SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY:: PUTTUR
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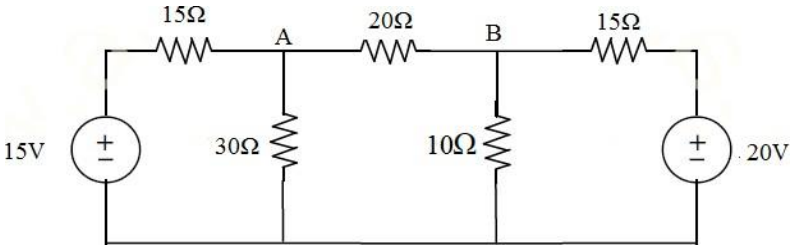
QUESTION BANK (DESCRIPTIVE)

Subject with Code: Basic Electrical Engineering(19EE0239) **Year & Sem:** I -B.Tech& II-Sem
Course & Branch: B.Tech & ECE **Regulation:** R19

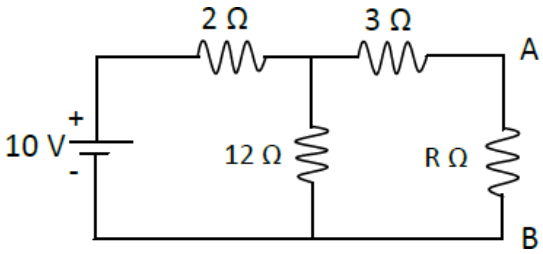
UNIT –I
D.C CIRCUITS

1. (a) State and explain Kirchhoff's laws? [L1] [4M]
   (b) Determine the current in branch A-B by using KVL [L4][6M]

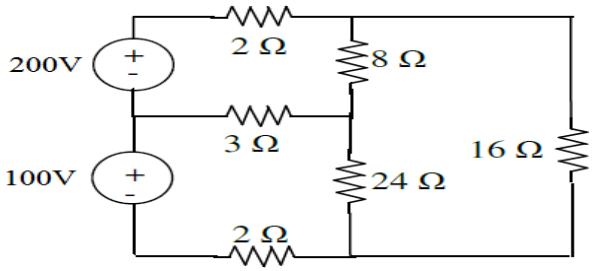
2. (a) State and explain Thevenin's theorem. [L1] [5M]



(b) Draw the Norton's equivalent circuit for the circuit shown in figure. [L4] [5M]



3. (a) Determine the mesh currents for the circuit shown below. [L4][5M]



(b) State &explain Super position theorem. [L1][5M]

4. (a) Use KCL to find node voltages for the circuit shown below. [L4][5M]

(b)Explain about Ideal and Practical Current sources in detail.
[L1][5M]

5. (a) State and Prove Maximum Power Transfer Theorem
[L1][5M]

(b) Find load current by using Thevenin's theorem for the following circuit where R_L=3Ω.
[L4][5M]

6 (a)Determine the Equivalent Resistance when the resistors are connected in Series & Parallel.

[L2][5M]

(b)Find the Thevenin's equivalent for the circuit shown below
[L4][5M]

7.(a)Determine the Equivalent Capacitance when the resistors are connected in Series & Parallel.

[L2][5M]

(b)Find the Norton's equivalent for the circuit shown below.
[L4][5M]

8.(a) State and explain Norton's Theorem? *[L1][4M]*

(b) Verify Superposition Theorem for 4Ω resistor for the following circuit. *[L4][6M]*

9.(a) Explain about Dependent sources briefly. *[L1][4M]*

(b) (i) Find the equivalent resistance between AB for the circuit shown bellow. *[L3][3M]*

R_1=4Ω, R_2=2Ω, R_3=8Ω, R_4=1Ω, R_5=12Ω, R_6=3Ω, R_7=10Ω & R_8=5Ω

(ii) Find the equivalent resistance for the circuit shown below. *[L3][3M]*

10. (a) Explain about Energy Sources. [L1][5M]

(b) By using superposition theorem find the current flowing through the 3 ohm resistor. [L4][5M]

UNIT-II

A.C CIRCUITS

1. (a) Derive an expression for RMS values of sine wave form. [L2] [6M]

(b) An alternating current is expressed as I = 14.14 sin 314t. Determine. [L4] [4M]

(i) Maximum current (ii) RMS current (iii) Frequency

(iv) Instantaneous current when t = 0.02msec.

2. Derive an expression for the current and impedance for a series RL and RC circuit excited by a Sinusoidally alternating voltage. Draw the phasor diagrams. [L3] [10M]

3. (a) Define Admittance and impedance [L1][4M]

(b) The impedances of series circuit are Z1= (6+j8) ohms and Z2 = (8-j6) ohms. If the applied voltage is 120V, find total impedance, curren t and power factor. Draw the phasor diagram. [L2] [6M]

4. Explain about Principle of A.C Voltages. [L2][10M]

5. (a) Define power factor, apparent power, active power and reactive power [L1] [4M]

(b) Z_1 and Z2 are in parallel where currents corresponding impedances are $I_1 = 50\angle 10$ and $I_2 = 20\angle 30^0$. If the applied voltage is $100\angle 15$V, find true power, reactive power and apparent power in each branch. [L2] [6M]

6. (a) Derive an expression for the voltage and impedance for a series RLC circuit excited by a

Sinusoidally alternating voltage. *[L2] [5M]*

(b) A series circuit consisting of a 10Ω resistor, a 100μF capacitor and a 10 mH inductor is driven by a

50 Hz a.c. voltage source of maximum value 100 volts. Calculate the equivalent impedance, Current

in the circuit and the phase angle. *[L2] [5M]*

7. (a) Derive the voltage and current relations in three phase balanced circuits for delta connection.

[L2] [6M]

(b) Find the rms value for the following waveform *[L3] [4M]*

8. (a) Explain the phasor relation for R, L & C elements.
[L1][4M]

(b) A resistor of 50Ω and inductance of 100mH are connected in series across 200V, 50Hz supply.

Determine the following *[L2] [6M]*

(i) Impedance (ii) current flowing through the circuit (iii) power factor

9. (a) Derive the voltage and current relations in three phase balanced circuits for star connection.

