Question bank of EC-I 4th sem

1-ϕ Transformer

1) Explain in detail about different parts of Transformer.

2) Derive the E.m.f equation in case of Transformer.

3) What is Transformation Ratio?

4) Explain working principle of transformer?

5) Explain No load operation of transformer with Phasor diagram.

6) Explain on load operation of transformer with phasor diagram.

7) Draw the phasor diagram of transforma for lagging, unity, leading Power factor load with and without leakage reactance.

8) Derive the formula for voltage regulation in case of transformer.

9) Explain in detail about open circuit test and short circuit test in case of transformer.

10) Explain different types of losses in case of transformer.

11) Explain Efficiency and derive the condition for maximum efficiency in case of transformer.

12) What is All day Efficiency ?

13) Explain the condition for Parallel operation in Single phase transformer.

14) Why Transformer is rated in KVA instead of KW ?

Auto Transformer

1) Explain Tap Changer with Transformer.

2) Derive the expression for copper saving in case of Auto transformer.

3) Explain working principle of Auto transforma.

4) What are the Application of Auto-transformer ?

Instrument Transformers

1) What is CT ?

2) What is PT ?

3) Define Ratio error, phase angle error

4) What is Burden ?

5) Write down uses of C.T and P.T.

Numericals

1) The maximum flux density in the core of a 250/3000 volt, 50 HZ single phase transformer is 1.2 wb/m^2. If the e.m.f per turn is 8 volt. Determine
(i) Primary and secondary turns
(ii) Area of the core.

2) A single phase transformer on No load draws a current of 5 Amp at a power fact of 0.25 lagging. The transformer has 1200 turns on H.T side which is connected to the supply with voltage transformation ratio of 0.2. Calculate the primary current and power factor when the secondary current is 250 Amp at a P.f of 0.8 lagging.

3) The no-load current of a transformer is 15A at a P.F of 0.2 when connected to a 460V, 50 HZ supply. If the Primary winding has 550 turns, Calculate.
(i) The magnetising component of no-load current.

(ii) Iron loss

(iii) The maximum value of flux in the core.

4) A 30 KVA, 2400/120 V, 50 HZ transformer has a high voltage winding resistance of 0.1 Ω and a leakage reactance of 0.22 Ω. The low voltage winding resistance is 0.035 Ω and the leakage reactance is 0.012 Ω. Find the equivalent winding resistance, reactance and impedance.

5) Obtain the equivalent circuit of a 200/400 V, 50 HZ, 1 ϕ transformer from the following test data:

O.C Test: 200 V, 0.7 A, 70 W - on L.V side

S.C Test: 15 V, 10 A, 85 W - on H.V side

Calculate the secondary voltage when delivering 5 KW, at 0.8 P.f lagging the primary voltage being 200 V.

6) A transformer is connected to 2200 V, 40 HZ supply. The core-loss is 800 watt out of which 600 watts are due to hysteresis and the remaining eddy current losses. Determine the core-loss if the supply voltage and frequency are 3300 V and 60 HZ respectively.

7) In a 25-KVA, 2000/200 V, 1-ϕ transformer the Iron and full load copper losses are 350 and 400 W respectively. Calculate the efficiency at unity power factor on (i) Full load (ii) Half load.

8) A 11000/230 V, 150 KVA, 1 phase, 50 HZ transformer has core loss of 1.4 KW and full load Cu loss of 1.6 KW. Determine the KVA load for max^m efficiency and value of max^m efficiency at unity P.F.

9) A 600 KVA, 1-ϕ transformer has an efficiency of 92%. both at full-load and half load at unity power factor. Determine its efficiency at 60% of full load at 0.8 power factor lag.

10) Find All day efficiency of a transformer having max^m efficiency of 98%. at 15 KVA at unity p.f and loaded as follows:

12 hours – 2 KW at 0.5 PF lag
6 hours – 12 KW at 0.8 PF lag
6 hours – at no load.

11) Derive the condition for Maxm and Minimum voltage regulation in case of 1-ϕ transformer.