1. Specify the synonym of aesthetic

(A) heroic
(B) prettiness
(C) horrible
(D) ugly

2. The antonym of Ubiquitous

(A) beautiful
(B) infrequent
(C) universal
(D) similar

3. **Direction**: Fill in the blanks with correct words which give correct meaning

A defect can be caused..... negligence by one of the members of a team.

(A) by
(B) to
(C) at
(D) in

4. **Direction**: Fill in the blanks with correct words which give correct meaning

They are refugees in need of……

(A) Restoration
(B) Recapitulation
(C) Rehabilitation
(D) Renovation

5. **Direction**: Fill in the blanks with correct words which give correct meaning

Children are the delight .....the house

(A) in
(B) with
(C) of
(D) into

6. **Direction**: Fill in the blanks with correct words which give correct meaning

Religious leaders should not delve ……..politics

(A) with
(B) at
(C) into
(D) for

7. **Direction**: Change the following sentence into passive voice and choose the appropriate alternative from the alternatives given below

Sheela wakes up Ashwini in the morning

(A) Ashwini is waken up by Sheela
(B) Ashwini is woken by Sheela in the morning
(C) Both (A) and (B)
(D) Neither (A) nor (B)

8. **Direction**: Select the option that expresses the given sentence in passive voice

Meteorologists predict storms

(A) Storms are predicted by meteorologists
(B) Storms have been predicted by meteorologists
(C) Storms would be predicted by meteorologists
(D) None of the above

9. **Direction:** Choose the one which can be substituted for the given words/sentence

The study of the origin and history of words

(A) Taxonomy
(B) Etymology
(C) Anthology
(D) Linguistics

10. Which among the following is not a skill of communication?

(A) Reading
(B) Writing
(C) Listening
(D) Interrupting

11. Find the correct sequence of sentences

P: to derive their answers
Q: them to rely on nothing more than the text
R: from distraction and forces
S: this allows students to work free

(A) RQSP
(B) PQRS
(C) QPSR
(D) SRQP

12. **Direction**: Select the word which means the same as the groups

A payment given for professional services that are rendered nominally without charge

(A) Mercenary
(B) Compensation
(C) Honorarium
(D) Commission

13. **Direction**: Select the word which means the same as the groups

One who loves books is known as

(A) Bibliography
(B) Bibliophoebe
(C) Bibliophile
(D) Bibliophagist

14. Read each sentence to find out whether there is any grammatical error in it. The error, if any will be in one part of the sentence. The letter of that part is the answer

(A) Several issues raising
(B) in the meeting
(C) could be amicably resolved
(D) due to his tactful handling

15. **Direction**: Choose the word which is the exact OPPOSITE of the given words

QUIESCENT

(A) Dormant
(B) Weak
(C) Active
(D) Unconcerned

16. **Direction**: Choose the word which is the exact OPPOSITE of the given words

FLAGITIOUS

(A) Innocent
(B) Ignorant
(C) Frivolous
(D) Vapid

17. **Direction**: In the question given below, a part of the sentence is *italicized and underlined*. Below are given alternatives to the italicized part which may improve the sentence. Choose the correct alternative. In case no improvement is needed, option 'D' is the answer

I took the cycle *which she bought yesterday*

(A) that she bought yesterday
(B) that she had bought yesterday
(C) that which she had bought yesterday
(D) No improvement

18. **Direction**: In each question below, there is a sentence of which some parts have been jumbled up. Rearrange these parts which are labelled a, b, c and d to produce the correct sentence. Choose the proper sequence

She sat

a. through the Town Hall Park
b. which flanked a path running
c. under the boughs
d. of a spreading Banyan tree

The Proper sequence should be:

(A) cbad
(B) acbd
(C) adbc
(D) cdba

19. **Direction**: Pick out the most effective word(s) from the given words to fill in the blank to make the sentence meaningfully complete

Do you know ….....?

(A) where does he come from
(B) where from he comes
(C) where he comes from
(D) from where does he come

20. **Direction**: Pick out the most effective word(s) from the given words to fill in the blank to make the sentence meaningfully complete

The robbers were arrested and ..... prison yesterday

(A) brought into
(B) taken to
(C) brought for
(D) taken into

21. The area of triangle with vertices at $(1,0),(0,6),(4,3)$ is

(A) 28
(B) 14
(C) 16
(D) 20

22. Let A be a 4×4 matrix with $|adj(A)| = 8$. Then $|A|$ is

(A) 2
(B) 4
(C) 6
(D) 8

23. If the points $(x,5),(5,3),(2,1)$ are collinear, then x is equal to

(A) 2
(B) 4
(C) 6
(D) 8

24. $\lim_{n\to\infty} \frac{1+2+...+n}{2n^2+3n+1} =$

(A) $\frac{1}{2}$

(B) $\frac{1}{4}$

(C) 0

(D) 1

25. $\lim_{x \to 0} \frac{e^x - 1}{2x} =$

(A) 0

(B) 1

(C) $\frac{1}{2}$

(D) ∞

26. The number of values of x in $[0, 2\pi]$ which satisfy $\sin 2x = 0$ is

(A) 2
(B) 3
(C) 4
(D) 5

27. Which one of the following points lies on the parabola $y^2 = 12x$?

(A) (3, 3)
(B) (–3, 3)
(C) (–3, 6)
(D) (3, –6)

28. The value of $\int_{-\infty}^{0} e^x dx$ is

(A) 0
(B) π
(C) $\log 2$
(D) 1

29. How many three digit numbers can be formed using {1, 2, 3} with repetition?

(A) 3!
(B) 3^3
(C) 2^3
(D) 1

30. If x is chosen from the set $\{0, 1, 2\}$, then the probability of $M = \begin{pmatrix} x & 2 \\ 1 & 1 \end{pmatrix}$ to be singular is

(A) $\frac{1}{3}$

(B) $\frac{2}{3}$

(C) $\frac{1}{2}$

(D) 1

31. Let $P(A) = \frac{7}{10}$ and $P(B) = \frac{3}{10}$. If A and B are independent, then $P(A \cap B)$ is

(A) $\frac{3}{10}$

(B) $\frac{7}{10}$

(C) $\frac{21}{100}$

(D) $\frac{1}{2}$

32. If A is a square matrix and $|A| = 3,$ then $\left|AA^T\right|$ is equal to

(A) 0
(B) 1
(C) 3
(D) 9

33. Let $(2,3)$ and $(-1,2)$ be the end points of a diameter of a circle. Then the equation of the circle is

(A) $x^2 + y^2 - 2x - 5y + 6 = 0$

(B) $x^2 + y^2 - x - 4y + 2 = 0$

(C) $x^2 + y^2 - x - 5y + 4 = 0$

(D) $x^2 + y^2 - x - 3y = 0$

34. The radius of a circle which has a tangent at point $x = 3$ and with origin as centre, is

(A) 2
(B) 3
(C) 4
(D) 5

35. The maximum value of the function $x^2 e^{-x}$, $x > 0$ is

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

36. The arithmetic and harmonic mean of two positive real numbers are 24 and 6. Then their geometric mean is

(A) 8
(B) 10
(C) 12
(D) 14

37. The number of elements in $\mathbb{Z}$ that have inverses under usual multiplication is

(A) 0
(B) 1
(C) 2
(D) ∞

38. If a and b are real roots of the equation $x^2 - mx + n = 0$, then the distance between the points $(a,0)$ and $(b,0)$ is

