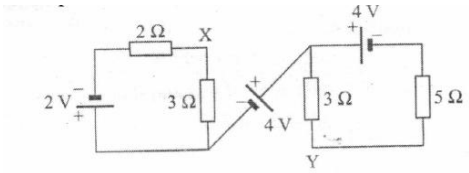
QUESTION BANK

MODULE-1

1. State and explain Faraday's laws of electromagnetic induction. **[June/July 2013, 2015]**
2. An air cored solenoid has a length of 50cm and a diameter of 2cm.Calculate its inductances if it has 1000 turns and also find the energy stored in it, if the current rises from zero to 5A. **[June/July 2013, 2015]**
3. If the total power dissipated in the circuit shown is 18W, find the value of 'R' and its current. **[June/July 2015]**



4. State Fleming's right hand rule and Fleming's left hand rule. **[June/July 2015]**
5. A closed iron ring of mean diameter 12cm is made from round iron bar of diameter 2cm.It has a uniform winding of 1000 turns .Calculate the current required to produce a flux density of 1.5Wb/m^2 given that relative permeability is1250.Hence calculate the self-inductance. **[June/July 2015]**
6. What is the potential difference between the point x and y in the network shown? **[June/July 2015]**
7. Find the values of currents in all the branches of the network shown in figure **[Dec 2014/Jan2015]**
8. A current of 20A flows through two ammeters A and B in series. The potential difference across A is 0.2V and across B is 0.3V.Find how the same current will divide between A and B when they are in parallel. **[Dec 2014/Jan2015]**
9. Coils A and B in a magnetic circuit have 600 turns and 500 turns respectively. A current of 8A in coil A produces a flux of 0.04Wb.If co-efficient of coupling is 0.2, calculate i)self-inductance of the coil A with B open circuited,(ii)flux linking with the coil B (iii)the average emf induced in coil B when flux with it changes from zero to full value in 0.02 seconds, (iv)mutual inductance. **[Dec 2014/Jan2015, Dec 2013/Jan 2014]**
10. A circuit consists of 2 parallel resistors having resistances 20Ω and 30Ω respectively,

connected in series with a 15Ωresistor. If the current through 30Ωresistor is 1.2A,Find (i)Currents in 20Ω and 15Ω resistors(ii)The voltage across the whole circuit(iii)voltage across 15 Ω resistor and 20 Ω resistor(iv) total power consumed in the circuit.

[Dec 2014/Jan2015]

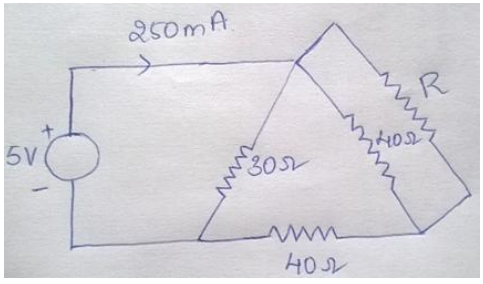
11. Obtain the relation between self-inductance, mutual inductance and co-efficient of coupling. **[Dec 2014/Jan2015]**
12. A coil consists of 600 turns and a current of 10A in the coil gives rise to a magnetic flux of 1mWb.Calculate (i) self-inductance (ii) induced emf (iii) energy stored when the current is reversed in 0.01second. **[Dec 2014/Jan2015]**
13. Show that the equivalent resistance of two resistors connected is the ratio of product of these two resistances divided by the sum of those two resistance values**. [June/July 2014]**
14. Derive an expression for dynamically induced emf. **[June/July 2014]**
15. Two coils having 1000 turns and 1600 turns respectively are placed close to each other such that 60% of the flux produced by one coil links the other. If a current of 10A, flowing in the first coil produces a flux of 0.5mWb.Find the inductance of the second coil. **[June/July 2014]**
16. Find the resistance of the circuit shown (R_{AD}). **[June/July 2013]**
17. State and explain Kirchoff's Laws. **[June/July 2013]**
18. In the parallel arrangement of resistors shown the current flowing in the 8ohm resistor is 2.5A. Find current in others resistors, resistor X, the equivalent resistance.

