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PREP. BY: R.K.RAMAN

1. A non -sinusoidal periodic waveform DC component, cosine components and even harmonics. The waveform has
   a) Half wave and odd function symmetry
   b) Half wave and even function symmetry
   c) Only odd functions symmetry
   d) Only half wave symmetry

[SSC. (JE)-2012]

2. In a series RLC ciricut R = 20Ω X_L = 30Ω and XC = 30Ω. If the supply voltage across the combination is $v = 100\sin(100\pi t + 30^\circ)$ Volts, the instantaneous current and the power factor of the circuit are respectively
   a) $I = 3.536\sin(100\pi t + 30^\circ)$ Amps, p.f. = 0.866
   b) $I = 5\sin(100\pi t + 30^\circ)$ Amps, p.f. = unity
   c) $I = 3.536\sin(100\pi t + 30^\circ)$ Amps, p.f. = unity
   d) $I = 5\sin(100\pi t + 30^\circ)$ Amps, p.f. = 0.866

[SSC. (JE)-2012]

3. The rms value of the alternating current given by the equation

$i = 50\sin(314t - 10^\circ) + 30\sin(314t - 20^\circ)$

   a) 41.23 A
   b) 58.31 A
   c) 38.73 A
   d) 77.43 A

[SSC. (JE)-2012]

4. A series R-L-C circuit will have unity power factor if operated at a frequency of
   a) $1/(2\pi\sqrt{LC})$
   b) LC
   c) $1/(LC)$
   d) $1/\sqrt{(LC)}$

[SSC. (JE)-2012]

5. In the series RC circuit, the voltage across C starts increasing, the moment the circuit is switched to V Volts dc. The rate of increase of voltage across C at the instant just after the switch is closed (i.e. at $t = 0^+$) is
   a) RV/C b) CV/R
   c) V/RC d) R/CV

[SSC. (JE)-2012]

6. Form factor of an alternating wave is
   a) Form factor = $\frac{\text{average value}}{\text{rms value}}$
   b) Form factor = $\frac{(\text{rms value})^2}{\text{average value}}$
   c) Form factor = $\frac{\text{rms value}}{\text{average value}}$
   d) Form factor = rms value × average value

[SSC. (JE)-2012]

7. The phase difference between the following voltage and current waves,

$v = 311\sin(100\pi t + 30^\circ)$ Volts

$i = 17\sin(100\pi t - 20^\circ)$ Amps

   a) 20° b) 50° c) 10° d) 30°

[SSC. (JE)-2012]

8. Match the items given in List – I and those in List – II Select your answer using codes given in the lists:

List – I	**List – II** ***(Temperature Coefficient of Resistance)***
(a) Aluminium	P. Negligibly small
(b) Manganin	Q. Positive
(c) Carbon	R. Negative

   a) a → R, b → Q, c → P
   b) a → Q, b → P, c → R
   c) a → P, b → Q, c → R
   d) a → R, b → P, c → Q

[SSC. (JE)-2012]

9. In an R-L series R = 20Ω, L = 0.056 H an d the supply frequency is *f* = 50 Hz. The magnitude impedance of the circuit is
   a) 26.64 Ω b) 20.0 Ω
   b) 37.6 Ω d) 20.056 Ω

[SSC. (JE)-2012]

10. In the measurement of power in a balanced 3-phase circuit by two-wattmeter method if the two wattmeter's show equal readings then the power factor of the circuit is
   a) Zero
   b) Unity
   c) 0.8 Lagging

d) 0.8 Leading

[SSC. (JE)-2012]

11. Given two coupled inductors L_1 and L_2 having their mutual inductance M. The relationship among them must satisfy

a) $M > L_1L_2$ b) $M = \sqrt{L_1L_2}$

c) $M = L_1L_2$ d) $M > \frac{L_1 + L_2}{2}$

[SSC. (JE)-2012]