[L2] [10M]

(b) Find the rms value for the following waveforms *[L3] [4M]*

10. (a) Explain resonance for series RLC circuit and derive the equation for resonant frequency.

[L2] [5M]

(b)A series RLC circuit of R=40 Ω, L= 50.07mH and a capacitor is connected across a

400V,50Hz, A.C supply. This RLC combination draws a current of 10A.Calculate

(i) Power factor of the circuit.

(ii) Capacitor value. *[L2] [5M]*

UNIT-III

DC MACHINES

1. *Explain the Constructional details of D.C machine with neat sketch.* *[L1][10M]*

2. *Explain about the Working principle of a D.C generator.* *[L1][10M]*

3. *(a) Derive the EMF equation of a D.C generator.* *[L2][5M]*

(b) Explain OCC Characteristics of D.C. generator. *[L2][5M]*

4. *(a) The armature of a 6-pole,wave wound D.C generator has 604 conductors. Calculate the generated EMF when the flux per pole is 60mWb and the speed is 250rpm.At what speed, the armature to be driven in order to generate an EMF of 550V,if the flux per pole is reduced to 58mWb.* *[L4][5M]*

(b) Define Torque and derive the expression for torque in a D.C. Motor. *[L2] [5M]*

5. *List the various types of D.C. Generators and Explain in detail.* *[L2][10M]*

6. *(a) What are the losses occur in a D.C Generator?* *[L1][5M]*

(b) A 4-pole, 500V, Wave wound D.C shunt motor has 720conductors on its armature. The full-load armature current is 60A and the flux per pole is 0.03Wb armature resistance is 1.2Ω and the brush contact drop is 1V/brush. Calculate the full-load speed. *[L4][5M]*

7. *Explain the working operation of a D.C Motor in detail.* *[L2][10M]*

8. *(a) What is the necessity of speed control?* *[L2] [5M]*

(b)How to control the speed of D.C. Shunt motor. Explain it with any one example. *[L1] [5M]*

9. *What are the different types o0f D.C. motors. Explain in detail.* *[L1] [10M]*

10. *(a) How to control the speed of D.C. Shunt motor. Explain it with any one example.*

[L2][5M]

(b)A D.C shunt generator has shunt field winding resistance of 100Ω.It is supplying a load of 5KWat a voltage of 250V.If its armature resistance is 0.22Ω.Calculate the induced emf of the generator.

. [L4][5M]

UNIT-IV

A.C MACHINES

1. *Draw the constructional diagram of a single –phase transformer and explain all the parts. [L2][10M]*
2. *(a) Explain the Working principle of single –phase transformer. [L2][5M]*

   (b) Compare Core type &Shell type transformer. [L1][5M]
3. *List the types of transformers based on Construction &explain in detail with neat diagrams. [L1][10M]*
4. *(a) Write the short notes on Voltage Regulation & Efficiency. [L1][5M]*

   (b) Derive an EMF equation of a single-phase transformer. [L1][5M]
5. *(a) A single-phase transformer has 400 turns on primary winding 1000 turns on secondary winding. If it is operating at 50Hz supply with a maximum flux of 0.045Wb.Find (i) Primary &Secondary induced EMF (ii) EMF induced per turn. [L4][5M]*

   (b) A230/110V, 1KVA, single –phase transformer is connected to 230V, A.C Supply. Calculate (i) Primary current (ii) Secondary current [L4][5M]
6. *(a) A single-phase 600/230V,50Hz transformer has a core area of 400cm^2 and a maximum flux density of 1.18Wb/m^2.Calculate the number of turns in Primary& Secondary windings. [L4][5M]*

   (b) Explain about Various losses occurs in a transformer. [L1][5M]
7. *A 5KVA, 500/250V, 50Hz, single –phase transformer gave the following results: [L4][10M]*

   From O.C Test: 500V, 1A, 50W (H.V Side is opened)

From S.C Test: 25V, 10A, 60W (L.V Side is shorted)

Determine:

(i) The Efficiency on Full-load, 0.8 lagging P.F.

(ii) The Voltage Regulation on Full-load 0.8 lagging P.F.

(iii) The Efficiency on 60% of Full-load, 0.8 lagging P.F.

(iv) The Voltage Regulation on Full-load,0.6 leading P.F.

8. (a) What is the Procedure for conducting O.C. test on a single-phase transformer, explain with neat diagram. [L1][5M]

(b) How Auto transformer works? Explain briefly with neat circuit. [L1][5M]

9. Explain Working Principle of Induction Motor in detail. [L2][5M]

10. (a)Explain Working Principle of 3-Ø Alternator. [L1][5M]

(b) Explain Salient-Pole type Rotor briefly. [L1][5M]

UNIT-V

DOMESTIC WIRING

1.(a) Define Wiring system &List the types of wiring systems. [L1][5M]

(b) What is the Importance of wiring system. [L1][5M]

2. Classify cables based on different aspects. [L2][10M]

3. What is Earthing? Explain Plate Earthing in detail. [L1][5M]

4.With neat diagrams, explain various types of fuses used in electrical wiring systems. [L1][10M]

5. (a) Explain about choice of wiring system. [L1][5M]

(b) Explain about different types of circuit breakers. [L1][5M]

6. Compare Fuse & Circuit breaker based on various aspects. [L1][5M]

7. Explain about : [L1][10M]

(a) PVC cables (b)Wheather proof cables (c) VIR cables

8. (a) What is Fuse &explain the principle of operation of Fuse. [L2][5M]

(b) What are the Materials required for Fuse element.

[L1][5M]

9. (a)List the advantages & disadvantages of Conduit wiring.

[L1][5M]

(b)What is the necessity of Earthing?

[L1][5M]

10. Define the following:

(a) What is the difference between wire & cable?