[June/July 2013]

19. Derive the expression for energy stored in a inductor.

[June/July 2013, Dec 2013/Jan 2014]

20. Find the value of resistance R as shown in the figure below. So that the current drawn from the source is 250 mA. All the resistance are in ohms. **[Dec 2013/Jan 2014]**



MODULE-2

1. Explain the characteristics of DC series motor with a neat diagram. **[June/July 2015]**

2. Explain the significance of back EMF in a DC motors. [**June/July 2015]**

3. A 4 pole DC shunt motor takes 22.5 A from 250V supply R_a =0.5ohms, R_{sh}=125ohms, the armature is wave wound with 300 conductors. If the flux per pole is 0.02Wb, calculate speed, torque and power developed. [**June/July 2015]**

4. With the neat diagram explain the construction and working of Dynamometer type wattmeter. [**Dec2014/Jan 2015, June/July 2015]**

5. A 4 pole generator with wave wound armature has 51 slots, each having 24 conductors, the flux per pole is 0.01 Wb. At what speed must the armature rotate to give a induced emf of 220V. What will be the voltage developed if the winding is lap and armature rotates at same speed. [**June/July 2015]**

6. Explain with diagram the construction features of various parts of a DC generators. [**June/July 2015]**

7. Derive the expression for armature torque developed in a dc motor. [**Dec2014/Jan 2015]**

8. With the help of a neat diagram. Explain the construction and principle of operation of induction type single phase energy meter.

[Dec2014/Jan 2015, June/July 2013, June/July 2014]

9. Derive the expression for EMF of a DC generator. [**June/July 2014, Dec2014/Jan 2015]**

10. 200V lap wound DC shunt motor has 800 conductors on its armature, the resistance of the armature winding is 0.5ohms and that of field winding is 200ohms, the motor takes a current of 21A, the flux per pole is 30mWb. Find the speed and torque developed by the motors. [**Dec2014/Jan 2015]**

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12. A 30 KW, 300 V DC shunt generator has armature and field resistance of 0.05ohms and 100 ohm respectively. Calculate the total power developed by armature when it delivers

full output power. [**Dec2014/Jan 2015]**

13. Sketch the various characteristics of DC shunt motors and mention its application. [**June/July 2014]**

14. A DC shunt motor takes an armature current of 110A at 480V. The armature resistance is 0.2 ohms, The machines has 6 poles, and armature is lap connected with 864 conductors. The flux per pole is 0.05 Wb, calculate speed and torque developed by the armature. [**June/July 2014]**

15. The emf generated in the armature of a shunt generator is 625 V, when delivering its full load current of 400A to the external circuit. The field current is 6 A and the armature resistance is 0.06 ohms. What is the terminal voltage? [**June/July 2013]**

16. 220 V series motor is taking a current of 40A, resistance of armature 0.5 ohms, resistance of series field is 0.25 ohms. Calculate voltage at the brushes, back Emf, power wasted in armature, and power wasted in series field. [**June/July 2013]**

MODULE 3

1. What is meant by power factor in ac circuit? What is its significant in Ac circuits? **[June/July 2015]**

2. Draw and explain the wiring diagram for 3 way control of lamp [**June/July 2015]**

3. A series circuit with resistance of 10ohms, inductance of 0.2 H and capacitance 40micro F is supplied with a 100 V supply at 50 Hz. Find current, power and power factor. [**June/July 2015]**

4. State form factor of an alternating quantity. Derive the expression for it. [**June/July 2015]**

5. Show that the average power consumed in pure capacitances is 0. Draw the neat wave form for the voltage, power and current. [**June/July 2015]**