12. If the length of a bar of magnetic material is increased by 20% and the cross-sectional area is decreased by 20%, then the reluctance is

a) Increased by 50%
b) Remaining same
c) Decreased by 33%
d) Increased by 67%

[SSC. (JE)-2012]

13. The coupled inductors L_1 = 0.2 H and L_2 = 0.8 H, have coefficient of coupling K = 0.8. the mutual inductance M is

a) 0.16 H b) 0.02 H
c) 0.32 H d) 0.24 H

[SSC. (JE)-2012]

14. A coil with a certain number of turns has a specified time constant. If the number of turns is doubled, its times constant would

a) Becomes four times
b) Get halved
c) Remain unaffected
d) Become doubled

[SSC. (JE)-2012]

15. The iron loss per unit frequency in a ferromagnetic core, when plotted against frequency, is a

a) Straight line with positive slope
b) Straight line with negative slope
c) Parabola
d) Constant

[SSC. (JE)-2012]

16. The mutual inductance between two closely coupled coils is 1H. If the turns of one coil is decreased to half and those of the other is doubled, the new value of the mutual inductance would be

a) 1/4H b) 1H c) 2H d) 1/2H

[SSC. (JE)-2012]

17. Two inductors have self inductance of 9 mH and 25 mH. The mutual inductance between the two is 12 mH. The coefficient of inductive coupling between the two inductors is

a) 18.75 b) 0.25 c) 0.8 d) 1.25

[SSC. (JE)-2012]

18. A wattmeter is being losted under phantom loading condition. If the wattmeter reading is 60 W, the actual power consumed from the supply, is

a) much higher than 60 W
b) 60 W
c) much less than 60 W
d) 30 W

[SSC. (JE)-2011]

19. Two coils with self-inductances 1 H and 2 H having a mutual inductance of 1 H between them carry currents of 2 A and $\sqrt{2}$ A respectively. The total energy stored in the field, in joules, is

a) $2(1+\sqrt{2})$ b) $2(2+\sqrt{2})$
c) $3(1+\sqrt{2})$ d) $3(2+\sqrt{2})$

[SSC. (JE)-2011]

20. The ratio of resistance of a 100 W, 220 V lamp to that of 100 W, 110 V lamp will be at respective voltages

a) 4 b) 2 c) 1/2 d) 1/4

[SSC. (JE)-2010]

21. Two sinusoidal equations are given as

$e_1 = A\sin\left(\omega t + \frac{\pi}{4}\right)$ and $e_2 = A\sin\left(\omega t - \frac{\pi}{6}\right)$

The phase difference between the two quantities is

a) 75° b) 60° c) 105° d) 15°

[SSC. (JE)-2010]

22. If four 10 μF capacitors are connected in parallel, the net capacitance is

a) 2.5 μF b) 40 μF

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c) 20 μF d) 15 μF

[SSC. (JE)-2010]

23. The earth's potential is taken as
a) infinite b) supply voltage
c) 1 volt c) zero

[SSC. (JE)-2010]

24. Permeance is analogous to
a) Conductance
b) Reluctance
c) Inductance
d) Resistance

[SSC. (JE)-2010]

25. A wire has a resistance 10Ω. It is stretched by one-tenth of its original length. Then its resistance will be
a) 10 Ω b)12.1Ω c) 9Ω d) 11 Ω

[SSC. (JE)-2010]

26. The curve representing Ohm's law is
a) Linear b) Hyperbolic
c) Parabolic d) Triangular

[SSC. (JE)-2009]

27. Specific resistance of a conductor depends upon
a) Dimension of the conductor
b) Composition of conductor material
c) Resistance of the conductor
d) Both a) and b)

[SSC. (JE)-2009]

28. Superposition theorem is essentially based on the concept of
a) Reciprocity
b) Linearity
c) Duality
d) Non-linearity

[SSC. (JE)-2009]

29. If a 500 KVA, 200 Hz transformer is operated at 50 Hz, its KVA rating will be
a) 2000 KVA b) 125 KVA
c) 250 KVA d) 1000 KVA