[L1][2M]

(b) Fusing Current [L1][2M]

(c) Fusing Factor [L1][2M]

(d) Rated Current [L1][2M]

(e) Fuse Element [L1][2M]

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UNIT –I
DC CIRCUITS

1. In a conductor, flow of current results due to the flow of [ ]
   A) Positive ions B) electrons C) protons D) atoms or molecules
2. Resistance is always measured in [ ]
   A) Ohms B) coulombs C) amperes D) henrys
3. In an electric circuit, if the current flows in only one path, the circuit is called a [ ]
   A) Parallel circuit B) series circuit C) series-parallel circuit D) compound circuit
4. According to Kirchhoff's voltage law, the algebraic sum of the voltage drops in a series circuit is equal to [ ]
   A) The current in the circuit B) the applied emf
   C) Sum of all potential drops in the circuit D) sum of the emfs taken in the order
5. The resistance of a 1KW electric heater when energized by a 230v 1-phase AC is [ ]
   A) 52.9Ω B) 230Ω C) 1000Ω D) 4.2Ω
6. Determine the current if a 10 coulombs charge passes a point in 0.5 seconds [ ]
   A) 10A B) 20A C) 0.5A D) 2A
7. Determine the charge when C = 0.001μF and V = 1KV [ ]
   A) 0.001C B) 1μC C) 1C D) 0.001C
8. How much energy is stored by a 0.05μF capacitor with a voltage of 100V [ ]
   A) 0.025 B) 0.05J C) 5J D) 100J
9. If one of the resistors in the parallel circuit is removed, what happens to the total

resistance [ ] A) Decreases B) increases C) remains constant D) exactly doubles

10. A series circuit has 3Ω, 10Ω and 20Ω and 2V DC in series. If 10Ω resistor is replaced by open circuit then current in the circuit is [ ]

A) Zero B) increased C) decreased D) constant

11. An inductor of inductance 0.1H, carrying current of 6A will store energy of [ ]

A) 6J B) 36J C) 1.8J D) 3.6J

12. Kirchhoff's current laws apply for [ ]

A) Resistive circuits only B) linear circuits only C) nonlinear circuits only D) both (b), (c)

13. The nodal analysis is primarily based on the application of [ ]

A) ohm's law B) KCL C) KVL D) both (a) and (b)

14. Energy stored in inductor is [ ]

A) LI^2 B) ½ LI^2 C) ½ LI D) none

15. The capacitor act as …….for DC [ ]

A) Short circuit B) open circuit C) both (a), (b) D) none

16. An inductor act as…….For DC [ ]

A) Short circuit B) open circuit C) both (a), (b) D) none

17. In parallel circuit which parameter is same [ ]

A) Power B) current C) voltage D) energy

18. The minimum number of the resistors required to form a series-parallel circuit is [ ]

A) One B) two C) three D) four

19. The S.I. unit of power is [ ]

A) Henry B) coulomb C) watt D) watt-hour

20. The resistance of a conductor varies inversely as [ ]

A) length B) area of cross section C) temperature D) resistivity

21. Norton's equivalent circuit consists of [ ]

A) Voltage source in parallel with resistance B) voltage source in series with resistance

C) Current source in series with resistance D) current source in parallel with resistance

22. While applying thevenin's theorem, the thevenin's voltage is equal to [ ]

A) Short circuit voltage at the terminals B) open circuit voltage at the terminals

C) Voltage of the source D) total voltage available in the circuit

23. Superposition theorem is valid only for [ ]

A) Linear circuits B) non-linear circuits C) both linear and non-linear D) neither of the two

24. Superposition theorem is not valid for [ ]

A) Voltage responses B) current responses C) power responses D) all the three

25. Thevenin's theorem is based on the idea of [ ]

A) An equivalent current source B) An equivalent source of emf

C) An equivalent power source D) An equivalent resistance

26. The concept on which Superposition theorem is based is [ ]

A) reciprocity B) duality C) nonlinearity D) linearity

27. For high efficiency of transfer of power, internal resistance of the source should be [ ]

A) equal to the load resistance B) less than the load resistance

C) more than the load resistance D) none of the above

28. Application of Norton's theorem to a circuit yields [ ]

A) equivalent current source and impedance in series

B) equivalent current source and impedance in parallel

C) equivalent impedance

D) equivalent current source

29. The superposition theorem is applicable to [ ]

A) voltage only B) current only C) both current and voltage D) current voltage and power

30. While calculating R_{th} in Thevenin's theorem and Norton equivalent [ ]

A) all independent sources are made dead B) only current sources are made dead

C) only voltage sources are made dead D) all voltage and current sources are made

dead

31. Ohm's law is applicable to [ ]

(A) Linear networks (B) Non-linear networks (C) Both (A)&(B) (D)none

32. For maximum power transfer between two cascaded sections of an electrical network, the relationship between the output impedance Z_1 of the first section to the input impedance Z_2 of the second section is (Gate ECE 2014)

[ ]

(A) $Z_2 = Z_1$ (B) $Z_2 = -Z_1$ (C) $Z_2 = Z_1^*$ (D) $Z_2 = Z_1^*$

33. A source $v_s(t) = V \cos 100 \pi\pi t$ has an internal impedance of (4 + j3) ΩΩ. If a purely resistive load connected to this source has to extract the maximum power out of the source, its value in Ω should be (Gate ECE 2014) [ ]

(A) 3 (B)4 (C) 5 (D)7

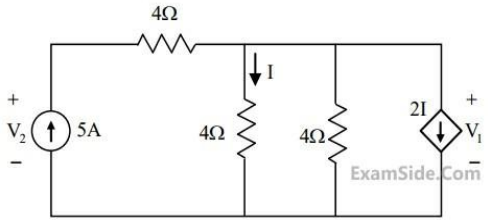
34. An independent voltage source in series with an impedance $Z_s = R_s + jX_s$ delivers a maximum average power to a load impedance Z_L when (Gate ECE 2015)

[ ]

(A) $Z_L = R_S - jX_S$ (B) $Z_L = R_S + jX_S$ (C) $Z_L = R_S$ (D) $Z_L = jX_S$

35. In the given circuit, the values of V_1 and V_2 respectively are (Gate ECE 2015)

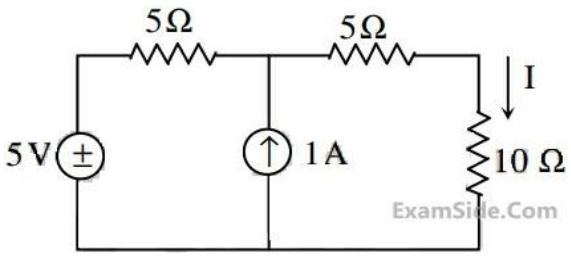
[ ]



