LE-TECH

Q1. If z_1 and z_2 are two non-zero complex numbers such that $|z_1 + z_2| - |z_1| - |z_2| = 0$, then $\arg(z_1) - \arg(z_2)$ is equal to

$(A)\frac{\pi}{2}$ (B) $-\frac{\pi}{2}$ (C) 0 (D) π

Q2. If 1, ω, ω^2 are the cube roots of unity, then $(1 - \omega + \omega^2)^5 + (1 + \omega - \omega^2)^5$ is equal to

$(A)32$ (B) -32 (C) $32i$ (D) $-32i$

Q3. The value of k for which the system of linear equations

$$2x + y + z = 0$$

$$x + ky + 2z = 0$$

$$x + y + z = 0$$

has non-zero solutions is

$(A) - 1$ (B) 1 (C) 2 (D) -2

Q4.If $M = \begin{pmatrix} cos\theta & -sin\theta & 0 \\ sin\theta & cos\theta & 0 \\ 0 & 0 & 1 \end{pmatrix}$then M^{-1} is equal to

$(A)M$ (B) M^2 (C) M^T (D) $2M$

Q5. If $x^2 + px + q = 0$ and $x^2 + qx + p = 0$ have a common root, then value of $(p + q)$ is

(A)2 (B) -1 (C) 1 (D) ½

Q6. If α, βbe the roots of $4x^2 + 3x + 7 = 0$ then the value of $\frac{1}{\alpha^3} + \frac{1}{\beta^3}$ is

$(A) - \frac{27}{64}$ (B) $\frac{27}{64}$ (C) $-\frac{225}{343}$ (D) $\frac{225}{343}$

Q7. If 5 parallel straight lines are intersected by 4 parallel straight lines, then the number of parallelograms formed is

(A) 126 (B) 101 (C) 60 (D) 20

Q8. The total number of ways in which 10 different toys can be distributed among three different children, so that the first gets 5, the second gets 3 and third gets 2, is

(A) 1260 (B) 630 (C) 420 (D) 2520

Q9. The sum of coefficients of the two middle terms in the expansion of $(1+x)^{201}$ is equal to

$(A)\binom{201}{100}$ (B) $\binom{201}{101}$ (C) $\binom{202}{101}$ (D)$\binom{202}{100}$

Q10. If the coefficient of x^3 in the expansion of $(1+k^2x)^5$ is 640, then k equals to

(A) 6 (B) 4 (C) 3 (D) 2

Q11. If $a_i > 0, i = 1,2,3,\ldots,25$and $a_1 + a_2 + a_3 + \cdots + a_{25} = 25$, then the minimum value of $\frac{1}{a_1} + \frac{1}{a_2} + \cdots + \frac{1}{a_{25}}$ is equal to

(A) 50 (B) 25 (C) 100 (D)625

Q12. The sum of the series $1 \cdot n + 2(n-1) + 3(n-2) + \cdots + n \cdot 1$ is

$(A)\frac{n(n+1)(n+2)}{6}$ (B) $\frac{n(n+1)(n+2)}{3}$ (C) $\frac{n(n+1)(2n+1)}{6}$ (D) $\frac{n(n+1)(2n+1)}{3}$

Q13.$\lim_{x\to 0}\frac{cos3x-cos5x}{x^2}$is

$(A)-2$ (B) 2 (C) 8 (D) 4

Q14.If $y = \tan^{-1}\sqrt{\frac{1+cosx}{1-cosx}}$, then $\frac{dy}{dx}$ is equal to

$(A)-\frac{1}{2}$ (B) $\frac{1}{2}$ (C) -1 (D) 1

Q15. Two positive numbers x and y such that $x+y=120$ and xy^3 is maximum, then x and y are

(A) 60,60 (B) 80,40 (C) 30,90 (D) 100,20

Q16. The minimum distance from the point (4,2) to the parabola $y^2 = 8x$ is

$(A)\sqrt{2}$ (B) 2 (C) $2\sqrt{2}$ (D) $3\sqrt{2}$

Q17.If $[x] \le x$, then $\int_3^6 4[x]\,dx$ is equal to

(A) 60 (B) 48 (C) 36 (D) 24

Q18. If $coshx = \frac{e^x+e^{-x}}{2}$ and $sinhx = \frac{e^x-e^{-x}}{2}$ then $\int e^x(sinhx + coshx)dx$ is equal to