[SSC. (JE)-2009]

30. In an R-L-C circuit susceptance is equal to
a) $\frac{1}{X}$ b) $\frac{1}{R}$ c) $\frac{R}{Z^2}$ d) $\frac{X}{Z^2}$

[SSC. (JE)-2009]

31. Two coupled coils with $L_1 = L_2 = 0.6$ H have a coupling coefficient of K = 0.8. The turn ratio $\frac{N_1}{N_2}$ is
a) 4 b) 2 c) 1 d) 0.5

[SSC. (JE)-2009]

32. Two heaters rated a 1000 W, 250 V each are connected is series across a 250 V, 50 V, 50 Hz AC mains. The total power drawn from the supply would be
a) 1000 watt b) 500 watt
c) 250 watt d) 2000 watt

[SSC. (JE)-2008]

33. The efficiency for maximum power transfer to the load is
a) 25% b) 50% c) 75% d)100%

[SSC. (JE)-2008]

34. A circuit component that opposes the change in circuit voltage is
a) Resistance
b) Capacitance
c) Inductance
d) All the above

[SSC. (JE)-2008]

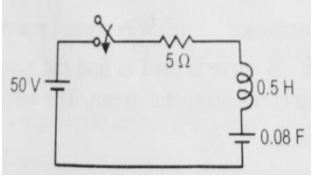
35. A series resonant circuit implies
a) zero power factor and maximum current
b) unity power factor and maximum current
c) unity power factor and minimum current
d) zero power factor and minimum current

[SSC. (JE)-2008]

36. A current $i = (10 + 10\sin t)$ amperes is passed through moving iron type ammeter. Its reading will be
a) zero b) 10 A
c) $\sqrt{150}$A d) $\sqrt{2}$ A

[SSC. (JE)-2008]

37. In the circuit shown in figure, find the transient current *i(t)* when the switch is closed at *t = 0*. Assume zero initial condition.



a) $50te^{-0.5t}$

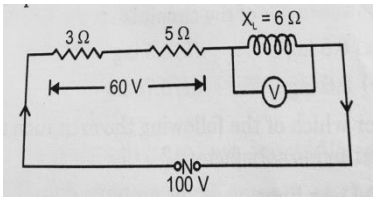
b) $50te^{-5t}$

c) $100te^{-5t}$

d) $100te^{-0.5t}$

[SSC. (JE)-2014]

38. The power factor of the circuit shown in figure:



a) 0.75 lagging

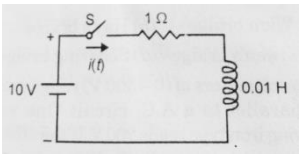
b) 0.6 lagging

c) 0.3 lagging

d) 0.8 lagging

[SSC. (JE)-2014]

39. After closing the switch's' at $t = 0$, the current $i(t)$ at any instant $'t'$ in the network shown in the figure:



a) $10-10e^{-100t}$

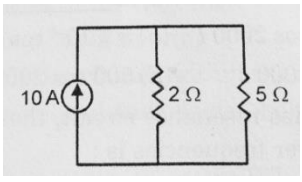
b) $10+10e^{100t}$

c) $10-10e^{100t}$

d) $10+10e^{-100t}$

[SSC. (JE)-2014]

40. Find the current through 5Ω resistor:



a) 3.5 A

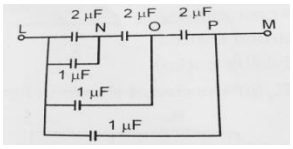
b) 7.15 A

c) 5 A

d) 2.85 A

[SSC. (JE)-2014]

41. Total capacitance between the points L and M in figure is:



a) $4.05\mu F$

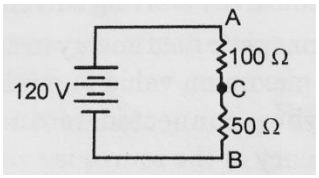
b) $1.45\mu F$

c) $1.85\mu F$

d) $2.05\mu F$

[SSC. (JE)-2014]