(A) 10V, 20V (B) 5V,10V (C) 0V,20V (D)15V,35V

36. In the figure shown, the value of the current I (in Amperes) is (Gate ECE 2014)

[ ]



(A) 0.5 A (B) 5A (C) 10A (D) 2A

A) 10 cycles B) 60 cycles C) 600 cycles D) 6 cycles

2. If the peak value of a certain sine wave voltage is 10 V, what is the peak to peak value [ ]

A) 20V B) 10V C) 5V D) 7.07V

3. A sine wave has a frequency of 50 Hz. Its angular frequency is_____radian/second. [ ]

A) 100 П B) 50 wt C) 25 jt D) 5 n

4. The period of a wave is [ ]

A) same as frequency B) time required to complete one cycle

C) Expressed in ampere D) none of the above

5. The period of a sine wave is 20mseconds.Its frequency is [ ]

A) 20 Hz B) 30 Hz C) 40 Hz D) 50 Hz

6. A heater is rated as 230 V, 10 kW, A.C. The value 230 V refers to [ ]

A) average voltage B) r.m.s. voltage C) peak voltage D) none of the above

7. In which of the following system, the phase is equal to line voltage [ ]

(A) star B) delta (C) star-delta D) delta-star

8. If two sinusoids of the same frequency but of different amplitudes and phase angles are subtracted,

the resultant is [ ]

A) a sinusoid of the same frequency B) a sinusoid of half the original frequency

C) a sinusoid of double the frequency D) not a sinusoid

9. Two waves of the same frequency have opposite phase when the phase angle between them is [ ]

A) 360° B) 180° C) 90° D) 0°

10. The r.m.s. value and mean value is the same in the case of [ ]

A) triangular wave B) sine wave C) square wave D) half wave rectified sine wave

11. For the same peak value which of the following wave will 'have the highest r.m.s. value ? [ ]

A) square wave B) half wave rectified sine wave

C) triangular wave D) sine wave

12. For a sine wave with peak value Imax the r.m.s. value is [ ]

A) 0.5 Imax B) 0.707 C) 0.9 D) 1.414 Lmax

13. For a sine wave with peak value Emax, the rms value is [ ]

A) 0.636 Emax B) 0.707 Emax C) 0.434 EWc D) lAUEmax

14. For a frequency of 200 Hz, the time period will be [ ]

A) 0.05 s B) 0.005 s C) 0.0005 s D) 0.5 s

15. The phase difference between voltage and current wave through a circuit element is given as 30°.

The essential condition is that [ ]

A) both waves must have same frequency B) both waves must have identical peak values

C) both waves must have zero value at the same time D) none of the above

16. Which of the following statement is correct for delta connected load system [ ]

A) $V_{ph} = V_L$ B) $I_{ph} = I_L$ C) $V_{ph} = \sqrt{3}\, V_L$ D) $I_L = \sqrt{3} I_p$

17. In a series resonant circuit, the impedance of the circuit is [ ]

A) minimum B) maximum

C) zero D) none of the above

18. Power factor of an electrical circuit is equal to [ ]

A) R/Z B) cosine of phase angle difference between current and voltage

C) kW/KVA D) ratio of useful current to total current Iw/I

19. All the rules and laws of D.C. circuit also apply to A.C. circuit containing [ ]

A) capacitance only B) inductance only

C) resistance only D) all above

20. Power factor of the following circuit will be zero [ ]

A) resistance B) inductance

C) capacitance D) both (b) and (c)

21. Power factor of the following circuit will be unity [ ]

A) inductance B) capacitance

C) resistance D) both (a) and (b)

22. In a pure resistive circuit [ ]

A) current lags behind the voltage by 90° B) current leads the voltage by 90°

C) current can lead or lag the voltage by 90° D) current is in phase with the voltage

23. In a pure inductive circuit [ ]

A) the current is in phase with the voltage B) the current lags behind the voltage by 90°

C) the current leads the voltage by 90° D) the current can lead or lag by 90°

24. In a circuit containing R, L and C, power loss can take place in [ ]

A) C only B) L only

C) R only D) all above

25. Inductance of coil [ ]

A) is unaffected by the supply frequency

B) decreases with the increase in supply frequency

C) increases with the increase in supply frequency

D) becomes zero with the increase in supply frequency

26. Which of the following circuit component opposes the change in the circuit voltage? [ ]

A) Inductance B) Capacitance C) Conductance D) Resistance

27. Power factor of electric bulb is [ ]

A) zero B) lagging C) leading D) unity

28. If a sinusoidal wave has frequency of 50 Hz with 30 A r.m.s. current which of the following equation represents this wave? [ ]

A) $42.42 \sin 3141$ B) $60 \sin 25t$ C) $30 \sin 50t$ D) $84.84 \sin 25t$

29. The safest value of current the human body can carry for more than 3 second is [ ]

A) 4 mA B) 9 mA C) 15 mA D) 25 Ma

30. Which of the following statement is correct for star connected load system [ ]

A) $V_{ph} = V_L$ B) $I_{ph} = I_L$ C) $V_{ph} = \sqrt{3}\, V_L$ D) $I_L = \sqrt{3} I_{ph}$

31. The line A to neutral voltage is $10\angle 15^\circ$ V for a balanced three phase star connected load with phase sequence ABC. The voltage of line B with respect to line C is given by (GATE EE 2014) [ ]

(a) $10\sqrt{3} \angle 105^0$ (b) $10\angle 105^0$ (c) $10\sqrt{3} \angle 75^0$ (d) $-10\sqrt{3} \angle 90^0$

32. A non-ideal voltage source V_S has an internal impedance of Z_S. If a purely resistive load is to be chosen that maximizes the power transferred to the load, its value must be (GATE EE 2014) [ ]

(A) 0 (B) real part of z_s (C) magnitude of z_s (D) complex conjugate of z_s purely resistive load

33. A source $v_s(t)=V\cos 100\pi t$ has an internal impedance of $(4 + j3)\ \Omega$. If a connected to this source has to extract the maximum power out of the source, its value in Ω should be (GATE EE 2013) [ ]

