**Q1)**

A 4 – pole DC generator has a wave wound armature with 40 slots and 15 conductor per slots .Find the open circuit generator voltage at 1200 R.P.M. The flux per pole is 0.02 wb.

**Q2)**

A 25 KVA, single phase transformer has 250 turns at primary and 40 turns on secondary, the primary is connected to 1500 volt, 50 HZ, calculate:

i) The primary and secondary currents at full load.

ii) The secondary e.m.f. Voltage.

iii)The maximum flux in the core.

**Q3)**

A shunt generator delivers 450A at 230V and the resistances of the shunt field and Armature circuit are 50Ω and 0.03Ω respectively .Calculate:

The internal voltage.

**Q4)**

The no load ratio of a 50HZ single phase transformer is 6000V/250V.Estimate the Number of turns in each winding if the flux is to be about 0.06 wb in the core.

**Q5)**

Why the external resistance connected to the armature circuit is kept at maximum value at starting and that connected to field resistance is kept at minimum.

**Q6)**

Why the resistance connected with armature circuit of DC shunt motor must be at starting in maximum value .

**Q7)**

What is the effect of increasing supply voltage on the each of the followings?

a – Flux.

b-iron losses

1. Copper losses.

**Q8)**

Write down the equation of induced voltage E1 and E2 of single phase transformer.

**Q9)**

What is the effect of increasing load on the terminal Voltage? Support answer by equation.

**Q10)**

Name the terms which induced Voltage of a DC Generator depends on.

**Q11)**

At which part of DC machine we find the field winding and what is the function of these winding.

**Q12)**

Why the shunt field winding have large Resistance?

**Q13)**

What are the effect of decreasing the field current of the DC shunt Motor on each of the following:

1. The Motor Speed.
2. The flux of the machine.

**Q14)**

A 4-pole, 900 R.P.M DC machine has a terminal voltage of 220 V and an induced voltage of 240 V at rated speed. The armature circuit resistance is 2 ohm. The machine operating as a generator. Compute the armature current and the number of the armature coils, if the air gap flux per pole is 10 m.wb and the armature turns per coil is 8. The armature is wave – wound.

**Q15)**

A 5KVA, (500/250)V, 1-PH transformer gave the following readings:

O.C Test: V=500V ; I=1A ; P=50 watt.

S.C Test: V=25V ; I=10A ; P=60watt.

Find (Ro &Xo).

**Q16)**

If we have the value of armature current, and flux per pole how can we evaluate the torque equation in a D.C Electrical machine.

**Q17)**

A 6 pole,480V, D.C motor takes an armature current of 110 A, the lap wound armature has864 conductors. Calculate :

The speed. assume flux per pole Is 0.05 WB, and armature resistance is 0.2 ohm.

assume flux per pole Is 0.05 WB, and armature resistance is 0.2 ohm.

**Q18)**

A 2 MVA,6.6 KV/400V single phase transformer has 100 turns in its secondary side.

Determine:

i)the primary number of turns . ii) the induced voltage per turn.

iii) full load primary and secondary currents . iv) flux in the core.

**Q19)**

Name and explain the function of the winding which exist in the stationary part for The D.C machine

**Q20)**

A 230 v, D.C shunt motor takes a total current of 25 A from the supply lines. The resistance of the shunt field winding is 200 ohm and that of the armature is 0.3 ohm. find:

1. the armature current.
2. The field current.

**Q21)**

A 230 v, D.C shunt motor takes a total current of 25 A from the supply lines. The resistance of the shunt field winding is 200 ohm and that of the armature is 0.3 ohm. find:

The back e.m.f. induced voltage.

**Q22)**

The open circuit and short circuit on a 10KVA,(125/250)v,50 HZ, single phase transformer:

Gave the following results:

Open circuit test: 125V; 0.6A; 50 watt (on low voltage side).

Short circuit test: 15V ; 30A ; 100 watt (on high voltage side).

Calculate the parameters (Req , Xeq , Ro ,Xo) of equivalent circuit for this transformer.