(A) $\sqrt{m^2 - 4n}$

(B) $\sqrt{4m^2 - n}$

(C) $\sqrt{m^2 - n}$

(D) $\sqrt{m^2 - 4}$

39. The sum of first n positive odd integers is equal to

(A) $n(n+1)$

(B) $\frac{n(n+1)}{3}$

(C) $\left[\frac{n(n+1)}{2}\right]^2$

(D) n^2

40. The sum of an infinite geometric progression is 16. If the first term is 4, then the common ratio is

(A) $\frac{3}{4}$

(B) $\frac{1}{4}$

(C) 4

(D) 3

41. The angle between the lines parallel to $3x - 4y + \pi = 0$ is

(A) 0°
(B) 30°
(C) 60°
(D) 90°

42. The differential equation for the family of all straight lines passing through the point (0, 3) is

(A) $y = x\frac{dy}{dx}$

(B) $\frac{d^2y}{dx^2} - y = 0$

(C) $y = x\frac{dy}{dx} + 3$

(D) $y = 2x\frac{dy}{dx} + 3$

43. Product of n roots of n^{th} roots of unity is equal to

(A) 0
(B) -1
(C) $(-1)^{n-1}$
(D) $(-1)^n$

44. A homogeneous system of linear equation $AX = 0$

(A) has trivial solution if $|A| = 0$
(B) has non trivial solution if $|A| \neq 0$
(C) is always consistent
(D) may be inconsistent

45. A polynomial equation of odd degree n always has

(A) n distinct roots
(B) n real roots
(C) n imaginary roots
(D) at least one real root

46. A critical point of $f(x)=\frac{x^4}{4}-5x$ is at

(A) $x=5$
(B) $x=\sqrt{5}$
(C) $x=\sqrt[3]{5}$
(D) $x=-5$

47. $\log_e\left(\frac{1+3x}{1-2x}\right)$ is

(A) $-5x-\frac{5x^2}{2}-\frac{35x^3}{3}-...$

(B) $-5x+\frac{5x^2}{2}-\frac{35x^3}{3}+...$

(C) $5x-\frac{5x^2}{2}+\frac{35x^3}{3}-...$

(D) $5x+\frac{5x^2}{2}+\frac{35x^3}{3}+...$

48. Let $f:R\to R$ be the real function defined by $f(x)=\frac{x-t}{t-x}$ for $x\neq t.$ Then the range of f is

(A) $\mathbb{R}$
(B) $\mathbb{R}\setminus\{t\}$
(C) $\{-1\}$
(D) $\mathbb{R}\setminus\{-t\}$

49. The equation $x^2+y^2+6x+4y+13=0$ represents a

(A) circle
(B) pair of two distinct straight line
(C) point
(D) pair of coincident straight line

50. $\int \frac{x+\sin x}{1+\cos x}dx$ is equal to

(A) $x\tan\frac{x}{2}+c$

(B) $\log(1+\cos x)+c$

(C) $x\cot\frac{x}{2}+c$

(D) $\log(x+\sin x)+c$

51. A solution of the differential equation $\left(\frac{dy}{dx}\right)^2 - x\frac{dy}{dx}+y=0$ is

(A) $y=2$
(B) $y=2x$
(C) $y=2x-4$
(D) $y=2x^2-4$

52. The sum of 10 terms of the series $\sqrt{2}+\sqrt{6}+\sqrt{16}+....$ is

(A) $121\left(\sqrt{6}+\sqrt{2}\right)$

(B) $243\left(\sqrt{3}+1\right)$

(C) $\frac{121}{\left(\sqrt{3}-1\right)}$

(D) $242\left(\sqrt{3}-1\right)$

53. The positive integer n for which $2\times2^2+2\times2^3+4\times2^4+...n\times2^n=2^{n+10}$, is

(A) 510
(B) 511
(C) 512
(D) 513

54. If $\begin{vmatrix} b+c & c & b \\ c & c+a & a \\ b & a & a+b \end{vmatrix} = Kabc,$ then K is equal to

(A) 1
(B) 2
(C) 3
(D) 4

55. Four dice are rolled. The number of possible outcomes in which at least one dice shows 2 is

(A) 625
(B) 671
(C) 1023
(D) 1296

56. If $f(x+y) = 2f(x)f(y)$ for all x, y where $f'(x) = 3,\ f(4) = 2$, then $f'(4) =$

(A) 6
(B) 12
(C) 4
(D) 8

57. If e, e' be the eccentricities of two conics $S = 0$ and $S' = 0$ and if $e^2 + e'^2 = 3,$ then both S and S' can be

(A) hyperbolas
(B) ellipses
(C) parabolas
(D) circles

58. The number of diagonals in the polygon with n sides is

(A) $\frac{n(n-3)}{2}$

(B) $\frac{n(n-1)}{2}$

(C) $\frac{(n-1)(n-2)}{2}$

(D) $\frac{(n+1)(n-2)}{6}$

59. If $n = 2^3 \times 3^4 \times 5^4 \times 7$, then the number of terminal consecutive zeros in n, where n is a natural number, is

(A) 2
(B) 3
(C) 4
(D) 7

60. If greatest lower bound and least upper bound of a set are equal, then the cardinality of that set is

(A) 1
(B) 2
(C) 3
(D) 4

61. If $f(x) = x \sin \frac{1}{x}, \ x \neq 0,$ then the value of the function at $x = 0$, so that the function
is continuous at $x = 0$, is

(A) 0
(B) −1
(C) 1
(D) an indeterminate

62. The value of a for which $\frac{1}{\log_2 a}+\frac{1}{\log_3 a}+\frac{1}{\log_4 a}=1$ is

(A) 9
(B) 12
(C) 18
(D) 24

63. If t_n denotes the n^{th} term of the series $2+3+6+11+18+...$ then t_{50} is

(A) 49^2-1
(B) 49^2
(C) 50^2+1
(D) 49^2+2

64. x^x has a stationary point at

(A) $x=e$
(B) $x=\frac{1}{e}$
(C) $x=1$
(D) $x=\sqrt{e}$

65. The number of real roots of the equation $e^{4x}+e^{3x}-4e^{2x}+e^x+1=0$ is

(A) 1
(B) 3
(C) 2
(D) 4

66. The composition $(f\circ g)(x)$ of two functions $f(x)=2x+3$ and $g(x)=x^2$ is

(A) $2x^2+6$
(B) $2x+3$
(C) $2x^2+6x+3$
(D) $2x^2+3$

67. If $A = \{1, 2, 3\}$ and $B = \{2, 3, 4\}$, then $(A \cup B) - A$ is

(A) $\{2, 3\}$
(B) $\{4\}$
(C) $\{1, 2, 3, 4\}$
(D) $\{1, 4\}$

68. The coefficient of x^3 in the expansion of $(1 + 2x)^5$ is

(A) 40
(B) 10
(C) 20
(D) 80

69. If A is a non-singular square matrix such that $A^3 = A$, then the determinant of A is

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

70. If $\sin\theta + \cos\theta = 1$, then the value of $\sin\theta\cos\theta$ is

(A) $\frac{1}{2}$
(B) $\frac{1}{4}$
(C) 0
(D) $\frac{1}{3}$

71. The resultant of two forces P and Q is R. If one of the forces is reversed in direction, the resultant is S. Then the identity $R^2 + S^2 = 2(P^2 + Q^2)$ holds good,

(A) when the forces are collinear
(B) only when the forces act at right angles to each other
(C) only when the forces act at 60^o to each other
(D) when the forces have any angle of inclination between them