(A) 3 (B) 4 (C) 5 (D) 7

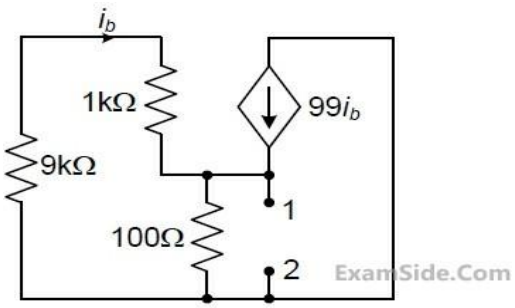
34. In the circuit given below, the value of R required for the transfer of maximum power to the load having a resistance of 3Ω is (GATE EE 2011) [ ]

(A) 0 (B) 3Ω (C) 6Ω (D) infinite

35. In the Fig. $Z1=10\angle -60^0, Z2=10\angle 60^0, Z3=50\angle 53.13^0$. Theremin's impedance seen from X−Y is (IES EE 2003) [ ]

(A) $56.66 \angle 45^0$ (B) $60 \angle 30^0$ (C) $70 \angle 30^0$

36. The impedance looking into nodes 1 and 2 in the given circuit is (GATE EE 2003) [ ]



(A) 50Ω (B) 100Ω (C) $5K\Omega$ (D) $10.1K\Omega$

37. The voltage V in Fig. is always equal to (IES ECE 1997) [ ]

(A) 9 (B) 5 (C) 1 (D) none of the above

38. The dependent current source shown in figure. (IES ECE 2002) [ ]

(A)Delivers 80W (B) Absorbs 80W (C) Delivers 40W (D) Absorbs 40W

39. In the circuit of Fig., the voltage v(t) is (GATE ECE 2000) [ ]

(A) $e^{at} - e^{bt}$ (B) $e^{at} + e^{bt}$ (C) $ae^{at} - be^{bt}$ (D) $ae^{at} + be^{bt}$

40. Two 2H inductance coils are connected in series and are also magnetically coupled to each other the

Coefficient of coupling being 0.1.The total inductance of the combination can be

(IES ECE 1995) [ ]

(A) 0.4H (B) 3.2H (C) 4.0H (D)4.4H

UNIT-III

D.C MACHINES

1. The D.C. Generator works on the principle of [ ]

A) Flemings left hand rule B) Ampere‟s law C) Lenz‟s law

D) Faradays laws of Electromagnetic induction

2. Laminated yoke in a dc generator reduces

[]

A) Iron losses B) Temperature rise C) Speed regulation D) Sparking on load

3. The EMF generated in a D.C. Generator depends on

[ ]

A) No. of turns in the armature B) Flux / pole C) Speed D) All

4. The load current and field current of a DC shunt generator are 50A and5A respectively.

Its armature current is [ ]

A) 50A B) 55A C) 45A D) 40A

5. In a d.c shunt generator the field winding is connected in.....to the armature.

[ ]

A) parallel B)series C) both A & B D) none of the above

6. The current relation in dc separately excited generator is

[ ]

A) $I_f = Ia$ B) $I_L = Ia$ C) $Ia = -I_L$ D) $Ia = 0$

7. A D.C. Generator is a machine that converts

[ ]

A) Electrical energy into Mechanical energy B) Electrical energy into Electrical energy

C) Mechanical energy into Mechanical energy D)Mechanical energy into Electrical energy

8. The brush voltage drop in d.c machine is about ……. [ ]

A) 0.1V B) 2V C) 10V D) 20V

9. The purpose of commutator in a D.C generator is to

[ ]

A) reduce sparking at brushes B) convert the induced a.c. into d.c.

C) increase output voltage D) provide smoother output

10. Which of the following DC Generators is suitable for charging Batteries?

[ ]

A) Shunt generator B) Series Generator

C) Differentially compounded Generator D) None

11. The current relation in dc compound generator is

[ ]

A) $Ia=Ish+I_L$ B) $Ia=Ish$ C) $Ia=I_L$ D) $Ia=0$

12. Residual magnetism is essential in the field electromagnets for building up of voltage of all types of d.c generators except.....

[ ]

A) shunt B) compound C) separately excited D) series

13. The critical resistance of the D.C. generator is the resistance of

[ ]

A) armature B) field C) load D) brushes

14. The armature of a d.c. machine is made of [ ]

A) wrought iron B) silicon steel C) cast steel D) soft iron

15. A separately excited d.c generator is normally not used because

[ ]

A) It is costly B) Separate d.c source is required for field circuit

C) Terminal voltage rises with increase in load D) None of these

16. The purpose of brush in a d.c. machine is to_

[ ]

A) prevent sparking B) clean the commutator

C) collect current from the commutator D) none of these

17. No-load speed of which of the following motor will be highest ? [ ]

A) Shunt motor B) Series motor

C) Cumulative compound motor D) Differentiate compound motor

18. If the supply voltage for a D.C. motor is increased, which of the following will decrease?

[ ]

A) Starting torque B) Operating speed

C) Full-load current D) All of the above

19. Buses, trains, trolleys, hoists, cranes require high starting torque and therefore make use of

[ ]

A) D.C. series motor B) D.C. shunt motor

C) induction motor D) all of above motors

20. The armature torque of the D.C. shunt motor is proportional to

[ ]

A) field flux only B) armature current only

C) both (a) and (b) D) none of the above

21. The speed of a D.C. motor can be varied by varying [ ]

A) field current B) applied voltage

C) resistance in series with armature D) any of the above

22. If the speed of a D.C. shunt motor is increased, the back e.m.f. of the motor will

[ ]

A) increase B) decrease

C) remain same D) become zero

23. The power factor of an alternator is determined by its

[ ]

A) speed B) load C) excitation D) prime mover

24. Maximum power developed is depends on [ ]

A) voltage B) reactance C) both 1and 2 D) load angle

25.Field winding of an alternator is

A) DC excited B) AC excited C) both(A) & (B) D) none

26. Which kind of rotor is most suitable for turbo alternators which are designed to run at high speed[ ]

A) Salient pole type B) Non-salient pole type C) Both (A) & (B) D) None of the above

27. The number of electrical degrees passed through in one revolution of a two pole alternator is

[ ]