**Q23)**

Derive the electrical induced torque equation in a D.C Electrical machine.

**Q24)**

How canelectrical torque induced when the D.C machine start running.

**Q25)**

A D.C motor 4 pole,480V, takes an armature current of 100 A, the lap wound armature has864 conductors. Calculate:

a)The speed. b) The output torque developed in the armature. assume flux per pole Is 0.05 WB, and armature resistance is 0.2 ohm.

**Q26)**

Derive the torque equation in a D.C Electrical generator, explained In terms of armature current , and induced flux per pole.

**Q27)**

A 6 pole,480V, D.C motor takes an armature current of 120 A, the armature lap wound armature has864 conductors lap wound winding. Calculate :

a)The rotor speed. b) The armature induced torque. assume flux per pole Is 0.05 WB, and armature resistance is 0.3 ohm.

**Q28)**

A 4 - pole D.C. shunt Generator with shunt field resistance 100 Ω, armature resistance is 1 ohm , has 378 wave – connected conductors. The flux per pole is 0.02 wb .If a load resistance of 10 Ω is connected a cross(shunt) with armature terminal , the speed of Generator is 1000 R.P.M.: calculate the load power.

**Q29)**

A 4-pole, long shunt , compound generator supplies 100A at a terminal voltage of

500V.If armature resistance is 0.02 ohm, series field resistance is 0.04 ohm and shunt Field resistance 100 Ω.Find: Armature developed power

**Q30)**

The armature, series field , and shunt field resistance of 240V long shunt compound Motor are 0.1 ohm,0.06Ω,and 80Ω respectively .If it draws 25 A from the mains and its Stress losses are 610 watt .calculate the overall efficiency.

**Q31)**

The open circuit ratio test of a 50HZ single phase transformer is 6000V/250V.find the number of turns in the two coils of the transformer if the flux is to be about 0.06 wb in the core

**Q32)**

A 10KVA, (1000/500)V,1-PH transformer gave the following readings:

O.C Test: V=500V ; I=2A ; P=100 watt.

S.C Test: V=25V ; I=10A ; P=120watt. Find the magnetizing brunch (Ro &Xo).

**Q33)** Explain the equation of the terminal Voltage of a DC electrical shunt motor.

**Q34)**

A DC machine with 4-pole, 900 R.P.M has a terminal voltage of 210 V and an induced voltage of 235 V at rated speed. The armature circuit resistance is 2 ohm. The machine operating as a generator. Compute the armature current and the number of the armature coils, if the air gap flux per pole is 10 m.wb and the armature turns per coil is 8. The armature is wave – wound.

**Q35)**

Define the term ’armature reaction’ of the rotating part in DC machine.

**Q36)** Name and explain the function of the winding which exist in the stationary part for The D.C machine.

**Q37)**

A 230 v, D.C shunt motor takes a total current of 25 A from the supply lines. The resistance of the shunt field winding is 200 ohm and that of the armature is 0.3 ohm . find :

the armature current.

**Q38)**

Shaw the location of the field and the armature winding s in the long compound D.C generator with according to the Terminal Voltage of a DC machine

**Q39)**

A 6-pole, 1000 R.P.M DC machine has a terminal voltage of 200 V and an induced voltage of 220 V at rated speed. The armature circuit resistance is 3 ohm. The machine operating as a generator. Compute the armature current and the number of the armature coils, if the air gap flux per pole is 20 m.wb and the armature turns per coil is 12. The armature is wave – wound type .

**Q40)**

Draw the equivalent electrical circuit of transformer referred to the primary side .

**Q41)**

Define what is the meaning of armature reaction in DC electrical machine.

**Q42)**

A DC Motor with 4 – pole has a wave wound armature type with 40 slots and 15 conductor per slots .Find the No - load generator voltage at 1000 R.P.M. The flux per pole is 0.025 Wb

**Q43)**

A 4 pole, lap wound ,D.C machine has 42 coils with 8 turns per coil. It is driven at 1120 r.p.m. If useful flux per pole is 21 mwb. Calculate: The generated Voltage (e.m.f).

