Shivaji University, Kolhapur

Question Bank for Mar 2022 (summer) Examination

Subject Code:71812Subject Name: **Basic Electrical Engineering**

Common subject Code (if any) _____

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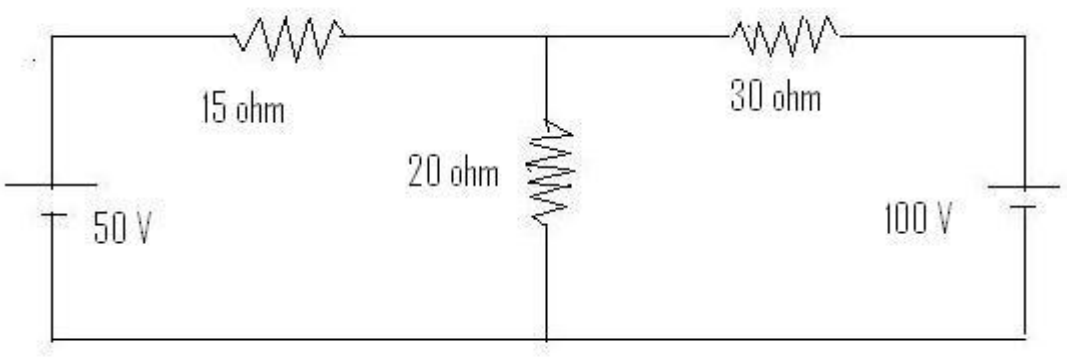
1) State and explain Kirchhoff's Laws as applicable to electrical circuit with suitable example.
2) Find the current through each resistance for a given network using mesh or node analysis.



3) Define the terms and their units-

   i) E.M.F, ii) Potential Difference, iii) Current.

4) Two batteries A & B are connected in parallel across a load resistance of 4 ohm. The emf & internal resistance of battery A & B are 20 volts, 2 ohm and 24 volts,4 ohm respectively, using mesh or node analysis,

   Find (i) current in battery A,

   (ii) current in battery B

   (iii) current in load resistance.

5) Two batteries A & B are connected in parallel across a load resistance of 10 ohm. The emf & internal resistance of battery A & B are 35 volts, 5 ohm and 40 volts, 5 ohm respectively, using mesh or node analysis, Find

   i) current in battery A,

ii) current in battery B.

iii) current in load resistance.

6) Explain Ohms Law for Electric circuits. Also state factors effect on Resistance

7) Two batteries A & B are connected in parallel across a load resistance of 4 Ω. The emf & internal resistance of battery A & B are 24 volts, 4 Ω and 36 volts,6 Ω respectively, using mesh or node analysis,

Find (i) current in battery A,

(ii) Current in battery B.

(iii) Current in load resistance.

8) Two batteries A & B are connected in parallel across a load resistance of 6 Ω. The emf & internal resistance of battery A & B are 32 volts, 4 Ω and 36 volts,6 Ω respectively, using mesh or node analysis,

Find (i) current in battery A,

(ii) Current in battery B.

(iii) Current in load resistance

9) Two batteries A & B are connected in parallel across a load resistance of 8 Ω. The emf & internal resistance of battery A & B are 50 volts, 4 Ω and 60 volts, 4 Ω respectively, using mesh or node analysis, Find

i) Current in battery A,

ii) Current in battery B.

iii) Current in load resistance

10) Define the terms and their units-

i) Resistance, ii) Potential Difference, iii) Current.

11) With the help of suitable example, explain Kirchhoff's Voltage and Current law.

12) Two batteries A & B are connected in parallel to supply a load resistance of 10 ohms. Battery A has an EMF of 50V with an internal resistance of 1 ohm & battery B has an EMF of 70V with an internal resistance of 1 ohm. Determine the current delivered by each battery & current in the load resistance. Also calculate power supplied to 10 ohm resistance.