6. With a neat diagram explain pipe earthing. [**June/July 2015]**

7. Obtain the expression for current through pure inductor, if the voltage across it is $v=V_m \sin(wt)$. **[Dec2014/Jan 2015]**

8. A voltage v=100sin (314t) is applied to a circuit consisting of a 25ohm resistance and 80microF capacitor in series. Determine peak value of the current, power factor, total power consumed by the circuit. [**Dec2014/Jan 2015]**

9. Write a short note on necessity of earthing, and precaution to be taken to prevent electric shock. [**Dec2014/Jan 2015]**
10. Voltage of 200 V is applied to a series circuit consisting of a resistor, inductor, and capacitor. The respective voltages across these components are 170V, 150 V, and 100V and the current is 4A. Find power factor, resistance, and impedance, inductive and capacitive reactance. [**Dec2014/Jan 2015**]
11. Explain the necessity and the operation of earth leakage circuit breaker.

[**Dec2014/Jan 2015]**

12. Two impedances Z1=(6-j8) ohms and Z2= (16+j12) ohms are connected in parallel. If the total current of the combination is 20+j10 A, find voltage across the combination and currents in the two branches. [**Dec2014/Jan 2015]**
13. Define instantaneous value, amplitude, cycle, period, with respect to sinusoidally varying quantities. [**June/July 2014]**
14. Two impedances (150-j157) ohms and (100+j110) ohms are connected in parallel across 200V, 50 Hz supply. Find branch currents, total currents, and total power consumed in the circuit. Draw the phasor diagram. [**June/July 2014]**
15. Show that power consumed in RC series circuit is VIcosΦ.Draw the waveform for the voltage, current and power. [**June/July 2014]**
16. Write the circuit diagram and switching table for 2 way and 3 way control of lamp. Where it is used [**June/July 2014]**
17. Derive an expression for the impedance of an ac circuit consisting of a resistance, inductance and capacitance connected in series. [**June/July 2013]**
18. 125V at 60 Hz is applied across a capacitance connected in series with a non-inductive resistor. Combination carries a current of 2.2A and causes a power loss of 96.8 W in the resistor. Power loss in the capacitor is negligible. Calculate the resistance and capacitance
19. Mention different types of wiring used in domestic drillings. [**June/July 2013]**

MODULE 4

1. With the usual notation derive the expression for EMF equation of an alternator [**June/July 2015, June/July 2013]**
2. Establish the relationship between phase and line value of voltage and currents in 3phase, delta connected circuit. Show the phasor diagram neatly. [**June/July 2015, June/July 2014]**
3. A balanced star connected load of 8+j6 ohms per phase is connected to 3phase 230V supply. Find the line current, power factor, power reactive volt ampere and total volt ampere. [**June/July 2015]**
4. Show that the power in a balanced 3phase circuit can be measured by two wattmeters. Draw the circuit and vector diagram. [**June/July 2015]**
5. Explain the generation of 3phase ac voltage. [**June/July 2015]**
6. A3phase, 50 Hz, 16 pole generator with star connected winding has 144 slots with conductor per slot is 10. The Flux per pole is 24.8 mWb is sinusoidally distributed. The coils are full pitched. Find the speed, line EMF. [**June/July 2015]**
7. Establish the relationship between phase and line value of voltage and currents in 3phase, star connected circuit. [**Dec2014/Jan 2015, June/July 2013]**
8. A 3phase delta connected balanced load consumes a power of 60KW taking a lagging current of 200 A at a line voltage of 400V, 50Hz. Find parameter of each phase. [**Dec2014/Jan 2015]**
9. Define phase sequence and list out the advantages of 3 phase system as compared to single phase systems. [**Dec2014/Jan 2015, June/July 2014]**
10. A 3 phase, 400V, motor takes an input of 40 KW at 0.45pf lag. Find the reading of each of the two single phase wattmeters connected to measure the input. [**June/July 2014]**
11. Define regulation of an alternator. [**June/July 2014]**
12. How are alternators classified? With a neat diagram, show the difference between them. [**June/July 2014]**
13. A 2 – pole, 3 – phase alternator running at 3000 rpm has armature slots with 2 conductors in each slot. Calculate the flux per pole required to generate a line voltage of 2300 V. Distribution factor is 0.952 and pitch factor is 0.956. [**June/July 2014]**