**Q44)**

A 6-pole lap connected shunt generator has armature and field resistance of 0.05Ω , And 125Ω respectively .If it delivers a current of 200A at 500 volt. Calculate: The generated e.m.f (Ea).

**Q45)**

A 4-pole 240 volt lap wound motor has armature and series field resistance of 0.2Ω

And 0.02Ω respectively .There are 660 armature conductors .If the flux per pole is

0.3 wb and the motor run at speed 659.5 r.p.m. Find:

The current taken by this motor.

**Q46)**

A single phase transformer, 50 HZ with open circuit ratio (4000V/250V).deduce

The number of turns in the two winding if the flux is to be about 0.06 wb in the core.

**Q47)**

Name the main electrical Winding for the D.C machine, and explain their functions, which one produce the necessary magnetomotive Electrical force (M.M.F), illustrate its equation.

**Q48)**

The open circuit (O.C) Voltage for different field currents of a D.C generator at

A speed of 1000 R.P.M. are given in the following Table:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Field current(A) | 0.5 | 1.0 | 1.25 | 1.5 |
| Induced Voltage (volt) | 100 | 200 | 230 | 250 |

1. For a field current of 1.25 A, find the speed of generator for developing a No – load Voltage of 250 Volt.

b) Find the field current required to generate a No- load of 200 Volt at 800 R.P.M.

**Q49)**

The secondary of a 500 KVA, (4400/500), Single Phase Transformer has 100

Turn. Determine:

i) Primary Turn. ii) Induced Voltage per Turn

iii) Secondary current at unity Power Factor. COS Ѳ (P.F ) = 1.

**Q50)**

a) Illustrate the function and location of the armature winding in DC electrical machine.

b) Derive the electrical generated Voltage equation of a DC Motor.

**Q51)**

A 6-pole D.C machine has 664 wave connected armature conductors .calculate;

The E.M.F. Voltage , when the flux per pole is 0.05 WB and the speed is 275 R.P.M.

**Q52)**

A 4-pole , long shunt ,compound generator supplies 100A at a terminal voltage of 500V.If armature resistance is 0.02 ohm, series field resistance is 0.04 ohm and shun Field resistance 100 Ω.Find:

Armature developed power.

**Q53)**

The test with secondary winding open of a 50HZ single phase transformer is 3000V/250V.find the Number of turns of primary and secondary winding if the flux is to be about 0.05 wb in the transformer core.

**Q54)**

Illustrate the location and duty of the field flux winding in DC machine.

**Q55)**

Derive the electrical induced Voltage of a DC Generator, and at which condition reach its maximum value.

**Q56)**

Define an ideal Transformer.

**Q57)**

Write down the Voltage e.m.f equation of the Transformer.

**Q58)**

Draw the machine cross section to illustrate the armature reaction of the rotor with increasing the current in DC generator.

**Q59)**

Draw the equivalent circuit of self – Excited shunt DC Generators.

**Q60)**

Explain the separately excited circuit for DC Generators

**Q61)**

How can you connect 1- phase transformer across the Auto - Transformer supply.

**Q62)**

Write down the terminal Voltage equation of the series D.C. Generators

**Q63)**

Explain voltage regulation of the Transformer.

**Q64)**

Name the all losses in a Transformer.

**Q65)**

Explain the term ”Transformation ratio” .

**Q66)**

What is an auto – Transformer.

**Q67)**

The primary winding of a single phase Transformer is connected to

230 Volt, 50 HZ supply .The secondary winding has 1500 turns .If the

Maximum value of the core Flux is 0.00207 WB, determine:

i)The number of turns on the primary winding.

ii)The secondary induced Voltage.

**Q68)**

A 5 KVA, (250/500) Volt, 50 HZ, single phase Transformer gave the

The following NO load test:

250 V, 0.75 A, 60 Watt, on low Voltage side, calculate:

The equivalent circuit constants (Ro &Xo).