13) State and explain factors affecting on resistance

Unit 2:Magnetic circuits:

1) Define and state the units-
   i) MMF ii) Magnetic flux iii) Magnetic field strength.
2) Obtain mathematical expression for series magnetic circuit for N number of materials.
3) State and explain Ohms Law for magnetic circuit.
4) Define- i) Magnet ii) Magnetic flux density iii) Reluctance
5) Explain the concept of magnetic leakage & fringing.
6) Describe B-H Curve .
7) Define- i) Magnetic field
   ii) Magnetic Field Intensity iii) Reluctance
8) Distinguish between electric & magnetic circuit.
9) . Explain the concept of B- H curve for magnetic &non magnetic material
10) State similarities and dissimilarities between Electric circuit & magnetic circuit

Unit 3: Single phase AC Circuits:

1) Derive the expression for RMS value by analytical method.
2) A resistance of 10 ohm is connected in series with inductance of 73 mH across 250 volts, 50 Hz ac supply. Find
   (i) Impedance, (ii) current,
   (iii) Power factor & Power
3) Explain Faradays laws of electromagnetic Induction
4) Derive current and power equation in pure resistance circuit
5) Derive the expression for average value by analytical method
6) A series R-L-C circuit connected across 200 volts, 50 Hz ac supply draws a current of 5 amp at unity power factor. If the capacitance is of 507 microfarad, Find
   (i) Resistance,

(ii) Capacitive & Inductive Reactance

(iii) Power

7) Derive the equation of Impedances in R-L-C circuit.

8) Define power factor and state disadvantages of low power factor.

9) A resistance of 20 ohm and inductance of 47.8 mH are connected in series across 200 volts, 50 Hz ac supply.Find

(i) Inductive Reactance,

(ii) Impedance,

(iii) Power factor,

10) Explain how single phase sinusoidal voltage is generated in AC.

11) State & explain types of induced EMF's. Compare statically and dynamically induced EMF.

12) Derive Expression of current and power for pure resistance circuit

13) A resistance of 10 Ω is connected in series with inductance of 80 mH across 230 volts, 50 Hz ac supply. Find

(i) Impedance (ii) current (iii) Power

14) A series R-L-C circuit connected across 250 volts, 50 Hz ac supply draws a current of 10 amp at 0.8 power factor. If the capacitance is of 419 microfarad, Find

(i) Resistance, (ii) Inductance

(iii) Power

15) Prove that average power consumed by pure inductor is zero

16) Derive the expression of current and power for pure capacitive circuit

17) A resistance of 30 ohm and inductance of 47.8 mH are connected in Series across 220 volts, 50 Hz ac supply. Find

(i) Impedance

(ii) Current

(iii) Power factor and its nature

18) Derive the Impedance and power equation of R-C series circuit

Unit 4: Three phase A.C. Circuits

1) Define and Explain: Balanced 3 phase ac supply, phase sequence, 3 phase balanced Load.
2) Prove that line voltage = √3 Phase Voltage in star connected circuit.
3) List the Advantages of 3 phase power generation, transmission, distribution and 3 phase machines
4) Prove that line Current = √3 Phase Phase current in Delta Connected circuit
5) Explain the terms: Line voltage, Line current , Phase voltage, Phase current.

6) Compare star connected 3 phase load with delta connected
7) Define and Explain:
   i) Balanced 3 phase ac supply,
   ii) Phase sequence,
   iii) Symmetrical system.
8) Explain the terms: Line voltage, Line current , Phase voltage, Phase current

9) What are the advantages of 3 phase system over Single-phase system?
10) List the Advantages of 3 phase power generation, Transmission, distribution and 3 phase machines over single phase system .
11) Compare star connected 3 phase load with delta connected 3 phase load in terms of Phase voltage, phase current, power drawn, other advantages related to the configuration

Unit 5:Earthing and lamps

1) Describe construction & working of fluorescent tube. And also state its advantages & disadvantages
2) State the various types of Earthing electrodes & explain the structure of any one with neat sketch.

3) Describe construction & working of Mercury vapour lamp. Also state its advantages , disadvantages & Applications.

4) Describe construction & working of LED Lamp. Also state its advantages & disadvantages.

5) Draw Single line diagram of typical power system and explain the stages involved in transmission of Electrical power from generating station to consumer premises.

6) Why Earthing is necessary in a wiring installation? Briefly explain any one method of Earthing

7) Describe construction & working of CFL. Also state its advantages & disadvantages.

8) Explain the construction & working of HRC fuse. Also state its advantages & disadvantages.