$(A)\frac{e^x}{coshx} + c$ (B) $e^x coshx + c$ (C) $e^x sinhx + c$ (D) $\frac{e^x}{sinhx} + c$

Q19. $\int \frac{xe^x dx}{(1+x)^2}$ is equal to

$(A)\frac{e^x}{x+1} + c$ (B) $-\frac{e^x}{x+1} + c$ (C) $\frac{e^x}{(x+1)^2} + c$ (D) $-\frac{e^x}{(x+1)^2} + c$

Q20. Area enclosed by the curves $5|x| + 10|y| = 25$ is equal to

(A)100 (B) 50 (C) 75 (D) 25

Q21. The two ends of a train moving with a constant acceleration pass a certain point with velocities $u$and v. The velocity in which the middle point of a train passes the same point is

$(A)\frac{u+v}{2}$ (B) $\frac{u^2+v^2}{2}$ (C) $\sqrt{\frac{u^2+v^2}{2}}$ (D) $\sqrt{u^2 + v^2}$

Q22. A projectile fired at an angle equally inclined to a horizontal and vertical with velocity v, the greatest height is given by

$(A)\frac{v^2}{g}$ (B) $\frac{v^2}{2g}$ (C) $\frac{2v^2}{g}$ (D) $\frac{v^2}{4g}$

Q23. If $sinx + \sin^2 x = 1$, then $\cos^4 x + 2\cos^6 x + \cos^8 x$ is equal to

$(A) - 1$ (B) 1 (C) 2 (D) 4

Q24. If $\frac{cosA}{a} = \frac{cosB}{b} = \frac{cosC}{c}$ and the side $a = 2$, then the area of the triangle ABC is

$(A)\frac{\sqrt{3}}{2}$ (B) $\sqrt{3}$ (C) 2 (D) 4

Q25. The solution of the differential equation $(x-y)^2\frac{dy}{dx} = 4$ is equal to

$$(A)y + c = \log|\frac{x-y-2}{x-y+2}|$$

$$(B)y + c = \log|\frac{x-y+2}{x-y-2}|$$

$$(C) y + c = \log|x - y - 2|$$

$$(D) y + c = \log|x - y + 2|$$

Q26. The standard deviation of the five numbers: 1, 3, 5, 7, 9 is equal to

$(A) 4\sqrt{2}$ (B) 4 (C) $2\sqrt{2}$ (D) 8

Q27. Let N be the set of natural numbers. The mapping $f: N \to N; f(n) = n^2 + n + 1$ is

(A) one –one onto

(B) one –one into

(C) many –one onto

(D) many – one into

Q28. If a set S contain k elements, then the number of elements in power set of S is

$(A) 2k$ (B) $k!$ (C) k^2 (D) 2^k

Q29. A natural number is selected at random from the first 400 natural numbers. The probability that the selected number is divisible by either 4 or 5 is

$(A) \frac{1}{4}$ (B) $\frac{1}{2}$ (C) $\frac{2}{5}$ (D) $\frac{1}{5}$

Q30. The probability of getting the sum at best 10 when a pair of dice are rolled is

$(A) \frac{3}{12}$ (B) $\frac{11}{12}$ (C) $\frac{1}{12}$ (C) $\frac{9}{12}$

Q31. The projection of the vector $\vec{a} = 2\hat{\imath} + 3\hat{\jmath} - 2\hat{k}$ on the vector $\vec{b} = \hat{\imath} + 2\hat{\jmath} + 3\hat{k}$ is

$(A) \frac{1}{\sqrt{14}}$ (B) $\frac{2}{\sqrt{14}}$ (C) $\frac{3}{\sqrt{14}}$ (D) $\frac{5}{\sqrt{14}}$