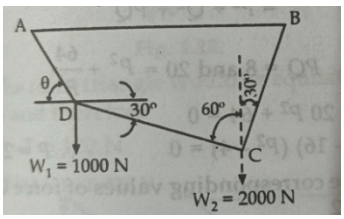
72. A force which combines with two or more forces to produce equilibrium is called

(A) Resultant
(B) Equilibrant
(C) Couple
(D) Moment

73. For analysis purposes, a body can be modelled as rigid if,

(A) its dimensions are small compared with the coordinates describing its motion
(B) it has continuous distribution of mass
(C) it is characterized by some preferred configuration of its own
(D) relative deformation between its parts is negligible

74. Consider cables *AB, BC* and *CD* arranged as shown in figure. If W_1 = 1000 N and
W_2 = 2000 N, how large is angle θ



(A) 30^o
(B) 45^o
(C) 60^o
(D) 75^o

75. Four forces *2P, 4P, 6P* and *8P* act along the sides, taken in order, of a square. The resultant force is

(A) zero
(B) $4\sqrt{2}$ P
(C) 2 P
(D) $\sqrt{5}$ P

76. A car moving with a speed of u can be stopped in minimum distance x when brakes are applied. If the speed becomes 3 times, the minimum distance over which the car can be stopped with the same deceleration would take the value

(A) $x/3$
(B) $3x$
(C) $x/9$
(D) $9x$

77. Two cars *A* and *B* move at 15 m/s in the same direction and the car *B* is 300 m ahead of car *A*. If car *A* is accelerated at 6 m/s^2 while car *B* continues to move with the same velocity, the car *A* will overtake car *B* at time

(A) 7.5 s
(B) 10 s
(C) 12 s
(D) 5 s

78. A particle starts from rest with a constant acceleration of α m/s^2 and after some time it decelerates at a uniform rate of β m/s^2 till it comes to rest. If the total time taken between two rest positions is t, the maximum velocity acquired by the particle would be

(A) $t.(\alpha + \beta)/2$
(B) $t.(\alpha - \beta)/2$
(C) $t.(\alpha.\beta)/(\alpha + \beta)$
(D) $t.(\alpha + \beta)/(\alpha - \beta)$

79. A stone falls freely from rest and the distance covered by it in the last second of its motion equals the distance covered by it in the first four seconds of its motion. The stone then remains in air for a total period of

(A) 6 s
(B) 8.5 s
(C) 10 s
(D) 12.5 s

80. A ball of mass 2 kg was thrown vertically upwards and at a height of 5 m above the ground, its kinetic energy was equal to its potential energy. How much total time does the ball take to reach the highest point? (Take $g = 10\ m/s^2$)

(A) 2 s
(B) $\sqrt{5}$ s
(C) $\sqrt{3}$ s
(D) $\sqrt{2}$ s

81. A body starts from rest and slides down a smooth inclined plane of height h. If θ is the angle of inclination of the plane, then the time taken by the body to reach the ground would be

(A) $\sqrt{(2h/g.\sin\theta)}$
(B) $\sqrt{(2h/g).\sin\theta}$
(C) $\sqrt{(2h/g).(1/\sin\theta)}$
(D) $\sqrt{(2h.\sin\theta/g)}$

82. A boat which has a speed of 8 km/hr in still water crosses a river of width 1 km along the shortest possible path in 15 minutes. The velocity of river in kilometre per hour is

(A) 1
(B) $4.\sqrt{3}$
(C) $\sqrt{40}$
(D) 3

83. A particle at rest at the origin is subjected to an acceleration which varies with time according to the relation $a = 3t$. After 6 seconds, the distance of the particle from the origin will be

(A) 32 m
(B) 46.5 m
(C) 108 m
(D) 80 m

84. A particle undergoing rectilinear motion has a displacement prescribed by the relation: $s = (t^3 - 3t^2 - 6t + 6)$ m, where t represents the time. The acceleration of the particle after 3 seconds will be

(A) 3 m/s^2
(B) 12 m/s^2
(C) 16 m/s^2
(D) 25 m/s^2

85. A rocket consumes fuel at the rate of 100 kg/s and the exhaust gases are ejected at a speed of 50 km/s. The rocket would then experience a thrust (in MN) equal to

(A) 2.5
(B) 5
(C) 50
(D) 250

86. At any time t, the position of a particle moving along a straight line is prescribed by the relation: $x = 2t^3 - 50t + 5$. From its initial position at $t = 0$, the particle will attain a velocity of 100 m/s after

(A) 2 s
(B) 5 s
(C) 6 s
(D) 10 s

87. A body is moving with a velocity of 1 m/s and a force F is needed to stop it within a certain distance. If the speed of the body becomes three times, the force needed to stop it within the same distance would be

(A) 1.5 F
(B) 3 F
(C) 6 F
(D) 9 F

88. A stationary object of 15 kg mass is acted upon by a force of 30 N for 6 seconds. The object will attain a final velocity of

(A) 1 m/s
(B) 12 m/s
(C) 24 m/s
(D) 36 m/s

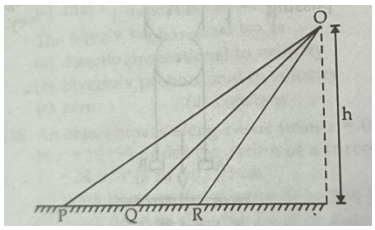
89. An object moves along x-axis from $x = 0$ to $x = 16$ cm under the action of a force
$F_x = 24 - 3x$ (x in cm). Then

(A) work done on the object will be 384 J
(B) work done on the object will be zero
(C) the potential energy of the object will be maximum at $x = 8$ cm
(D) the object will oscillate about its mean position

90. A bullet of mass m_1 and moving with a velocity v_1 strikes a wooden block of mass m_2 lying on a frictionless surface and gets embedded into it. The final velocity of the system is

(A) $(m_1 + m_2).v_1$
(B) $m_1.v_1/(m_1 + m_2)$
(C) $(m_1 + m_2).v_1/m_1$
(D) $m_1/(m_1 + m_2).v_1$

91. Three different balls of masses m_1, m_2 and m_3 are allowed to roll from rest along three different frictionless paths *OP*, *OQ* and *OR* respectively from point *O* (as shown in figure) whose vertical height above the ground is *h*. The respective speeds v_1, v_2 and v_3 at *P*, *Q* and *R* will be such that



(A) $v_1 = v_2 = v_3$
(B) $v_1 < v_2 < v_3$
(C) $v_1 > v_2 > v_3$
(D) $v_1/m_1 = v_2/m_2 = v_3/m_3$

92. A 5 kg sphere is accelerated upwards by a string whose breaking strength is 200 N. The maximum value of acceleration with which the sphere can move without breaking the string is

(A) 10 m/s^2
(B) 20 m/s^2
(C) 30 m/s^2
(D) 50 m/s^2

93. A boy weighing 625 N stands on a spring weighing machine inside a lift. The lift commences its downward journey and the machine reads 500 N. At that instant, the lift is descending with an acceleration of

(A) 1.25 m/s^2
(B) 2 m/s^2
(C) 8 m/s^2
(D) 12 m/s^2

94. Two objects of masses 3 kg and 5 kg respectively are connected by a light cord passing over a smooth weightless pulley. The acceleration with which the masses moves is

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

95. Two objects of masses 3 kg and 5 kg respectively are connected by a light cord passing over a smooth weightless pulley. The tension in the string would be
(Take $g = 10\ m/s^2$)

