
ANSWER ALL QUESTIONS

1.(a) what are the conditions for voltage built up of a shunt generator and define critical field resistance?

(b) derive expression of a armature reaction torque of dc motor?

(c) a 230/2300v transformer takes no-load current of 5 a at 0.25 power factor lagging. find 1.the core loss 2.magnetizing current.

(d) write the advantages of transformer tests?

(e) explain the principle of operation of a synchronous motor with necessary diagram?

(f) explain the principle of 3 -phase induction motor?

(g) a 3-phase, 500v motor load has a power factor of 0.4. the two watt meter connected to measure power, show the input to be 30kw. find the reading on each watt meter?

2.(a) discuss the following armature winding terminology

1. back pitch

2. front pitch

3. resultant pitch

4. commutator pitch

5. progressive winding

(b) a 6-pole lap - wound dc generator has 600 conductors on its armature. the flux per pole is 0.02 wb. calculate.

1 the speed at which the generator must be run to generate 300v.

2 what would be the speed if the generator were wave wound .

or

(b) 1. what are the functions of inter poles?

2. explain the characteristics of a dc shunt motor and dc series motor? (15 marks)

3 (a) 1. explain the shifting impedances in transformers?

1. referred to primary

2. referred to secondary with relevant diagrams.

2. a 10 kva, 2000/400v single phase transformer has $R_1=5\Omega$, $X_1=12\Omega$, $R_2=0.2\Omega$ and $X_2=4.8\Omega$. determine equivalent impedance of the transformer referred to

1. primary side.

2. secondary side.

or

(b) a 200kva, 2000/440 v, 50 hz single - phase transformer gave the following test results.

oc.test : 2000v 1.8A 1.75kw.on hv side

sc.test : 13v 300A 1kwon lv side

obtain the equivalent circuit as referred to hv side.

4(a) explain the principle of operation of an alternator and its constructional details with neat diagram.

or

(b) what are the methods to control the speed of three phase induction motor and explain any one method with relevant diagram?

5(a) explain the constructional details of PMMC instrument.

or

(b) explain the constructional details of induction type energy meter with neat diagram?

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