Q32. If $\vec{a} = p\hat{\imath} - 10\hat{\jmath} - 5\hat{k}$, $\vec{b} = -7\hat{\imath} - 5\hat{\jmath}$, and $\vec{c} = \hat{\imath} - 4\hat{\jmath} - 3\hat{k}$ be coplanar, then the value of p is

(A)3 (B) -3 (C) -1 (D) -2

Q33. The angle between the planes $x + y + 2z = 7$ and $2x - y + z = 6$ is

$(A)\frac{\pi}{3}$ (B) $\frac{\pi}{2}$ (C) $\frac{\pi}{6}$ (D) $\frac{\pi}{4}$

Q34. The equation of the plane through the line of intersection of the planes $x+y+z=6$and $2x+3y+4z=5,$ and passing through the point $(1,1,1)$ is

$$(A)10x+13y+16z=39$$

$$(B)-10x+13y+16z=19$$

$$(C)10x-13y+16z=13$$

$$(D)10x+13y-16z=7$$

Q35. If $P(-1,4,-3)$ is one end of a diameter PQ of the sphere $x^2+y^2+z^2-3x-2y+2z-15=0$, then the coordinate of Q is

$(A)(4,-2,1)$ (B) $(-2,4,1)$ (C) $(-4,2,1)$ (D) $(-2,4,-1)$

Q36. The foot of the perpendicular from the point $(7,14,5)$ to the plane $2x+4y-z=2$ is

(A)(2,1,5) (B) (1,2,8) (C) (7,2,8) (D) (1,14,8)

Q37. The locus of the mid points of the line segment $xcos\theta+ysin\theta=4$ intercepted between the axes is

$(A)x^2+y^2=4xy$ (B) $2(x^2+y^2)=x^2y^2$

(C)$x^2+y^2=8xy$ (D) $4(x^2+y^2)=x^2y^2$

Q38. The equation of the tangents to the circle $x^2+y^2=9$ which are parallel to the line $3x+4y=0$ are

$$(A)3x+4y\pm15=0$$

$$(B)3x+4y\pm12=0$$

$$(C)4x+3y\pm15=0$$

$$(D)4x+3y\pm12=0$$

Q39. The eccentricity of the circle $\frac{x^2}{2}+\frac{y^2}{2}=1$ is

$(A)\ 0$ (B) 1 (C) -1 (D) 2

Q40. The line $x-y=1$ touches the curve $\frac{x^2}{4}-\frac{y^2}{3}=1$ at the point

$(A)(-4,-5)$ (B) $(-2,-3)$ (C) $(-3,-4)$ (D) $(4,3)$

(41) A person weighing 25 kg stands in an elevator. The elevator accelerated upward with a constant value of 7 m/s^2. Assume gravitational acceleration as 9.81 m/s^2. If the elevator cage weights 2000 N, the tension of cable which supports the elevator is

(a) 2337 N

(b) 3847 N

(c) 2000 N

(d) 420 N

(42) Which of the following are vector quantities?

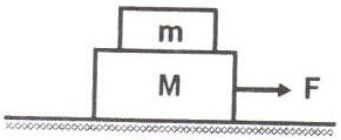
(a) Displacement

(b) Velocity

(c) Both velocity and displacement

(d) Neither velocity nor displacement

(43) A block of mass m is placed on another block of mass M lying on a smooth horizontal surface as shown in the figure below. The coefficient of friction between two blocks is 0.25. Consider the value of g as 10 m/s^2. If M = 20 kg and m = 5 kg, what will be the maximum horizontal force F to be applied to the block M so that the block moves together?



(a) 62.5 N
(b) 50 N
(c) 200 N
(d) 125 N

(44) The motion of a particle is given by the equation $s = 3t^3+4t$, where s is the distance in meter and t is time in second. Starting from $t = 0$, to attain a velocity of 13 m/s, the particle will have to travel a distance of

(a) 7 meter
(b) 9 meter
(c) 11 meter
(d) 13 meter

(45) The point, through which the whole weight of the body acts, irrespective of its position, is known as

(a) Center of mass
(b) Moment of inertia
(c) Center of gravity
(d) None of these

(46) Two bars of different materials with same size are subjected to the same magnitude of tensile force. If the bars have unit elongation in the ratio of 3:7, then the ratio of modulus of elasticity of the two materials will be