A)360^0 B)720^0 C) 1080^0 D)2160^0

28. The slip of an induction motor normally does not depend on

[ ]

A) Rotor speed B) synchronous speed C) Shaft torque D) core-loss component

29. Find the number of poles required, when the frequency is 50Hz and speed of the motor is 500 rpm?

A) 5 B) 10 C) 12 D) 24 [ ]

30. The shape of the torque/slip curve of induction motor is

[ ]

A) parabola B) hyperbola C) rectangular parabola D) straight line

31. A 4–point starter is used to start and control the speed of a (GATE EE 2011)

[ ]

(A) D.C shunt motor with armature resistance control

(B) D.C shunt motor with field weakening control

(C)D.C series motor (D) D.C.Compound motor

32. The dc motor, which can provide zero speed regulation at full load without any controller [ ]

(A) series (B) shunt (C) cumulatively compound (D) Differentially compound

33. The torque speed characteristic of a Repulsion motor resembles which of the following dc motor characteristic? (GATE EE 1996) [ ]

(A) separately excited (B) shunt (C) series (D) compound

34. A 4 pole dynamo with wave wound armature has 5151 slots containing 20 conductors in each slot. The induced emf is 357 volts and the speed is 5800rpm. The flux per pole will be (IES EE 1996) [ ]

(A) 3.5mWb (B)1.2mWb (C) 14mWb (D)21 mWb

35. Neglecting all losses, the developed torque (T) of d.c. separately excited motor, operating under constant terminal voltage, is related to its output power (P) as under (IES EE 1996) [ ]

(A) $T\alpha \sqrt{P}$ (B) $T\alpha P$ (C) $T^2 \alpha P^3$ (D) T independent of P.

36. A 4 pole dynamo with wave wound armature has 51 slots containing 20 conductors in each slot. The induced emf is 357 volts and the speed is 5800rpm. The flux per pole will be (GATE EE 1996) [ ]

(A)3.5mWb (B)1.2mWb (C) 14mWb (D)21 mWb

37. A 1.8° step, 4-phase stepper motor has a total of 40 teeth on 8 poles of stator. The number of rotor teeth for this motor will be (IES EE 2000) [ ]

(A) 40 (B)50 (C) 100 (D) 80

38. A dc series motor fed from rated supply voltage is overloaded and its magnetic circuit is Saturated . The torque-speed characteristic of this motor will be approximately represented by which curve of Fig. (GATE EE 2002) [ ]

(A) curve A (B) curve B (C) curve C (D) curve D

39. A cumulative compounded long shunt motor is driving a load at rated torque and rated speed. If the series field is shunted by a resistance equal to the resistance of the series

field, keeping the torque constant. (GATE EE 1993) [ ]

40. A differentially compounded d.c. motor with interpoles and with brushes on the neutral axis is to be driven as a generator in the same direction with the same polarity of the terminal voltage. It will then (GATE EE 1995) [ ]

(A) be a cumulatively compound generator but the interpole coil connections are to be reversed

(B) be a cumulatively compounded generator without reversing the interpole coil connections.

(C) be a differentially compounded generator without reversing the interpole coil connections

(D) be a differentially compounded generator but the interpole coil connections are to be reversed.

UNIT –IV

A.C MACHINES

1. The two windings of a transformer is [ ]

A) conductively linked B) inductively linked C) not linked at all D)electrically linked.

2. The efficiency of a transformer is mainly dependent on

[ ]

A) core losses. B) copper losses. C) stray losses. D) dielectric losses.

3. In a transformer the voltage regulation will be zero when it operates at

[ ]

A)unityp.f. B)leadingp.f. C)lagging p.f. D)Zero p.f. leading

4. An ideal transformer is one which

[ ] A) has more losses B) does not work C) has no losses and leakage reactance D) All the above

5. Which of the following is minimized by laminating the core of a transformer?

[ ]

A) Eddy current loss B) Hysteresis loss C) Heat loss D) copper loss

6. To step 120 V ac up to 900 V ac, the turn's ratio must be

[ ]

A) 75 B) 750 C) 7.5 D) 0.13

7. Transfer of electrical power from primary to secondary in a transformer takes place

[ ]

A) Electrically B) Electromagnetically C) magnetically D) none of the above

8. The path of a magnetic flux in a transformer should have [ ]

A) high resistance B) high reluctance C) low resistance D) low reluctance

9. The efficiency of a transformer will be maximum when [ ]

A) copper losses = hysteresis losses B) hysteresis losses = eddy current losses

C) eddy current losses = copper losses D) copper losses = iron losses

10. A transformer cannot raise or lower the voltage of a D.C. supply because [ ]

A) there is no need to change the D.C. voltage

B) a D.C. circuit has more losses

C) Faraday's laws of electromagnetic induction are not valid since the rate of change of flux is zero

D) none of the above

11. A transformer is so designed that primary and secondary have…… [ ]

A) high leakage reactance B) tight magnetic coupling

C) large resistance D)good electric coupling

12. Which winding in a transformer has more number of turns? [ ]

A) Low voltage winding B) High voltage winding

C) Primary winding D) Secondary winding

13. The transformer ratings are usually expressed in terms of [ ]

A) volts B) amperes C) kW D) kVA

14. Which of the following does not change in transformer [ ]

A) Voltage B) Current C) Power D) Frequency

15. Silicon steel used for laminating the core to reduce [ ]

A) Hysteresis loss B) Eddy current loss C) Copper loss D) All of the above

16. Eddy current loss will depend on

[ ]

A) Frequency B) flux density C) thickness D) All of the above

17. Which of the following is step up transformer [ ]

A) If K<1 B) If K>1 C) If K=1 D) All

18. Which of the following is step down transformer [ ]

A) If K<1 B) If K>1 C) If K=1 D) All

19. Transformation ratio is denoted by a letter of [ ]

A) V B) I C) K D) P

20. Hysteresis loss will depends on [ ]

A) f^2 B) f^3 C) f D) $f^{1.6}$

21. Total core loss is also called as ----------? [ ]

A) Eddy current loss B) Hysteresis loss C) Magnetic loss D) Copper loss

22. Which of the following are variable losses? [ ]

A) Eddy current loss B) Hysteresis loss C) shunt field loss D) armature copper loss