(A) 37.5 N
(B) 80 N
(C) 150 N
(D) 5 N

96. The value of coefficient of restitution for perfectly elastic bodies is

(A) 1.0
(B) 0.6 to 0.9
(C) 0.1 to 0.5
(D) zero

97. A tennis ball is dropped onto a plane surface from a height of 1 m. After rebound, the ball rises to 0.81 m height. The coefficient of restitution is

(A) 0.64
(B) 0.81
(C) 0.5
(D) 0.9

98. A projectile can have the same range for two angles of projection. If t_1 and t_2 are the times of flight in the two cases, then the product of the two times of flight is proportional to

(A) R^2
(B) $1/R^2$
(C) R
(D) 1/R

99. A projectile is launched into the atmosphere with a velocity of 100 m/s and at an angle of 30^o with the vertical. Taking gravitational acceleration $g = 10$ m/s^2, the horizontal range is

(A) 432 m
(B) 577 m
(C) 866 m
(D) 1300 m

100. A projectile has a range *R* in the gravitational field of earth. Under identical conditions of velocity and acceleration, its range on moon would be (Take *g* on moon equal to one-sixth of that on earth)

(A) 6R
(B) $\sqrt{6}R$
(C) R/6
(D) $R/\sqrt{6}$

101. Which of the following remains constant during flight of a projectile?

(A) vertical component of velocity
(B) horizontal component of velocity
(C) angle of projectile
(D) sum of its kinetic energy and potential energy

102. The velocity of a particle executing simple harmonic motion with amplitude *'a'* is half of the maximum velocity. At that instant, displacement of the particle is

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

103. The oscillation of a particle is prescribed by the equation $x = 3 \cos (0.5 \pi t)$, where t is the time in seconds. Then the time taken by the particle to move from position of equilibrium to maximum displacement is

(A) 0.5
(B) 3
(C) 2
(D) 1

104. A flywheel rotates about a fixed axis and slows down from 400π rad/minute to 200π rad/minute in a time duration of 2 minutes. The angular deceleration in rad/minute^2 during the slow down is

(A) 200π
(B) 400π
(C) 50π
(D) 100π

105. The flywheel of a steam engine has a radius of gyration of 1 m and a mass of 3000 kg. The starting torque of the engine is 1500 Nm and remains constant. The angular acceleration of the flywheel is

(A) 0.5 rad/s^2
(B) 0.8 rad/s^2
(C) 1.2 rad/s^2
(D) 1.5 rad/s^2

106. For a solid cone of height h, the centre of gravity lies on the axis at a distance above the base equal to

(A) h/4
(B) h/3
(C) 2h/3
(D) 3h/8

107. The moment of inertia of a thin circular ring with radius r and mass m about an axis through its centre and perpendicular to its plane would be

(A) mr^2
(B) $0.5\ mr^2$
(C) $1.5\ mr^2$
(D) $1.25\ mr^2$

108. A block of weight 100 N is placed on a rough horizontal plane. If a horizontal force of 30 N just causes the body to slide over the horizontal plane, the coefficient of friction between the block and the plane is

(A) 0.2
(B) 0.4
(C) 0.1
(D) 0.3

109. A weight of 5 N rests on a rough horizontal plane that has a coefficient of friction $\mu = 0.5$. If $g = 10\ m/s^2$, the smallest horizontal force that gives the weight an acceleration of $5\ m/s^2$ is

(A) 2 N
(B) 2.5 N
(C) 5 N
(D) 10 N

110. The unit of moment of inertia of an area is

(A) m^3
(B) $kg.m^2$
(C) m^4
(D) kg/m^2

111. The untrimmed size for ……. sheet is 240 mm × 330 mm

(A) A1
(B) A2
(C) A3
(D) A4

112. The angle which we can't make using a single Set-square is

(A) 45°
(B) 30°
(C) 60°
(D) 75°

113. Identify the softest grade of pencil from the options given below.

(A) 2B
(B) 2H
(C) HB
(D) H

114. According to the Indian Standard Institution (ISI), what is the size of the designation A3 in mm?

(A) 420 × 297
(B) 841 × 594
(C) 1189 × 841
(D) 297 × 210

115. Which type of line is used to join the dimension line and the curve that needs to be dimensioned?

(A) Leader line
(B) Outline
(C) Dimension line
(D) Section line

116. Representative fraction is the

(A) ratio of the length in drawing to the actual length
(B) ratio of the actual length to the length in the drawing
(C) reciprocal of the actual length
(D) square of the length in the drawing

117. The length of the drawing is 50 mm, the scale is given as 1 : 5. Find the actual length.

(A) 50 cm
(B) 10 cm
(C) 25 cm
(D) 10 mm

118. The length of the drawing is 20 cm, the scale is given as 2 : 1. Find the actual length.

(A) 50 cm
(B) 10 cm
(C) 25 cm
(D) 10 mm

119. Which of the following scales is a reducing scale?

(A) 3 : 2
(B) 1 : 3
(C) 1 : 1
(D) 1 : 0.4

120. What is the formula for calculating the length of the scale?

(A) Minimum length to be measured × R.F.
(B) Minimum length to be measured ÷ R.F.
(C) Maximum length to be measured ÷ R.F.
(D) Maximum length to be measured × R.F.

121. What is the length of the scale, if the representative fraction is 1 : 50000 and the scale must measure up to 25 km?

(A) 5×10^4 cm
(B) 50 cm
(C) 5 cm
(D) 0.5 cm

122. If a diagonal scale is to be made with a metre, decimetre and centimetre then, how many divisions it has to be made vertically?

(A) 3
(B) 5
(C) 10
(D) 9

123. The included angle of a regular pentagon is

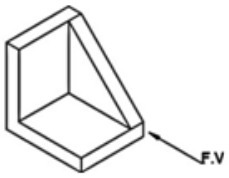
(A) 68°
(B) 72°
(C) 108°
(D) 112°

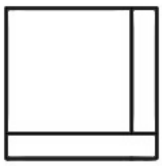
124. Match the following terms which are used in perspective projections.

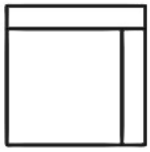
TABLE I	TABLE II
P. Station point	I. Eye level of the observer is indicated
Q. Horizon line	II. An object is projected on this plane
R. Picture plane	III. Eye of the observer
S. Ground line	IV. Object rests on this plane

(A) P-IV, Q-II, R-III, S-I
(B) P-III, Q-I, R-II, S-IV
(C) P-IV, Q-III, R-II, S-I
(D) P-I, Q-II, R-III, S-IV

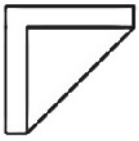
125. Which is the front view of the object shown in the figure?