14. Explain construction and working principle of synchronous generator. [**June/July 2013]**

MODULE 5

1. Explain the construction and working principle of a transformer with a neat sketch. [**June/July 2015]**

2. Explain the concept of rotating magnetic field in a 3 phase induction motor. [**June/July 2015]**

3. The frequency of the emf in the stator of a 4-pole induction motor is 50Hz and in the rotor is 1.5Hz.What is the slip and at what speed is the motor running? [**June/July 2015]**

4. What is slip in an induction motor? Explain why slip is never zero in an induction motor. [**June/July 2015]**

5. A single phase transformer has 400 turns primary and 1000 secondary turns. The net cross-sectional area of the core is 60cm^2 .The primary winding is connected to a 500V, 50Hz supply. Find peak value of flux density, emf induced in the secondary winding. [**June/July 2015]**

6. The maximum efficiency at full load and unity p.f of a single phase 25KVA,500/1000V,50Hz transformer is 98%.Determine its efficiency at i)75% load,0.9p.f and ii)50% load,0.8p.f [**June/July 2015]**

7. Explain principle of operation of a single phase transformer and derive the EMFequation [**June/July 2013, Dec2014/Jan 2015]**

8. In a 25KVA 2000/200V single phase transformer, the iron and full load copper losses are 350W and 400W respectively. Calculate the efficiency at unity power factor on full load and half load. [**Dec2014/Jan 2015]**

9. An 8 pole alternator runs at 750rpm and supplies power to a 6 pole induction motor which runs at 970rpm.What is the slip of the induction motor? [**Dec2014/Jan 2015]**

10. A 600KVA transformer has an efficiency of 92% at full load, unity power factor and half full load, 0.9 pf. Determine its efficiency at 75% of full load,0.9pf. [**Dec2014/Jan 2015]**

11. Derive the condition for which the efficiency of a transformer is maximum. [**Dec2014/Jan 2015]**

12. An 8 pole alternator runs at 750rpm and supplies power to a 4 pole induction motor. The frequency of rotor current is 1.5Hz.Determine the speed of the motor.

[**Dec2014/Jan 2015]**

13. With a neat diagram, explain the working principle of 3 - φ induction motor.

[**June/July 2014]**

14. A 10 pole induction motor is supplied by a 6 – pole alternator which is driven at 1200 rpm. If the motor runs with a slip of 3%, what is its speed? [**June/July 2014]**
15. Why does an induction motor need a starter? [**June/July 2014]**
16. Explain the construction and working of a transformer. [**June/July 2014]**
17. Find the number of turns on the primary and secondary side of a 440/230 V, 50 Hz single phase transformer, if the net area of cross section of the core is 30 cm2 and the maximum flux density is 1Wb/m2. [**June/July 2014]**
18. A single phase transformer working at 0.8 pf has efficiency 94% at both three fourth full load and full load of 600 kW. Determine the efficiency at half full –load, unity power factor. [**June/July 2014]**
19. A single phase, 20KVA transformer has 1000 primary turns and 2500 secondary turns. The net cross sectional area of the core is $100cm^2$ .when the primary winding is connected to 500V,50Hz supply, calculate)the maximum value of the flux density in the core, the voltage induced in the secondary winding and the primary and the secondary full load currents. [**June/July 2013]**
20. Explain construction and working principle of star-delta starter. [**June/July 2013]**
21. What is meant by the slip of this induction motor? Under what circumstances the slip is unity and zero. [**June/July 2013]**