23. The basic function of a transformer is to change [ ]

A) the power level B) the power factor C) the level of the voltage D) the frequency

24. R1 is the resistance of the primary winding of the transformer. The turn ratio in terms of primary to

secondary is K. Then the equivalent resistance of the primary referred to secondary is

[ ]

A) R1/K B) K^2R1 C) $R1/K^2$ D) K*R1

25. Voltage regulation of transformer is given by [ ]

A) $(E_2 - V_2) / V_2$ B) $(E_2 - V_2) / E_2$ C) $(V_2 - E_2) / V_2$ D) $(V_2 - E_2) / E_2$

26. In a transformer which of the following losses are zero ? [ ]

A) iron loss B) copper loss C) mechanical loss D) all of the above

27. A single-phase 100 kVA, 1000 V / 100 V, 50 Hz transformer has a voltage drop of 5% across its series impedance at full load. Of this, 3% is due to resistance. The percentage regulation of the transformer at full load with 0.8 lagging power factor is

(GATE EE 2018) [ ]

(A) 4.8 (B) 6.8 (C) 6.8 (D)10.8

28. Assuming an ideal transformer, The Thevenin's equivalent voltage and impedance as seen

from the terminals x and y for the circuit in figure are (GATE EE 2014)

[ ]

(A) 2 sin(wt),4Ω (B) 1sin(wt),1Ω (C) 21sin(wt),2Ω (D) 2 sin(wt),0.5Ω

21. For a specified input voltage and frequency, if the equivalent radius of the core of a transformer is reduced by half, the factor by which the number of turns in the primary should change to maintain the same no load current is (GATE EE 2014)

[ ]

(A) 1/4 (B) 1/2 (C) 2 (D) 4

22. A single-phase transformer has a turns ratio of 1:2, and is connected to a purely resistive load as shown in the figure. The magnetizing current drawn is 1 A, and the secondary current is 1 A.

If core losses and leakage reactances are neglected, the primary current is (GATE EE 2010)

[ ]

(A) 1.41A (B) 2A (C) 2.24A (D) 3A

23. In a transformer, zero voltage regulation at full load is (GATE EE 2007)

[ ]

(A) not possible (B) possible at unity power factor load

(C) possible at leading power factor load

(D) possible at lagging power factor load

24. Which three-phase connection can be used in a transformer to introduce a phase difference of 30° between its output and corresponding input line voltages (GATE EE 2005)

[ ]

(A) Star-star (B) Star-Delta (C) Delta-Delta (D) Delta-Zig Zag

25. A single phase transformer has a maximum efficiency of 90% at full load and unity power factor. Efficiency at half load at the same power factor is (IES EE 2003)

[ ]

(A)86.7% (B)88.26% (C)88.9% (D)87.8%

26. A 3-phase, 4-pole, 400 V, 50 Hz squirrel-cage induction motor is operating at a slip of 0.02. The speed of the rotor flux in mechanical rad/sec, sensed by a stationary observer, is closest to (GATE EE 2017) [ ]

(A)1500 (B) 1470 (C) 157 (D)154

27. A 4 pole induction machine is working as an induction generator. The generator supply frequency is 60 Hz. The rotor current frequency is 5 Hz. The mechanical speed of the rotor in RPM is (GATE EE 2017) [ ]

(A)1350 (B)1650 (C)1950 (D)2250

28. Leakage flux in an induction motor is (GATE EE 2013) [ ]

(A) flux that leaks through the machine

(B) flux that links both stator and rotor windings

(C) flux that links none of the windings

(D) flux that links the stator winding or the rotor winding but not both

29. The slip of an induction motor normally does not depend on (GATE EE 2012) [ ]

(A) rotor speed (B)synchronous speed (C) shaft torque (D)core-loss component

30. For an induction motor, operating at a slip 's', the ratio of gross power output to air gap power is equal to: (IES EE 2005) [ ]

(A)$(1-s)^2$ (B) $(1-s)$ (C) $\sqrt{(1-S)}$ (D)$(1-\sqrt{s})$

31. The type of single-phase induction motor having the highest power factor at full load is (GATE EE 2004) [ ]

(A) shaded pole type (B)split-phase type (C)capacitor-start type (D)capacitor-run type

32. If a 400 V, 50 Hz, star connected, 3 phase squirrel cage induction motor is operated from a 400 V, 75 Hz supply, the torque that the motor can now provide while drawing rated current from the supply? (IES EE 2002) [ ]

(A) reduces (B)increases (C)remains the same

(D)increase or reduces depending upon the rotor resistance

33. In a salient pole synchronous motor, the developed reluctance torque attains the maximum value when the load angle in electrical degrees is (GATE EE 2018) [ ]

(A)0 (B)45 (C)60 (D)90

34. In a constant V/f induction motor drive, the slip at the maximum torque (GATE EE 2016) [ ]

(A) is directly proportional to the synchronous speed

(B)remains constant with respect to the synchronous speed

(C) has an inverse relation with the synchronous speed

(D)has no relation with the synchronous speed

35. A three-phase, 4-pole, self-excited induction generator is feeding power to a load at a frequency f1f1. If the load is partially removed, the frequency becomes f2f2. If the speed of the generator is maintained at 1500 rpm in both the cases, then (GATE EE 2014) [ ]

(A) f1,f2 > 50Hz and f1f1 > f2f2 (B)f1f1 < 50Hz and f2f2 > 50Hz

(C)f1,f2 < 50Hz and f2f2 > f1f1 (Df1 > 50Hz and f2f2 < 50Hz

36. If a synchronous motor is running at a leading power factor, its excitation induced voltage (E_f) is

(GATE EE2017) [ ]

(A) equal to terminal voltage V_t (B) higher than the terminal voltage V_t

(C)less than terminal voltage V_t (D)dependent upon supply voltage V_t

37. In a synchronous machine, hunting is predominantly damped by (GATEEE2014) [ ]

(A) mechanical losses in the rotor (B)iron losses in the rotor

(C)copper losses in the stator (D)copper losses in the rotor

38. Distributed winding and short chording employed in AC machines will result in

(IES EE2008) [ ]

(A) increase in emf and reduction in harmonics

(B) reduction in emf and increase in harmonics

(C) increase in both emf and harmonics

(D) reduction in both emf and harmonics

39. A single-phase transformer has a turns ratio of 1:2, and is connected to a purely resistive load as

shown in the figure. The magnetizing current drawn is 1 A, and the secondary current is 1 A. If core

losses and leakage reactances are neglected, the primary current is (GATEEE2010) [ ]

(A) 1.41 A (B)2 A (C)2.24 A (D)3 A

40. In transformers, which of the following statements is valid? (IESEE2006) [ ]

(A) In an open circuit test, copper losses are obtained while in short circuit test, core losses are obtained.