(a) 3:7
(b) 7:3
(c) 1:1
(d) None of these

(47) If a number of coplanar forces acting on a particle are in equilibrium, then according to the law of moments,

(a) their algebraic sum is zero
(b) their lines of action are at equal distances

(c) the algebraic sum of their moments in their plane about any point is zero

(d) the algebraic sum of their moments about any point is equal to the moment of their resultant force about the same point

(48) A simply supported beam is carrying a uniformly distributed load. The shape of the bending moment diagram over the length of the beam will be

(a) Circular
(b) Linear
(c) Cubical
(d) Parabolic

(49) If the shear force along a section of a beam is zero, the bending moment at the section is

(a) Zero
(b) Minimum
(c) Maximum
(d) Average of maximum and minimum

(50) A projectile is fired from the top of a tower of 50 m height with an initial speed of 70 m/s with an unknown angle. Assume g as 10 m/s^2.The speed of the projectile before it hits the ground will be

(a) zero
(b) 76.8 m/s
(c) 70 m/s
(d) cannot be determined as angle is unknown

(51) Which of the following statement is correct?

(a) A continuous beam has only two supports at the ends.
(b) The bending moment is maximum where shear force is maximum
(c) The maximum bending moment of a simply supported beam of length l with a central point load W is $Wl/8$.
(d) A uniformly distributed load spreads uniformly over the whole length of a beam.

(52) The ratio of the largest load in a test to the original cross-sectional area of the test piece is called

(a) Yield stress
(b) Elastic limit
(c) Ultimate stress
(d) Breaking stress

(53) A ball is thrown vertically upward with a velocity of 15 m/s, from the top of a 20 m high tower. If g = 10 m/s^2, the velocity with which the ball will strike the ground is

(a) 15 m/s
(b) 22 m/s
(c) 25 m/s
(d) 30 m/s

(54) Which of the following is a scalar quantity?

(a) Force
(b) Speed
(c) Velocity
(d) Acceleration

(55) If a number of forces are acting at a point, their resultant will be inclined at an angle θ with the horizontal, such that

(a) $\tan\theta = \sum V/\sum H$
(b) $\tan\theta = \sum H/\sum V$
(c) $\tan\theta = \sum H \times \sum H$
(d) $\tan\theta = \sum V \times \sum H$

(56) The rate of change of momentum is directly proportional to the impressed force, and takes place in the same direction in which the force acts. This statement is known as

(a) Newton's first law of motion
(b) Newton's second law of motion
(c) Newton's third law of motion

(d) None of these

(57) A cantilever beam of length l is carrying a linearly varying load from zero at free end and w per unit length at the fixed end. The shear force diagram of the cantilever beam is a

(a) horizontal straight line
(b) inclined line
(c) parabolic curve
(d) none of these

(58) If a force acts on a body and the body undergoes a displacement, then

(a) body has kinetic energy of translation
(b) work is said to be done
(c) power is being transmitted
(d) none of the above

(59) A lead ball is made to strike a wall with a certain velocity and it falls down. A rubber ball of same mass and with same velocity is made to strike the same wall and it rebounds. Select the correct reason from the following:

(a) the change in momentum suffered by rubber ball is more than the lead ball
(b) the change in momentum suffered by rubber ball is less than the lead ball
(c) both the balls undergo an equal change in momentum
(d) none of the above

(60) The term 'centroid' is

(a) the point of application of the resultant of all the forces tending to cause a body to rotate about a certain axis
(b) the point of suspension
(c) the same as center of gravity
(d) none of the above

(61) A steel bar of 20 mm is heated from 25°C to 55°C and it is free to expand. The bar will induce

(a) compressive stress
(b) tensile stress
(c) shear stress
(d) no stress

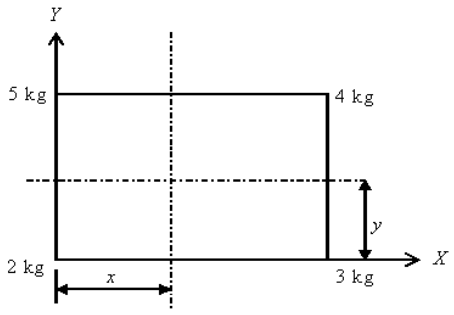
(62) A cylinder rolls on a floor without slipping. The ratio of the translational to rotational kinetic energy is:

(a) ½
(b) ¼
(c) 4
(d) 2

(63) Which of the following statement is correct?