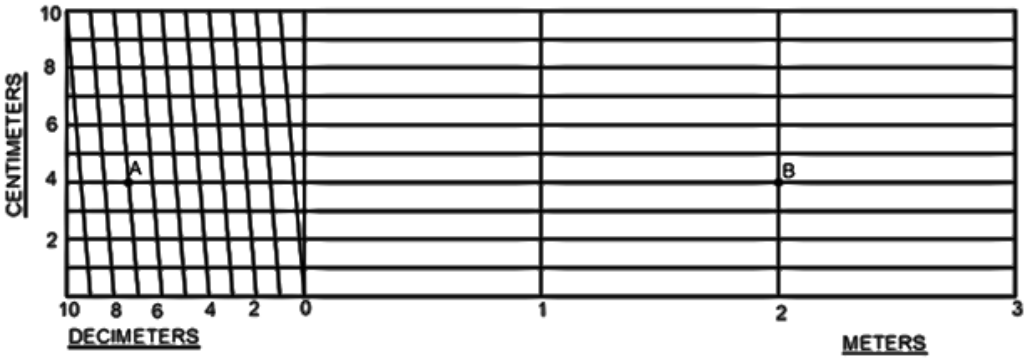
(A) 

(B) 

(C) 

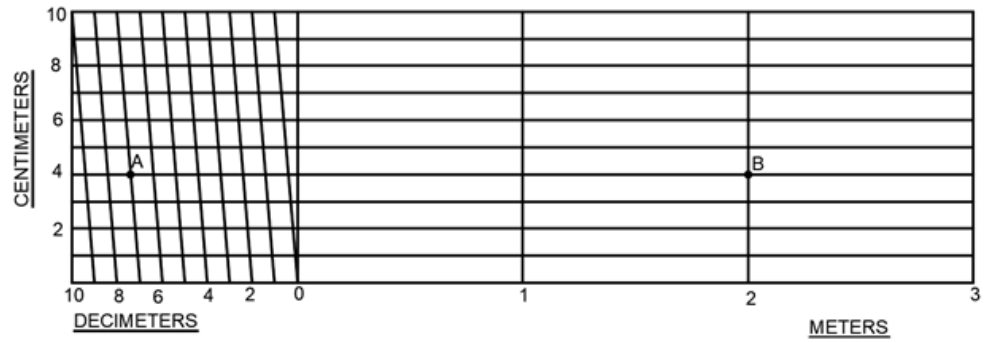
(D) 

126. What is the dimension AB shown in the diagonal scale?



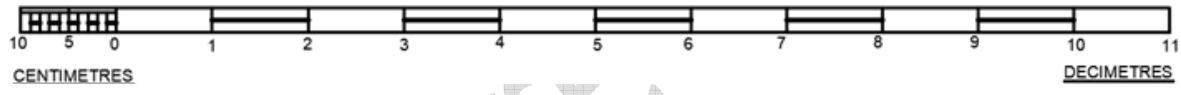
(A) 2.47 m
(B) 2.74 m
(C) 2.74 cm
(D) 2.47 cm

127. What is the maximum length that can be measured using the scale given below?



(A) 4 m
(B) 4.5 m
(C) 5 m
(D) 4 dm

128. What is the least count of the scale shown below?



(A) 1 m
(B) 1 dm
(C) 1 cm
(D) 1 mm

129. The lines which touch the hyperbola at an infinite distance are

(A) Axes
(B) Tangents at vertex
(C) Latus rectum
(D) Asymptotes

130. Which of the following is the eccentricity for ellipse?

(A) 1

(B) $\frac{3}{2}$

(C) $\frac{2}{3}$

(D) 2

131. A hyperbola is called rectangular hyperbola if the ……. are perpendicular to each other.

(A) latus rectum
(B) asymptotes
(C) major and minor axes
(D) tangent and normal

132. A regular cone is placed such that axis is parallel to both reference planes. The section plane perpendicular to both reference planes and cuts the cone. The section will be like

(A) ellipse
(B) hyperbola
(C) circle
(D) parabola

133. A regular cone is placed on H.P with its axis perpendicular to HP and parallel to VP. A section plane parallel to axis and passing through the apex cuts the cone. What is the true shape of the section?

(A) Ellipse
(B) Hyperbola
(C) Parabola
(D) Triangle

134. A line of length 10 cm kept on the horizontal plane is parallel to vertical plane. Keeping one of its ends fixed, the line is turned 30 degrees with respect to vertical plane and then turned 45 degrees with respect to horizontal plane. What is the length of line in top view?

(A) 5 cm
(B) 7.07 cm
(C) 3.53 cm
(D) 10 cm

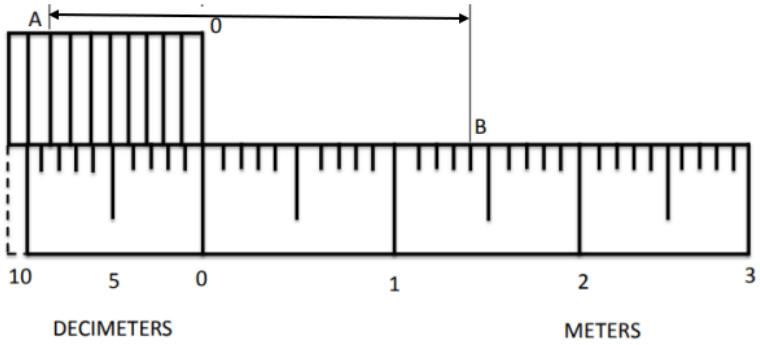
135. A square lamina is placed perpendicular to vertical plane and inclined to horizontal which of the following is true?

(A) Front view-line, top view- square
(B) Front view- line, top view- rectangle
(C) Front view –line, top view-line
(D) Top view-line, side view- rectangle

136. A thread is designated in a drawing as SQ 50 × 5 mm, what does it indicate?

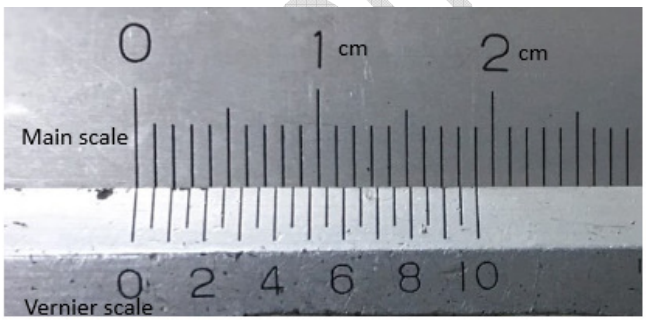
(A) A square thread of pitch 5 mm and 50 mm is the nominal diameter
(B) A square thread of pitch 20 mm and 250 mm is the nominal diameter
(C) A square thread of pitch 50 mm and 5 mm is the nominal diameter
(D) A thread of pitch 5 mm and 50 mm is the nominal diameter

137. What is the distance between A and B from the vernier scale shown below?



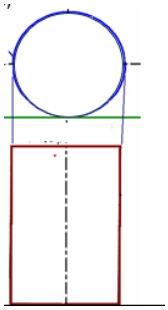
(A) 1.4 m
(B) 2.2 m
(C) 2.28 m
(D) 2.82 m

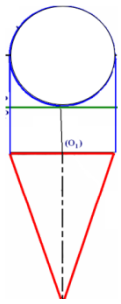
138. The following figure shows a vernier callipers. What is the least count of the instrument?

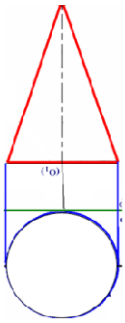


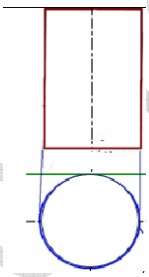
(A) 0.02 mm
(B) 0.05 mm
(C) 0.01 mm
(D) 0.005 mm

139. Which of the figure below represents the projections of a cone with its axis perpendicular to VP and base edge touching the HP?