09) Describe construction & working of Fluorescent lamp. Also State its Applications.

10) Draw Single line diagram of typical power system and explain the stages involved in transmission of Electrical power from generating station to consumer premises.

11) Explain the construction & working of HRC fuse. Also state its advantages .

12) Describe construction & working of Mercury vapour Lamp. Also state its Applications.

Unit 6: Single phase Transfomer

1) Derive the EMF equation of transformer. Also find expression relating voltage ratio,current ratio and turns ratio

2) A 40 KVA single phase transformer has 40 turns on the primary winding and 100 turns on secondary winding. The primary winding is connected to 2000 V, 50 Hz supply. Calculate

i) secondary voltage on no load

ii) Approximate primary & secondary currents on full load

iii) The maximum value of flux.

3) State the principle on which transformer works.Describe with a neat sketch constructional features of shell type transformer.

4) A 220/400 V, 5 KVA single phase transformer delivers 10A to a 0.8 p.f load at rated voltage. Find its efficiency. Given transformer Iron loss and copper loss at 20 A current are 60W and 400 W respectively

5) Derive the EMF equation of transformer. Also find expression relating voltage ratio,current ratio and turns ratio.

6) A 30 KVA ,3000/800 Volts, 50 hz Single phase transformer has 100 turns on secondary winding . Calculate

i) Primary & secondary currents on full load

ii) The number of primary turns

iii) The maximum value of flux.

7) State the principle on which transformer works.Describe with a neat sketch constructional features of Core type transformer.

8) A 200/400 V, 50 Hz single phase transformer operates on rated supply at no load by taking 1 A at 0.5 pf. The emf per turn is 2 V. Find

i) Maximum flux in core

ii) Secondary winding turns

iii) Iron loss

9) Explain the operation of Single phase transformer on No load.Also draw related phasor diagram .

10) The primary winding of Single phase transformer is connected to a 200V, 50Hz supply. The secondary winding has 1000 turns . If the maximum value of flux is 2.01 mWb, determine

i) The number of primary turns

ii) The Secondary induced voltage

iii) The net cross sectional area if the flux density has maximum value of 0.365 Tesla

11) State and Explain Power Losses occurred in Transformer

12) A 1100/220 V, 20 KVA,50 Hz single phase transformer operates has100W iron loss and 80W copper loss at half of the full load. When this transformer operates at full load with 0.8 pf, find

i) Full load primary and secondary currents

ii) Full load copper loss

iii) Full load efficiency

13) State the principle on which transformer works. Describe with a neat sketch constructional features of shell type transformer

14) A 50 KVA single phase transformer has 50 turns on the primary winding and 100 turns on secondary winding. The primary winding is connected to 1000 V, 50 Hz supply. Calculate

i) Secondary voltage on no load

ii) Approximate primary & secondary currents on full load

iii) The maximum value of flux.

15. A 220/440 V, 6 KVA single phase transformer delivers 5A to a 0.9 p.f load at rated voltage. Find its efficiency.

Given transformer:

Iron loss and copper loss at 10 A current are

80W and 800 W respectively.

16) State the principle on which transformer works.Describe with a neat sketch constructional features of

Core type transformer.

17) A 50 KVA , 3000/600 Volts, 50 hz Single phase transformer has 200 turns on secondary winding . Calculate

i) Primary & secondary currents on full load

ii) The number of primary turns

iii) The maximum value of flux.

18) A 400/800 V, 50 Hz single phase transformer operates on rated supply at no load by taking 2 A at 0.6 pf. The emf per turn is 4 V. Find

i) Maximum flux in core

ii) secondary winding turns

iii) Iron loss

19) Derive the EMF equation of single phase Transformer

20) The primary winding of Single phase transformer is connected to a 220V, 50Hz supply. The secondary winding has 1200 turns . If the maximum value of flux is 3.02 mWb, determine

i) The number of primary turns

iv) The Secondary induced voltage

iii) The net cross sectional area if the flux density has maximum value of 0.46 Tesla

21) In a 50 KVA transformer the Iron Losses is 500W and the full load copper loss 800 W. and operates at 0.8 pf

i) Full load Efficiency

ii) Half load copper loss iii) Half load efficiency