(a) Hook's law holds good up to the breaking point.
(b) Stress is directly proportional to strain within elastic limit.
(c) The strain is expressed in mm.
(d) The stress is the pressure per unit area.

(64) Four masses of 2 kg, 3 kg, 4 kg and 5 kg are placed at the corners of a square of side 2 m length as shown in the figure below. What will be its center of mass?

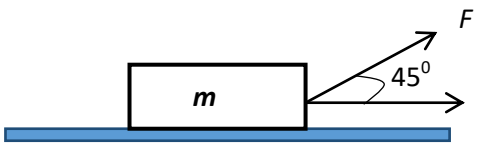


(a) x = 1.00 m; y = 1.00 m
(b) x = 1.25 m; y = 1.25 m
(c) x = 1.29 m; y = 1.00 m
(d) x = 1.00 m; y = 1.29 m

(65) Moment of inertia is the

(a) first moment of area
(b) second moment of mass
(c) first moment of mass
(d) none of these

(66) A mass m rests on a horizontal surface. The coefficient of friction between the surface and mass is μ. If the mass is pulled by a force F as shown in the figure, the limiting friction between surface and mass is

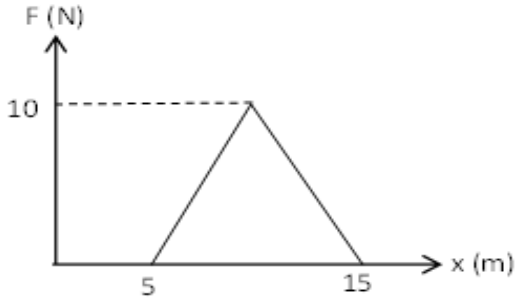


(a) $\boldsymbol{\mu(mg - \frac{F}{2})}$
(b) $\boldsymbol{\mu(mg - \frac{\sqrt{3}F}{2})}$
(c) $\boldsymbol{\mu(mg + \frac{F}{2})}$
(d) $\boldsymbol{\mu(mg - \frac{F}{\sqrt{2}})}$

(67) If the momentum of a body is increased by 30%, the percentage increase in its kinetic energy will be

(a) 69%
(b) 50%
(c) 44%
(d) 30%

(68) A 5 kg block is kept on a frictionless horizontal surface. A force as shown in the figure below is applied horizontally to the block. The change in kinetic energy is



(a) 15 J
(b) 35 J
(c) 50 J
(d) 70 J

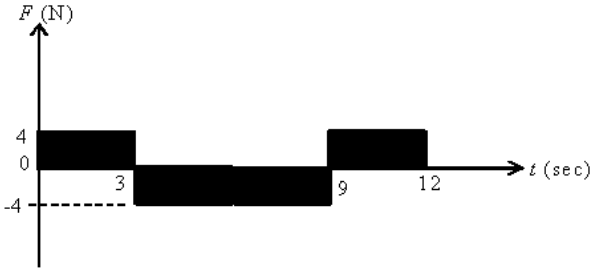
(69) A ball of mass 500 g starting from rest falls through a vertical distance of 100 cm before it strikes to the ground. Assuming g as 10 m/s^2, the kinetic energy of the body before it strikes the ground will be

(a) zero
(b) 5 J
(c) 10 J
(d) 20 J

(70) A beam is subjected to pure bending. The intensity of stress in any fiber will be _____ the distance of the fiber from the neutral axis.

