Practice Questions (Basic Electrical and Electronics Engg. (Unit 2))

Q.No 1 Mention the types of 3 phase Synchronous generators and explain with neat diagram the construction of any one type.

Q.No 2..Derive an expression for emf per phase in a 3 phase Synchronous generator. What are the advantages of stationary armature ?

Q.No 3 A 3 phase, 100 kVA, 4 pole, 1500 rpm star connected Synchronous generator has 48 stator slots with 10 conductors each. Flux per pole is 0.03 Wb. Distribution factor is 1 and pitch factor is 0.96. Find the emf per phase and the line emf induced.

Q.No.4 Derive the relations between phase voltage and line voltage, phase current and line current in 3 phase star connected and delta connected systems.

Q.No 5. In a 3 phase 415 V, 50 Hz system has 3 load impedances , each consisting of 5 Ω resistance and 20 mH . Find phase current, line current, the power consumed, reactive power in each case when load is connected in i) star and in ii) delta.. Which connection is more advantageous?.

Q.No 6.Show that 3 phase power can be measured using 2 Watt meters using near circuit diagram and phasor diagram.

Q. No 7..Find the two wattmeter readings in a 3 phase, 50 Hz, 440 V star connected system with impedence/phase of 3+j4 Ω. Also find the 3 phase power consumed, reactive power and power factor in the circuit.

Q.No 8 A 3 phase, 415 V, 50 Hz Squirrel cage Induction motor is operating at 85 percent efficiency. The two watt meters connected read as W1=5000 W and W2=-1500 W.Find i)Input power ii)power factor iii)reactive power iv)output power.

Q.No 9.A single phase 50 Hz , 10 kVA transformer has a rated primary voltage of 2000 V.Flux density in the core is 1 Wb/m2 and area of cross section 5x5 cm.The voltage transformation ratio is 1/10 .Find i) the no.of turns in primary winding and secondary winding ii) secondary terminal voltage.If voltage regulation at full load is 5% find secondary terminal voltage at full load..

Q.No 11.Derive EMF equation for a Single phase transformer and define Voltage transformation ratio and voltage ratio and turns ratio.

Q.No 12.For a 50 kVA ,2000 V/230 V, 50 Hz, Single phase transformer Full load copper loss is 400 W and Iron loss is 350 W.Find % efficiency at i) Full load and 0.8 pf lag ii) Half load and unity pf lag. If the secondary terminal voltage is 210 V at full load find % voltage regulation.

Q.No 13. Explain with neat diagrams construction of different types of transformers.

Practice Questions

Q.No1.What is the necessity of earthing the electrical appliances? With a neat sketch explain a typical earthing system.

Q.No.2.The details of a domestic load and their operating schedule are as follows. Find the energy consumed during a month of 30 days. Calculate the energy bill for the month if the energy tariff per unit is Rs.5. and the fixed charge per month is Rs.100.(Ans:Energy consumed per month 241.8 kWh(units), Energy bill per month Rs.1309)

|  |  |  |  |
| --- | --- | --- | --- |
| Load (appliance) | Number | Power rating(each) | Duration of operation in hours per day |
| Tube light | 4 | 40 W | 5 |
| Fan | 4 | 75 W | 6 |
| Fridge | 1 | 300 W | 4 |
| Water heater | 1 | 2 kW | 2 |
| LED bulbs | 5 | 13 W | 4 |

Q.No.3 For an alternating voltage v = 325.27sin(314t) volts find i)RMS voltage ii) Average voltage iii) frequency in Hz and time period iv)instantaneous voltage at t = 0.005 sec and at t=0.002sec v) time at which the instantaneous voltage is 200 V. (Ans:230V,206.87V,50 Hz, 0.02sec,325.27Vand 191.10V, 2.108msec)

Q.No.4.Explain voltage and current in purely inductive circuit. Show that the energy consumed by a pure inductance is zero.

Q.No 5.Derive an expression for the average power consumed by a single phase R-L series circuit. Show the wave forms for voltage, current and power.

Q.No 6.A solenoid coil has a resistance of 2 Ω and inductance of 5 mH with a supply voltage of single phase 230 V, 50 Hz. Find i)impedence ii) current iii) power factor iv) power consumed and v) reactive power(Ans:2.5426/\_38.13 Ω,90.55/\_-38.13 A, 0.7866,460W,361VAR)

Q.No 7.A single phase 250 V, 50 Hz AC circuit takes a current of 2∠450 A .Find the parameters in the circuit and power consumed .( Ans: leading current means R & CZ=125/\_-45 Ω, R=88.38 Ω, Xc=88.38 Ω, C=36μF)

Q.No 8 An alternating current varying sinusoidal with a frequency of 50 Hz has RMS value of 20 A. Find the Max.value,Time period, instantaneous current at 0.005 sec and 0.015 sec. Find the time at which the current attain 14.14 A. (Ans:28.28A,0.02sec,28.28 A,-28.28A,1.66msec)

Q.No9 Find the impedence, current, p.f., power consumed, active and reactive power in a R L C series circuit with single phase, 230 V, 50 Hz supply with resistance 5Ω, inductance 0.02 H, capacitance 150μF. Draw phasor diagram.(Ans:XL=6.28 Ω, XC=21.22 Ω,Z=15.75/\_-71.49 Ω,14.60/\_71.49A, pf 0.3174(lead),1065.82 W, 3184.28 VAR)

Q.No 10 An inductor takes 2 A consuming 400 W power in a 250 V, 50 Hz single phase circuit. Find the parameters of the inductor.(Ans:Z=125 Ω, cosф=0.8,R=100 Ω, XL=75 Ω, L=0.238H)

Q.No 11 A sinusoidal voltage 80+j60 V is applied to a circuit and the current is -4+j10 A. Find

i) impedance of the circuit ii)power factor iii) power consumed .Show the voltage and current phasors.(Ans:9.28/\_-74.93 Ω, p.f.0.26, 280 W)

Q.No 12.Find the circuit parameters if the applied voltage is v= !00sin(314t) V and the current is

i=100sin(314t-30)A. Draw voltage and current phasors (R=8.77Ω, L=5H)

Q.No 13 Find total impedence &currents in all the branches if supply voltage is 230 V, 50 Hz

2-j4Ω

3+j4Ω

5+j6Ω