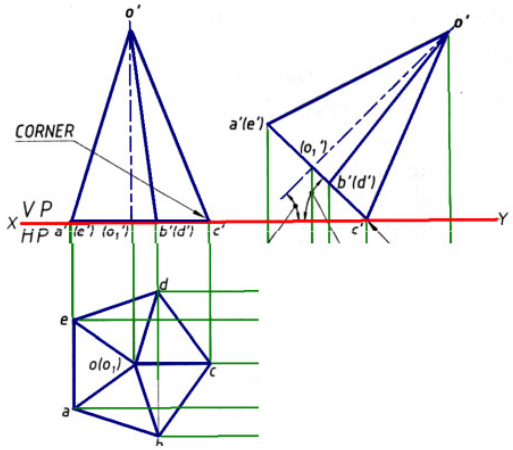
(A) 

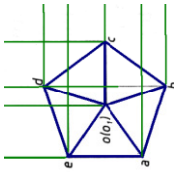
(B) 

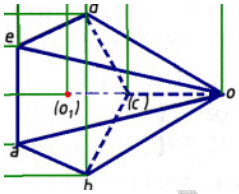
(C) 

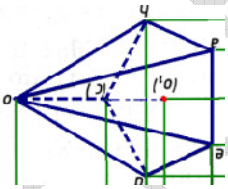
(D) 

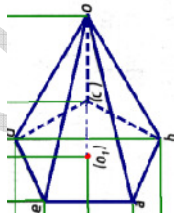
140. The projections of a pentagonal pyramid resting on a corner in HP with its axis inclined to HP is shown. What will be its top view?



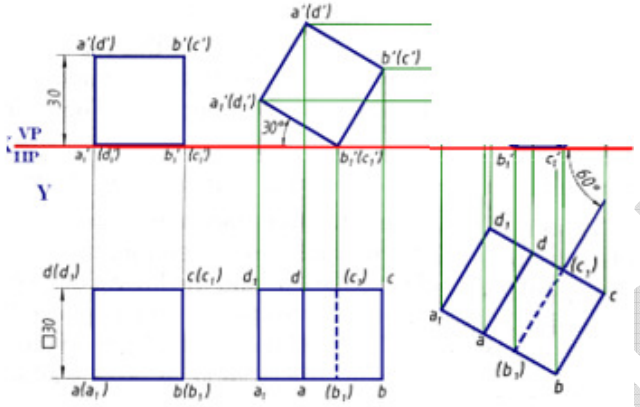
(A) 

(B) 

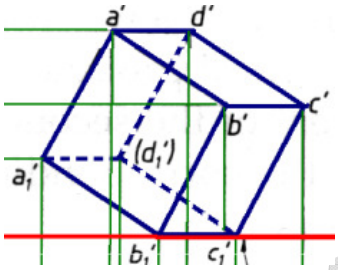
(C) 

(D) 

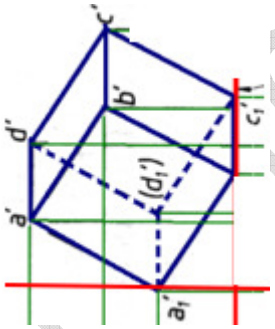
141. A cube rests on one of its edges on HP which is inclined at 60° to VP and the square face containing that edge is inclined at 30° to HP. What is the final front view of the cube?



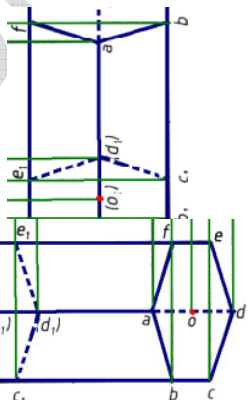
(A)



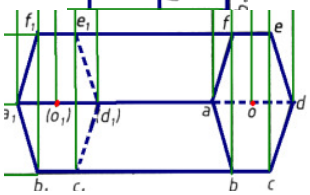
(B)



(C)



(D)



142. A regular pentagonal plane ABCDE makes an angle of 40° to the HP. The edge AB is on the ground and makes an angle of 55° with the VP. The point D is in the VP. To obtain the final front view, the auxiliary plane is drawn at

(A) Inclined at 40° to AB
(B) Inclined at 40° to AB and passing through D
(C) Inclined at 55° to AB
(D) Inclined at 55° to AB and passing through D

143. Imagine two identical right circular cones such that one is inverted over the other and they share a common circular base. If a cutting plane passes through the vertices of the assembled cones, what is the true shape of the section?

(A) Triangle
(B) Ellipse
(C) Rhombus
(D) Hexagon

144. Locus of a point *P* equidistant from a fixed line and a fixed point *O* is

(A) a circle with centre *O*
(B) an ellipse with foci *P* and *O*
(C) a parabola
(D) a hyperbola

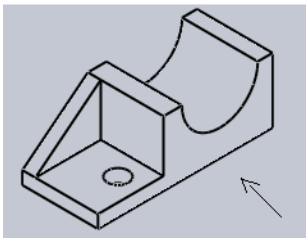
145. If the distance from the focus is 10 units and the distance from the directrix is 30 units, then what is the name of the conic?

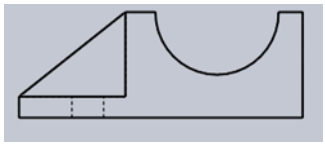
(A) Circle
(B) Parabola
(C) Hyperbola
(D) Ellipse

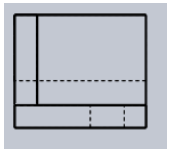
146. If the distance from the focus is 2 cm and the distance from the directrix is 0.5 cm then what is the value of eccentricity?

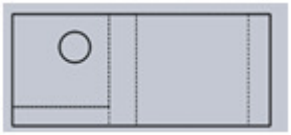
(A) 0.4
(B) 4
(C) 0.25
(D) 1

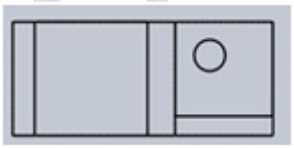
147. Identify the front view and left side view of the block shown below.



(1) 

(2) 

(3) 

(4) 

(A) 1 and 2
(B) 1 and 3
(C) 2 and 4
(D) 3 and 1

148. A cylinder first placed in such a way its axis is perpendicular to H.P and next this is tilted in such a way that its axis is making some acute angle with H.P. The front views for the two positions will be

(A) circle, rectangle with circular ends
(B) rectangle, rectangle
(C) rectangle with circular ends, rectangle
(D) circle, rectangle

149. The development of the lateral surface of a cylinder is a …….having one of the sides equal to the …….of its base-circle and the other equal to its length.

(A) rectangle, circumference
(B) circular sector, circumference
(C) rectangle, diameter
(D) circular sector, radius

150. The development of lateral surface of a pyramid consists of a number of equal …….triangle in contact.

(A) equilateral
(B) isosceles
(C) scalene
(D) right angled

151. In OPC 33, OPC 43 and OPC 53, what does the number 33, 43 and 53 represent?

(A) Compressive strength in $N/mm^2$of cement cubes after 28 days of curing
(B) Average compressive strength in $N/mm^2$of at least three cement mortar cubes in the ratio 1:3 (cement to standard fine aggregate) after 28 days of curing
(C) Average compressive strength in $N/mm^2$of at least three cement mortar cubes in the ratio 1:4 (cement to standard fine aggregate) after 28 days of curing
(D) Average compressive strength in $N/mm^2$of at least two cement mortar cubes in the ratio 1:4 (cement to standard fine aggregate) after 28 days of curing

152. Why do we use steel as reinforcement in concrete in RCC?

(A) Steel is the best metal which is available for reinforcement
(B) Steel is the strongest metal which can withstand tension and compression better than that of concrete
(C) Concrete is weak in tension and steel is the only option for reinforcement to bear tensile stresses
(D) Steel has nearly the same thermal expansion as that of concrete and it bears tensile stresses much better than that in concrete