(a) directly proportional to
(b) equal to
(c) more than
(d) less than

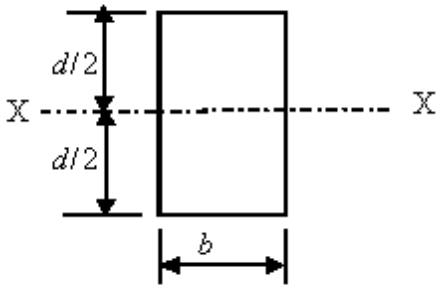
(71) Force-time graph for the motion of a body of mass 5 kg is shown in the figure below. Change in velocity between 0 to 8 sec is



(a) zero
(b) 0.8 m/s

(c) 1.6 m/s
(d) none of these

(72) The radius of gyration of the following rectangular section about X-X axis is



(a) $(\frac{d}{\sqrt{2}})$
(b) $(\frac{d}{\sqrt{3}})$
(c) $(\frac{d}{\sqrt{6}})$
(d) $(\frac{d}{\sqrt{12}})$

(73) Choose the correct statement from the following

(a) A brittle material has no plastic zone
(b) A ductile material has large plastic zone
(c) A rigid material has no plastic zone
(d) All of the above

(74) The number of points of contraflexure in a simple supported beam carrying uniformly distributed load, is

(a) 0
(b) 1
(c) 2
(d) 3

(75) The law which states, “within elastic limits strain produced is proportional to the stress producing it”, is known as

(a) Hooke's law

(b) Stress law
(c) Bernoulli's law
(d) Poisson's law

(76) Strain energy of any member may be defined as work done on it
(a) to resist elongation
(b) to deform the member
(c) to resist shortening
(d) all of the above

(77) For a beam, if fundamental equations of statics are not sufficient to determine all the reactive forces at the supports, the structure is said to be

(a) determinate
(b) statically determinate
(c) statically indeterminate
(d) none of these

(78) The moment diagram for a cantilever beam whose free end is subjected to a bending moment, will be a

(a) rectangle
(b) cubic parabola.
(c) parabola
(d) triangle

(79) In a continuous bending moment curve the point where it changes sign, is called

(a) point of inflexion
(b) point of contraflexture
(c) point of virtual hinge
(d) all

(80) The acceleration of a body sliding down in an inclined plane is

(a) $g \sin \theta$
(b) $g \cos \theta$
(c) $g \tan \theta$
(d) cannot be determined

81. Two heaters, rated at 1000 W, 250 V each are connected in series across a 250 V, 50 Hz ac mains. The total power drawn from the supply would be -------- W.
(a) 1000 (b) 500 (c) 250 (d)2000

82. A 100 W light bulb burns on an average of 10 hours a day for one week. The weekly consumption of energy will be ------- units.
(a) 7 (b) 70 (c) 0.7 (d) 0.07

83. The number of 2 µF, 400 V capacitors needed to obtained a capacitance value of 1.5 µF rated for 1600 V is
(a) 12 (b) 8 (c) 6 (d) 4

84. A parallel plate capacitor has capacitance of 10 µF. If the linear dimensions of the plates are doubled and the separation between them is also doubled the value of the capacitor would be (in µF)
(a) 10 (b) 20 (c) 5 (d) 40

85. 1 KVA, 230 V, 50 Hz, single phase transformer has an eddy current loss of 30 watts. The eddy current loss when the transformer is excited by a dc source of same voltage will be
(a) 30 W (b) more than 30 W (c) less than 30 W (d) zero watt

86. In a 4-pole, 25 kW, 200 V wave wound dc shunt generator the current in each parallel path will be
(a) 62.5 A (b) 125 A (c) 31.25 A (d) 250 A

87. Conductor is constant and field is varying then emf will be induced. This principle is called
(a) virtually induced emf (b) dynamically induced emf
(c) static induced emf (d) none of the above

88. Commutators in DC machines have a role of which converts
(a) AC to DC (b) both AC to DC and DC to AC
(c) high voltage DC to low voltage DC (d) none of the above

89. Which of the following condition is not true in a series RLC circuit at resonance
(a) $X_L = X_C$ (b) $Z = jX_L$
(c) The power factor is one (d) magnitude of Z = $\sqrt{R^2 + (X_L - X_C)^2}$