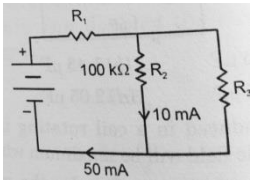
42. Determine the voltage at point C shown below with respect to ground:



a) 80 V b) 120 V c) 40 V d) 70 V

[SSC. (JE)-2014]

43. Find R_3 for the circuit shown in figure:



a) 25 mega ohm

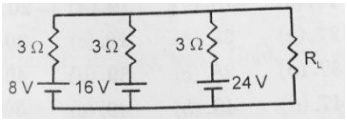
b) 25 milli ohm

c) 25 ohm

d) 25 kilo ohm

[SSC. (JE)-2014]

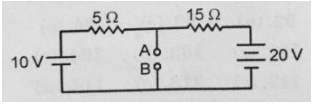
44. Using Millman's theorem, find the current through the load resistance RL of 3Ω resistance shown below:



a) 12 A b) 4 A c) 6 A d) 8 A

[SSC. (JE)-2014]

45. Thevenin's equivalent voltage and resistance between the terminal A and B for network of given figure is:

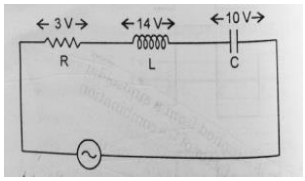


a) 2.5 V, 12.5Ω

b) 2.5 V, 3.75 Ω
c) 12.5 V, 3.75 Ω
d) 12.5 V, 2.5 Ω

[SSC. (JE)-2014]

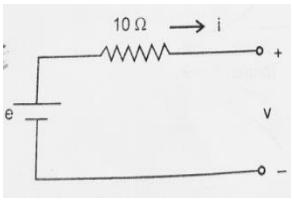
46. The voltage across R, L and C are 3 V, 14 V and 10 V respectively as in the figure. If the voltage source is sinusoidal, then the input voltage (r.m.s.) is



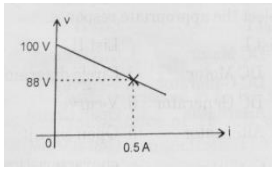
a) 10 V b) 5 V c) 2.5 V d) 15 V

[SSC. (JE)-2013]

47.



The voltage (v) vs. current (i) curve of the circuit is shown below:

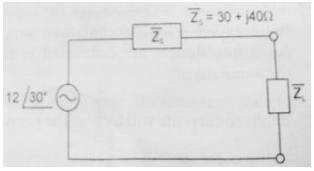


Internal resistance of the source e is

a) 24Ω b) 4Ω c) 10Ω d) 14Ω

[SSC. (JE)-2013]

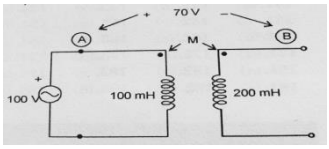
48. Value of the load impedance Z_L for which the load consumes maximum power is



a) 50Ω at a power factor of 0.6 lead
b) 50 Ω at a power factor of 0.6 lag
c) 30 Ω at a power factor of unity
d) None of the above

[SSC. (JE)-2013]

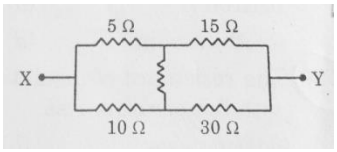
49. In the circuit as shown, voltage measured between A, B is found to be 70 V. Value of M is



a) 30 mH
b) 100 mH
c) 200 mH
d) 70 mH

[SSC. (JE)-2013]

50. The equivalent resistance between terminals X and Y of the network shown is



a) 8Ω b) $\frac{100}{3}\Omega$

c) $\frac{40}{3}\Omega$ d) $\frac{20}{9}\Omega$

[SSC. (JE)-2012]