153. Which among the following parameters in tension test depict ductility in rebars?

(A) Percentage reduction in area and percentage elongation
(B) Young's modulus of elasticity and yield stress
(C) Ultimate stress and actual breaking stress
(D) Ultimate stress and nominal breaking stress

154. As per IS:1077:1992, classes of common burnt clay bricks range from

(A) 350 to 35, where the number represents the compressive strength of bricks in N/mm^2
(B) 35 to 5, where the number represents the compressive strength of bricks in N/mm^2
(C) 35 to 3.5, where the number represents the compressive strength of bricks in N/mm^2
(D) 0 to 5, where the number represents the compressive strength of bricks in N/mm^2

155. The maximum and minimum sizes of sieves which are used to analyse fine aggregates in concrete, as per IS:2386(Part I):1963 are

(A) 4.75 mm and 75 microns, respectively.
(B) 4.75 mm and 150 microns, respectively
(C) 80 mm and 4.75 mm, respectively
(D) 80 mm and 75 microns, respectively

156. Which among the following is true regarding water cement ratio and compressive strength of concrete?

(A) Water cement ratio and compressive strength of concrete are directly proportional
(B) Water cement ratio and compressive strength of concrete are not related
(C) Water cement ratio and compressive strength of concrete are inversely proportional
(D) Compressive strength of concrete will increase at a constant water cement ratio

157. In M25 grade of concrete, the letter 'M' represents, Mix and the number 25 represents

(A) Compressive strength of concrete cubes after 28 days
(B) Compressive strength of concrete cubes after 21 days
(C) Characteristic compressive strength of concrete cubes after 28 days
(D) Characteristic compressive strength of concrete cubes after 21 days

158. Which among the following is a deep foundation?

(A) Well foundation
(B) Raft foundation
(C) Mat foundation
(D) Isolated footing

159. Which among the following offers better strength to the brick masonry?

(A) Stretcher bond
(B) English bond
(C) Flemish bond
(D) Header bond

160. Which among the following is the basic principle of surveying?

(A) To work from part to the whole
(B) To work from triangles to rectangles
(C) To work from in the field to outer of the field
(D) To work from the whole to the part

161. Which of the following is an example of a closed system?

(A) A boiling kettle with an open lid
(B) A sealed gas cylinder
(C) A car engine during combustion
(D) A river flowing into a dam

162. The Zeroth Law of Thermodynamics is used to define

(A) Work
(B) Energy
(C) Temperature
(D) Entropy

163. According to the First Law of Thermodynamics, energy can be

(A) Created but not destroyed
(B) Destroyed but not created
(C) Transferred or converted but not created or destroyed
(D) Created and destroyed freely

164. The Carnot cycle consists of which of the following processes?

(A) Two isothermal and two adiabatic processes
(B) Two constant volume and two constant pressure processes
(C) Two isothermal and two constant pressure processes
(D) Two adiabatic and two constant volume processes

165. In a Diesel cycle, heat addition occurs at

(A) Constant volume
(B) Constant pressure
(C) Constant entropy
(D) Constant temperature

166. Which of the following statements is true for a two-stroke engine?

(A) It completes one power cycle in two revolutions of the crankshaft
(B) It requires valves for intake and exhaust
(C) It has a power stroke in every revolution of the crankshaft
(D) It uses separate lubrication like a four-stroke engine

167. In a four-stroke petrol engine, the power stroke occurs in

(A) Every revolution of the crankshaft
(B) Every alternate revolution of the crankshaft
(C) During the compression stroke
(D) At the end of the exhaust stroke

168. In an ideal Otto cycle, compression and expansion processes are

(A) Isothermal
(B) Isobaric
(C) Isochoric
(D) Adiabatic

169. The thermal efficiency of a Carnot engine depends on

(A) Pressure ratio
(B) Temperature ratio
(C) Heat added
(D) Specific volume

170. In a diesel engine, the fuel is ignited by

(A) An electric spark
(B) High compression temperature
(C) External heat supply
(D) Glow plugs

171. Which type of memory is non-volatile and retains data even when the power is turned off?

(A) RAM
(B) Cache Memory
(C) ROM
(D) Register

172. Which of the following storage devices has the fastest data access time?

(A) Hard Disk Drive (HDD)
(B) Solid State Drive (SSD)
(C) Optical Disk
(D) Magnetic Tape

173. What is the main function of an operating system?

(A) Convert high-level language to machine code
(B) Manage system hardware and software resources
(C) Execute user programs directly
(D) Design hardware components

174. What is the main advantage of a fiber optic cable over copper cables?

(A) Lower Cost
(B) Higher Bandwidth and Faster Data Transmission
(C) Easier Installation
(D) Less Susceptible to Damage

175. Which component of a modern CPU is responsible for speculative execution?

(A) Arithmetic Logic Unit (ALU)
(B) Register File
(C) Branch Predictor
(D) Memory Management Unit (MMU)

176. Which of the following is the fastest memory in a computer system?

(A) Main memory
(B) Cache memory
(C) Hard disk
(D) Virtual memory

177. What is the purpose of disk fragmentation?

(A) To store files contiguously
(B) To slow down disk access
(C) To distribute files across multiple disks
(D) To arrange data randomly

178. What is a race condition in concurrent programming?

(A) A situation where two processes wait for each other indefinitely
(B) A condition where multiple threads access shared data unpredictably
(C) A CPU scheduling technique
(D) A deadlock prevention method

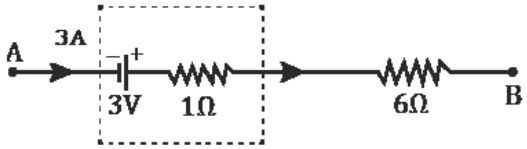
179. What is the primary purpose of the goto statement in C?

(A) To create an infinite loop
(B) To exit a loop or function
(C) To transfer control unconditionally to another part of the program
(D) To define labels for function calls

180. In Python, which of the following statements about lists and tuples is correct?

(A) Lists are immutable, while tuples are mutable
(B) Tuples are immutable, while lists are mutable
(C) Both lists and tuples are mutable
(D) Both lists and tuples are immutable

181. The Figure represents a part of closed loop circuit. What is the potential difference between points A and B



(A) 6V
(B) 12V
(C) 24V
(D) 18V

182. An Inductive coil takes 10A and dissipates 1000 W when connected to a supply at 250 V, 25Hz. Calculate the power factor

(A) 0.4 lagging
(B) 0.5 lagging
(C) 0.9 lagging
(D) 0.88 lagging

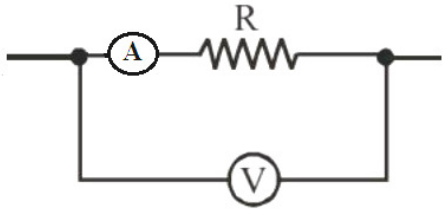
183. A resistance of 100 ohm is connected in series with a 50uf capacitor to a supply at 200 V, 50HZ. Find the Impedance Z

(A) X_C=53.66 Ω,Z=218.54 Ω
(B) X_C=63.66 Ω,Z=118.54 Ω
(C) X_C=23.66 Ω,Z=58.54 Ω
(D) X_C=45.64Ω,Z=80.54 Ω

184. A coil of 500 turns is linked by a flux 0.4 mWb. If the flux is reversed in 0.01 s. Find the e.m.f induced in the coil