90. The resistor values in Wye network that is equivalent to a delta network containing three 12 kΩ resistor is……
(a) 2 kΩ each (b) 4 kΩ each (c) 8 kΩ each (d) 6 kΩ each

91. A coil has an inductance of 0.7 H and is joined in series with a resistance of 220Ω. When an alternating voltage of 220 V, 50 Hz is applied to it, the wattles component of current is
(a) 1.5 A (b) 0.7 A (c) 7 A (d) 0.5 A

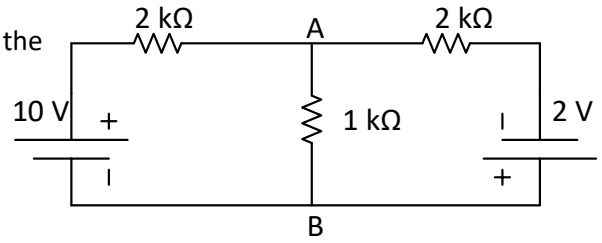
92. For high current and low voltage rating which winding is employed to DC machine?

(a) Lap winding (b) wave winding (c) both lap and wave winding (d) none

93. A 4 pole wave wound dc motor having flux per pole of 9.56×10^{-3}Wb contains 460 armature conductors. Calculate the back emf produced when it is running at a speed of 1500 rpm.

(a) 220 V (b) 230 V (c) 240 V (d) 440 V

94. Voltage across the 1 kΩ resistor between the nodes A and B of the network shown in the given figure is



(a) 2 V (b) 3 V

(c) 4 V (d) 8 V

95. If resonance frequency is 10 kHz and quality factor is 50, then

(a) Bandwidth is 200 Hz (b) X_L = 50 kΩ (c) R = 50 Ω (d) X_C = 50 kΩ

96. Generally tappings in a transformer are provided

(a) in the LV side to control voltage (b) in HV side to control voltage

(c) in HV side to control current (d) in LV side to control current

97. A distribution transformer is required to supply

(a) Variable load between no load to full load (b) Constant part full load throughout the day

(c) Constant full load throughout the day (d) Variable load between no loads to full load at a fixed power factor

98. A 2 µF capacitor is connected by closing a switch, to a supply of 100 V through a 1 MΩ series resistance. The initial charging current is

(a) 50 µA

(b) 100 µA

(c) 1 mA

(d) 0 A.

99. A single phase transformer when supplied from a 220 V, 50 Hz has eddy current loss of 50 W. If the transformer is connected to a voltage of 330 V, 50 Hz, then eddy current loss will be

(a) 168.75 W (b) 112.5 W

(c) 75 W (d) 50 W

100. A dc shunt generator delivers 395 A at 250 V and resistance of the shunt field and armature are 50 Ω and 0.05 Ω respectively. The generated emf will be

(a) 269.75 V (b) 270 V (c) 220 V (d) 230.25 V

101. When PMMC instrument is connected to ac voltage

(a) the instrument will get damage

(b) the pointer will not move at all

(c) the pointer will indicate RMS value

(d) the instrument will indicate zero

102. A moving coil instrument has 10 Ω resistance and gives a full scale deflection when carrying 50 mA. It can be used to measure 750 V by using resistance of
(a) 0.005002 Ω in series
(b) 0.005002 Ω in parallel
(c) 14990 Ω in series
(d) 14990 Ω in parallel

103. Most of the generators in thermal power plants run at
(a) 1500 rpm (b) 3000 rpm (c) 15000 rpm (d) 30000 rpm

104. The modern steam turbines are
(a) reaction turbine (b) impulse turbine
(c) impulse reaction turbine (d) none of the these

105. Which of the following power plant has the least operating cost
(a) hydro-electric (b) diesel engine
(c) thermal (d) nuclear

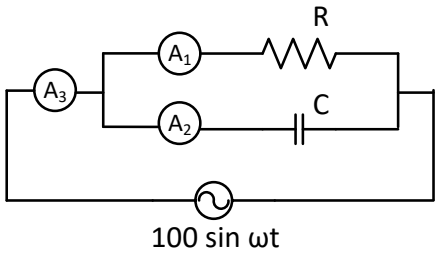
106. The material used for the fuse wire should be of
(a) Low resistivity and high melting point
(b) High resistivity and high melting point
(c) High resistivity and low melting point
(d) Low resistivity and low melting point