**Q69)**

A 40 KVA, (400/200) V, 50 HZ, 1- phase Transformer gave Following results:

Open circuit Test: 400 V; 5A; 500 Watt.

Short circuit Test: 10 V ; 50A ; 150 Watt.

i)Draw the Transformer equivalent circuit and show the Values of resistances

and reactance’s in terms of the primary side.

ii) Calculate the terminal Voltage, when the Transformer delivers the

Soled output at P.F of 0.8 lagging on the low Voltage side.

**Q70)**

A single phase Transformer has (Np/Ns) = 6.The resistances are 0.9 Ω

And 0.03 Ω, and the reactance’s 5 Ω and 0.13 Ω for high Voltage and Low

Voltage Winding respectively. Determine:

a)The Voltage be applied to high Voltage side to obtain full load current of

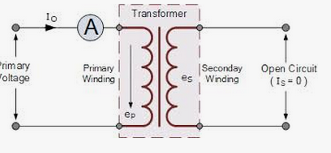
200 A in the Low Voltage winding on short circuit. b)The Power Factor.

**Q71)**

A Transformer operating at no- load draws an exciting current Io= 5 A,

When the primary to a 120 volt, 60 HZ source. The wattmeter reads 180 Watt it is known as the iron losses in the core. Calculate:

1. The reactive Power. b) The values of Ro &Xo. c) The values of Ic & Im



Primary Voltage (Vp)= Vo=Ep = 120 V ;Po=180 Watt

**Q72)**

The open circuit ratio of 4.6 KVA, 1- phase Transformer is given as (230/460)V. It has a primary resistance of 0.2 Ω and a reactance of 0.5 Ω, and corresponding values for secondary are R2 =0.75 Ω and X2 = 1.8 Ω respectively. Compute:

a) The terminal voltage on the secondary side on full load .

b)The Voltage regulation for 0.8 P.F lagging .

**Q73)** A 1- phase Transformer has (N1/N2) = 6. The Resistances are 0.9 Ω & 0.03 Ω and The reactance’s 5 Ω & 0.13 Ω for High Voltage and Low Voltage Winding respectively . Determine:

a) The Voltage applied to H.V side to obtain full load current of 200 A in the Low Voltage winding on short circuit.

b) The Power factor on short circuit.

**Q74)** A 1- phase step- up Transformer having turns ratio (N) =4 , takes 1A at 0.15 power factor lagging on NO – load . Determine the primary and Power factor when the Transformer is supplying a load of 25A at 0.8 Power factor. Neglect Voltage drop in the Transformer.

**Q75)** Deduce the efficiency at full load and 0.8 Power factor (P.F) of 40 KVA (3200/400) Transformer.

Given: R1 = 0.2 Ω , R2 =0.0025 Ω and iron losses = 2500 Watt, neglect magnetizing current .

**Q76)** A 10 KVA, (220/ 2200) Transformer is connected to a load of 6 KVA and 0.8 P.F at 2200 Volt. Determine The Primary and Secondary currents.

**Q77)** A 10 KVA, (220/ 2200) Transformer is connected to a load of 6 KVA and 0.8 P.F at 2200 Volt. Determine The Primary and Secondary currents.

**Q78)**

A 25 Kw, 125V Separately – excited D.C machine is operated at a constant speed of 3000 rpm with a constant field current such that the open – circuit armature Voltage is 125V. The armature resistance is 0.02Ω. Find

i) the armature current.

ii)Terminal power and electromagnetic power and Torque,when the Terminal Voltage is :

**A)** 128V **B)** 124 V

**Q79)**

A shunt motor is fed by a D.C. source voltage, the line current is 51 A, the armature current is 50 A, and the shunt field resistance is 120 Ω. If armature resistance is 0.1 Ω. Calculate:

a) The source voltage.

b) The voltage across the armature.

c) The mechanical power developed by the motor.

**Q80)**

The primary of a transformer has twice as many turns as the secondary. The primary Voltage is 220 V, and a 5 Ω load is connected across the secondary. Calculate the power developed by the transformer as well as The primary and the secondary currents