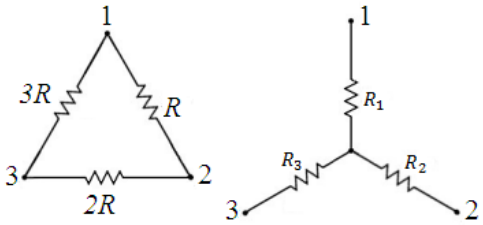
(A) 50 V
(B) 60 V
(C) 40 V
(D) 80 V

185. The ammeters reads 5 A and voltmeter reads 50 V. The actual resistance



(A) 10 Ω
(B) Greater than 10 Ω
(C) Less than 10 Ω
(D) None of the above

186. Three resistance R, 2R, 3R are connected in delta. Determine the resistance for an equivalent star Connection



(A) R1=R/2, R2=R/3, R3=R
(B) R1=3R/2, R2=5R/3, R3=2R
(C) R1=R/2, R2=4R/3, R3=3R
(D) R1=R/2, R2=2R/3, R3=3R

187. The load in the three-phase power measurement method using two wattmeters is resistive. The wattmeter's measurements are W_1 and W_2

(A) W_1 may be greater than W_2
(B) W_1 may be less than W_2
(C) $W_1 = W_2$
(D) None of the above

188. When using a voltmeter, what kind of resistance is connected in series with the coils?

(A) Low resistance with high temperature co efficient
(B) High resistance with high temperature co efficient
(C) Variable resistance
(D) No additional resistance is needed

189. According to Lenz's Law, the induced current in a coil flows in such a direction that it

(A) Enhances the change in flux
(B) Opposes the change in flux
(C) Does not affect the magnetic flux
(D) Increase the resistance of the coil

190. An air cored solenoid has a length of 30 cm and a diameter of 1.5 cm. Calculate its reluctance, if it has 900 turns

(A) 1350949×10^3 A/Wb
(B) 1120949×10^3 A/Wb
(C) 1004×10^3 A/Wb
(D) 10544×10^3 A/Wb

191. A delta network consists of equal resistances in all three arms. Find the resistance of the arms of its equivalent star

(A) R/3
(B) R
(C) R/2
(D) 2R

192. An RLC series circuit consist of capacitor of value 0.05μF. It resonates at 500 Hz. Calculate the value of inductance L

(A) 1.09 H
(B) 10.03 H
(C) 4.065 H
(D) 2.03 H

193. What is the forbidden energy gap of germanium?

(A) 1.1 eV
(B) 0.72 eV
(C) 2 eV
(D) 0.5 eV

194. A single phase half-wave rectifier supplies power to a 1kohm load. The sinusoidal a.c. supply has an r.m.s value of 200 V. The step–down transformer has a turn ratio N1/N2=10. Neglecting forward resistance of the diode, calculate the d.c voltage across the load

(A) 9 V
(B) 8 V
(C) 12 V
(D) 10 V

195. In a NPN transistor both collector and base are …… with respect to the emitter

(A) Negative
(B) Positive
(C) Ground
(D) Infinity

196. What type of signal is the message or modulating signal?

(A) High- frequency radio wave
(B) Low frequency audio signal
(C) Direct current signal
(D) Digital data stream

197. What happens to the phase of the voltage as the core moves through the centre position in an LVDT?

(A) It remains unchanged
(B) It changes by 90 degrees
(C) It changes by 180 degrees
(D) It changes randomly

198. Find current through Zener diode if dc voltage is 15 V, R=385 ohm, Vz=12 V

(A) Iz = 7.792 mA
(B) Iz = 2 mA
(C) Iz = 9 mA
(D) Iz = 12 mA

199. Regarding frequency modulation (FM), which of the following assertions is accurate?

(A) The amplitude of the carrier signal varies with the modulating signal
(B) The frequency of the modulating signal determines the amount of frequency deviation
(C) The amplitude of the modulated carrier remains constant
(D) Maximum frequency deviation occurs at the minimum amplitude of the modulating signal

200. The length of a metal conductor increases from L+ΔL as it is stretched under stress. What is the change in its resistance?

(A) Decreases due to reduced resistivity
(B) Increases due to increased length and reduced cross-sectional area
(C) Remains the same as resistivity is constant
(D) Decreases due to increased cross-sectional area

102 Lateral Entry for B Tech Programme													
SI NO	**KEY**	**SI NO**	**KEY**	**SI NO**	**KEY**	**SI NO**	**KEY**	**SI NO**	**KEY**	**SI NO**	**KEY**	**SI NO**	**KEY**
1	B	**31**	C	**61**	A	**91**	A	**121**	B	**151**	B	**181**	D
2	B	**32**	C	**62**	D	**92**	C	**122**	C	**152**	D	**182**	A
3	A	**33**	C	**63**	D	**93**	B	**123**	B	**153**	A	**183**	B
4	C	**34**	B	**64**	B	**94**	A	**124**	C	**154**	C	**184**	C
5	C	**35**	C	**65**	A	**95**	A	**125**	A	**155**	A	**185**	C
6	C	**36**	C	**66**	D	**96**	A	**126**	B	**156**	C	**186**	A
7	B	**37**	C	**67**	B	**97**	D	**127**	A	**157**	C	**187**	C
8	A	**38**	A	**68**	A	**98**	C	**128**	C	**158**	A	**188**	B
9	B	**39**	D	**69**	B	**99**	C	**129**	D	**159**	B	**189**	B
10	D	**40**	A	**70**	C	**100**	A	**130**	C	**160**	D	**190**	A
11	D	**41**	A	**71**	D	**101**	B	**131**	B	**161**	B	**191**	A
12	C	**42**	C	**72**	B	**102**	B	**132**	C	**162**	C	**192**	D
13	C	**43**	C	**73**	C	**103**	D	**133**	D	**163**	C	**193**	B
14	A	**44**	C	**74**	B	**104**	D	**134**	B	**164**	A	**194**	A
15	C	**45**	D	**75**	D	**105**	A	**135**	B	**165**	B	**195**	B
16	A	**46**	C	**76**	B	**106**	A	**136**	A	**166**	C	**196**	B
17	B	**47**	C	**77**	D	**107**	A	**137**	C	**167**	B	**197**	C
18	D	**48**	C	**78**	C	**108**	D	**138**	B	**168**	D	**198**	A
19	C	**49**	C	**79**	B	**109**	C	**139**	B	**169**	B	**199**	C
20	B	**50**	A	**80**	D	**110**	C	**140**	B	**170**	B	**200**	B
21	B	**51**	C	**81**	C	**111**	D	**141**	A	**171**	C		
22	A	**52**	A	**82**	B	**112**	D	**142**	D	**172**	B		
23	D	**53**	D	**83**	C	**113**	A	**143**	C	**173**	B		
24	B	**54**	D	**84**	B	**114**	A	**144**	C	**174**	B		
25	C	**55**	B	**85**	B	**115**	A	**145**	D	**175**	C		
26	D	**56**	B	**86**	B	**116**	A	**146**	B	**176**	B		
27	D	**57**	A	**87**	D	**117**	C	**147**	A	**177**	A		
28	D	**58**	A	**88**	B	**118**	B	**148**	B	**178**	B		
29	B	**59**	B	**89**	B	**119**	B	**149**	A	**179**	C		
30	A	**60**	A	**90**	B	**120**	D	**150**	B	**180**	B		