107. The terminal potential difference of a battery of e.m.f. 2 V and internal resistance 0.1 Ω when supplying a current of 5 A will be
(a) 1.5 V (b) 2 V (c) 2.5 V (d) 1.9 V

108. The delay fuses are used for the protection of
(a) Lighting circuits
(b) Motors
(c) resistive loads
(d) Capacitive loads

109. Five cells, each with an e.m.f. of 2 V and internal resistance of 0.5 Ω are connected in series. The resulting battery will have
(a) An e.m.f. of 2V and an internal resistance of 0.5 Ω
(b) An e.m.f. of 10V and an internal resistance of 2.5 Ω
(c) An e.m.f. of 2V and an internal resistance of 0.1 Ω
(d) An e.m.f. of 10V and an internal resistance of 0.1 Ω

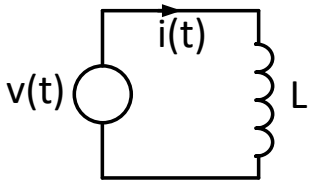
110. In the given figure, A_1, A_2 and A_3 are ideal ammeters. If A_1 reads 5 A, A_2 reads 12 A, then A_3 should read



(a) 7 A (b) 12 A (c) 13 A (d) 17 A

111. In the circuit shown in figure, it is desired to have a constant direct current *i(t)* through the ideal inductor L. The nature of the voltage source V(t) must be

(a) Constant voltage
(b) Linearly increasing voltage
(c) An ideal impulse
(d) Exponential increasing voltage



112. A dc series motor has linear magnetization and negligible armature resistance, the motor speed is

(a) Directly proportional to $\sqrt{T}$
(b) Inversely proportional to $\sqrt{T}$
(c) Directly proportional to T
(d) Inversely proportional to T

Where, **T = load torque**

113. A dc voltmeter uses 200 μA meter movement having an internal resistance of 500 Ω. Calculate the value of multiplier on the 20 V range

(a) 100 kΩ (b) 99.50 kΩ (c) 100.5 kΩ (d) 105 kΩ

114. Which of the following motor can be referred as a universal motor?

(a) DC shunt motor (b) DC compound motor
(c) Permanent magnet motor (d) DC series motor

115. A 50 Hz operation, single phase transformer has hysteresis loss of 200 W and eddy current loss of 100 W. Its core loss at 60 Hz operation will be

(a) 432 W (b) 408 W (c) 384 W (d) 360 W

116. If The winding of a machine has 9600 turns. When 3 A current passes the flux linked with the coil is 20 mwb. The inductance of the coil is

(a) 6 mH

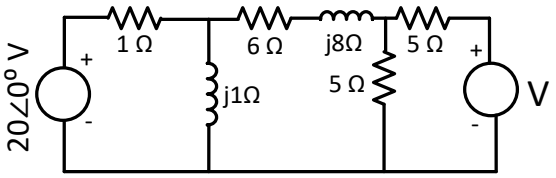
(b) 6 H

(c) 64 H

(d) 32 H

117. In the given circuit, if power dissipated in the 6 Ω resistor is zero, then V is

(a) $20\sqrt{2}\angle 45^o$ (b) $20\angle 30^o$
(c) $20\angle 45^o$ (d) $20\sqrt{2}\angle 30^o$



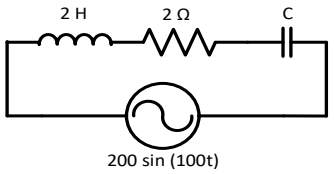
118. The average thermal efficiency of nuclear power plant is around

(a) 30% (b) 50% (c) 70% (d) 80%

119. A thermal protection switch can protect against

(a) Short-circuit (b) temperature (c) overload (d) overvoltage

120. A series RLC circuit is shown. If the circuit is under resonance, then the capacitance is



(a) 2 F (b) 100 µF (c) 1.2 µF (d) 50 µF