(B) In an open circuit test, current is drawn at high power factor.

(C) In a short circuit test, current is drawn at zero power factor

(D) In an open circuit test, current is drawn at low power factor.

UNIT-V

DOMESTIC WIRING

1. Which of the following relation is not correct [ ]

A) P=VI B) P=V/R2 C) I=V/R D) V=IR

2. The voltage of the single phase supply to residential consumer is [ ]

A) 110V B)210V C) 230V D) 420V

3. The rating of fuse wire is always expressed in [ ]

A)volts B) ampere C) ampere-volts (D)ampere hours

4. The supply used in houses is ---------- [ ]

A) 3-phase supply B)1-phase supply C) both A and B D) all of the above

5. CTS stands for [ ]

A) Calcutta tram way service B) cab tyre sheathed

C) cable tyre sheathed D) cable type sheathed

6. Green coloured cable indicates [ ]

A)phase line B) neutral line C) earth connection D) none

7. If a person is in contact with the current, the rescuer should use [ ]

A) Metal rod B) wet wood C) dry wood D) wet rope

8. In electrical circuits fuse is blown and cut of the circuits due to [ ]

A) Excessive current B) excessive voltage C) low voltage D) high inductive

9. Insulation on a current carrying conductor is provided to prevent [ ]

A) Current leakage B) electric shop C) both (a) and (b) D) none

10.3 core cable is used for [ ]

A) 2 phase service B) 1 phase service C) 3 phase service D) none

11. In 1748, first time word used in connection with electricity was [ ]

A) Battery B) charge C) electrode D)all of them

12. Fuse material must have _____ melting and _____ conductivity [ ]

(A) high, low (B) low, high (C) lower (D) high, high

13 Fuse is always connected to [ ]

A) Phase wire B) neutral wire C) earth line D) all

14. A fuse is normally inserted in [ ]

A) Phase wire B) neutral wire C) earth wire D) none

15. The rating of fuse wire is always expressed in [ ]

A) volts B) ampere C) ampere-volt D) ampere-hour

16.A material best suited for manufacturing of fuse is [ ]

A) silver B) copper C) aluminum D) zinc

17. Fuse is a device [ ]

(A) power limiting (B) voltage limiting (C) current limiting (D) both (A) and (B)

18. Cleat wiring is type of wiring [ ]

A) costly B) cheapest C) more cost D) none

19 The cheapest system of internal wiring is [ ]

A) cleat wiring B) wooden casing and capping wiring C) CTS or TRS wiring D) None

20. Advantage of fuel cell over petrol is its only product [ ]

A) Oxygen B) Water C) Nitrogen D) CO2

21. A battery consists of [ ]

A) A cell B) A circuit C) A generator D) A number of cells

22. Storage batteries are rated according to ——— [ ]

A) Ambient Temperature B) Discharge Rate C) A and C D) None of the above

23. Number of cells connected in series provide a [ ]

A) High current carrying capacity B) Higher voltage C)Higher power D)None of the above

24. Benefits of using small cells could be [ ]

A)light weight B)high voltage C)constant voltage D)all of them

25. Cells are connected in series in order to increase the [ ]

A) Current capacity B) Life of the cells C) Voltage ratings D) Terminal voltage

26. We connect the fuse in [ ]

A) phase line B) neutral line C) earth line D)none

27. The most commonly used fuse in house wiring is [ ]

A) open type fuse B) kitKat fuse C) D-type cartridge fuse D) H.R.C fuses

28. Cost is very cheap in a [ ]

A) TRS wiring B) conduit wiring C) cleat wiring D) all of the above

29. Type of wiring is only used for service main [ ]

A) cleat wiring B) wooden casing and capping wiring C) conduit wiring D) None

30. The Cables do not require cotton tape against moisture protection [ ]

A) TRS cables B) VIR cables C) PVC cables D) all

31. The interrupting time of a circuit breaker is the period between the instant of

(GATE EE2010) [ ]

(A) Initiation of short circuit and the arc extinction on an opening operation

(B) Energizing of the trip circuit and the arc extinction on an opening operation

(C)Initiation of short circuit and the parting of primary arc contacts

(D)Energizing of the trip circuit and the parting of primary arc contacts

32. The use of high-speed of circuit-breakers (GATE EE1997) [ ]

(A)Reduces the short circuit current (B) Improves system stability

(C)Decreases system stability (D) Increases the short circuit current

33. Resistance switching is normally employed in (GATE EE1996) [ ]

(A)All breakers (B) Bulk oil breakers (C) Minimum oil breakers (D) Air blast circuit breakers

34. In house wiring all bulbs, fans are connected in [ ]

(A) Series (B) series-parallel (C) parallel (D) all

35. Ground resistance should be designed such that grounding resistance should be [ ]

(A) as low as possible (B) as high as possible (C) always zero (D)none of the above

36. Factors on which soil resistance depends [ ]

(A)Depth of the electrode (B) moisture (C) Nacl (D)all the above

37. Average resistance of human body is [ ]

(A)500 ohms (B)1000 ohms (C)1500 ohms (D)2000 ohms

38. Earth wire or ground wire is made of [ ]

(A) copper (B)aluminum (C)iron (D)galvanized steel

39. Nickel-Cadmium batteries are preferred more than Lead-Acid batteries in military applications because ——— [ ]

(A) Can be easily charged and discharged. (B)Discharge rate is higher

(C)Delivers large amount of power (D)All of the above

40. Storage batteries are rated according to ——— [ ]

A) Ambient Temperature B) Discharge Rate C) A and C D) None of the above

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