ii) Define coil span or coil pitch.
 - (iii) What is eddy current loss?
 - (iv) What is crawling?
 - (v) How induction motor can be designed for best power factor?
 - (vi) Usually where split phase induction motor are used?
 - (vii) What are the limitation of auto transformer?
 - (viii) Why the rating of the transformer in kVA?
 - (ix) What is step up transformer.
 - (x) ~~What is~~ why the core of the transformer is laminated?

(B) Answer any six. $(6 \times 5 = 30$ marks)

- (i) Describe the principle of $I-\phi$ Induction motor.
- (ii) Explain various magnetic material and their uses.
- (iii) Explain shell type transformer.
- (iv) Speed of D.C. motor by field control method.
- (v) Derive the emf equation of a transformer.
- (vi) Explain the principle of development of rotating magnetic field in the stator.
- (vii) Difference between single phase transformer and $3-\phi$ transformer.

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Electrical machine

1(A) Answer all question's. $2 \times 10 = 20$ marks

- (i) What are the main part of a Dc generator
- (ii) Define specific magnetic loading
- (iii) Why induction motor is called as rotating transformer?
- (iv) What is cogging.
- (v) Define the regulation of transformer.
- (vi) Define core loss.
- (vii) Give method adopted to reduce the effect of armature reaction in a Dc machine.
- (viii) What are the factor that decide the choice of specific magnetic loading?
- (ix) Define commutator pitch.
- (x) How the polarities of interpole decided?

1(B) Answer any six. $(6 \times 5 = 30$ marks)

- (i) Explain the statically induced emf?
- (ii) A coil of 1500 turns carrying a current of 5 amps produces a flux of 2.5 mwb. Calculate the self inductance of the coil.
- (iii) Define (i) Ampere law
(ii) Inductance
(iii) Leakage flux.

(iv) What is armature reaction? Describe demagnetizing and cross magnetizing effect

(v) of armature reaction

(vi) A dc generator has an armature emf of 100V when the useful flux per pole is

20mwb and speed is 800 rpm.

(vii) calculate the generated emf.

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- (vi) State the condition for proper operation of two transformer in parallel.
- (vii) When is an open delta (V-V) system?
- (viii) Which method will you adopt to control the speed of dc shunt motor above the base speed?

(3) Answer any 2 = (2 x 10 = 20 marks)

(i) The speed of a 500 V d.c shunt is raised from 700 RPM to 1000 RPM by field weakening the total torque remaining unchanged. The armature field resistance and field resistance are 0.8Ω and 75Ω respectively. Calculate the additional shunt field resistance required, assuming the magnetic circuit to be unsaturated. Neglect all losses.

(ii) Two single phase transformer having the same voltage ratio on no-load, operate in parallel to supply a load of 1000 kVA at 0.8 pf lagging. one of the transformer is rated at 400 kVA and has per unit equivalent impedance of $(0.01 + j0.06)$ and other one rated is 600 kVA and has per unit equivalent impedance of $(0.01 + j0.05)$. Determine the load on each of the transformer in kVA.

- (iii) Derive the emf equation of dc generator.
- (iv) Explain the speed control of dc motor by the various methods.