BTECH LET - 2019

Directions: Fill in the blanks with the most appropriate word selected from the options given below

1. She left too…… …….. to catch the early train

(A) lately
(B) latest
(C) later
(D) late

2. **Directions:** Fill in the blanks with the most appropriate word selected from the options given below

Warning! No unauthorised personnel …… …….. this point.

(A) about
(B) from
(C) beyond
(D) on

3. **Directions:** Fill in the blanks with the most appropriate word selected from the options given below

She has been …. …….. of murdering her husband.

(A) charged
(B) blamed
(C) arrested
(D) accused

4. **Directions:** Fill in the blanks with the most appropriate word selected from the options given below

I'm sorry, dinner isn't ready yet, but it

(A) is going to be ready in a minute.
(B) will have been ready in a minute.
(C) will be ready in a minute
(D) is ready in a minute

5. **Directions:** Fill in the blanks with the most appropriate word selected from the options given below

Passengers who wish to ……. at the next station should travel in the first coach.

(A) alight
(B) leave
(C) descend
(D) climb down

6. **Directions:** Fill in the blanks with the most appropriate word selected from the options given below

My boss didn't say it in so many words, but she …….. that I would get a promotion before the end of the year,

(A) clarified
(B) declared
(C) implied
(D) suggested

Direction: Choose the correct question tag

7. Mohan will come today, ……?

(A) will he
(B) won't mohan
(C) shall he
(D) won't he

8. **Direction:** Choose the correct question tag

He came here yesterday, ……..?

(A) is it
(B) does he
(C) did he
(D) didn't he

9. **Direction:** Choose the correct question tag

You haven't lost your ticket,……?

(A) do you
(B) haven't you
(C) have you
(D) is it

10. **Direction:** Choose the word that is spelt correctly.

(A) Guarantee
(B) Gaurantee
(C) Garanntee
(D) Guarantie

11. Choose the word that is spelt correctly.

(A) Abreviation
(B) Abbrevition
(C) Abbreivation
(D) Abbreviation

12. Choose the word that is spelt correctly.

(A) Entrepreneer
(B) Entreprenur
(C) Entrepreuner
(D) Entrepreneur

Directions: Choose the word from the options given which best expresses the meaning of the word given in capital letters

13. CLANDESTINE

(A) Secret
(B) Calculated
(C) Absurd
(D) Crafty

14. **Directions.** Choose the word from the options given which best expresses the meaning of the word given in capital letters

ARTICULATE

(A) Express
(B) Agitate
(C) Adulate
(D) None of the above

15. **Directions:** Choose the word from the options given which best expresses the meaning of the word given in capital letters

PENSIVE

(A) Thoughtless
(B) Thoughtful
(C) Anxious
(D) Poised

Direction: Select the correct form of passive voice

16. The marvellous performance delivered by the children enthralled us.

(A) We have been enthralled by the marvellous performance delivered by the children.
(B) We are enthralled by the marvellous performance delivered by the children.
(C) We were enthralled by the marvellous performance delivered by the children.
(D) We has been enthralled by the marvellous performance delivered by the children.

17. **Direction:** Select the correct form of passive voice

They will build the house.

(A) The house is built by them.
(B) The house will be built by them.
(C) The house will built by them.
(D) The house will be build by them.

Direction: Read the passage and answer the questions given below

The study of history provides many benefits. First, we learn from the past. We may repeat mistakes, but, at least, we have the opportunity to avoid them. Second, history teaches us what questions to ask about the present. Contrary to some people's view, the study of history is not the memorization of names, dates and places. It is the thoughtful examination of the forces that have shaped the courses of human life. We can examine events from the past and then draw inferences about current events. History teaches us about likely outcomes. Another benefit of the study of history is the broad range of human experience which is covered. War and peace are certainly covered as national and international affairs. However, matters of culture (art, literature, and music) are also included in historical study. Human nature is an important part of history: emotions like passion, greed, and insecurity have influenced the shaping of world affairs. Anyone who thinks that the study of history is boring has not really studied history.

18. What is the main idea of this passage?

(A) Studying history helps us to live in today's world.
(B) Studying history is not just memorization.
(C) The role of education is to help students deal with real life.
(D) Students should study both national and international history.

19. Which method of teaching history would the author of this passage support?

(A) Applying historical events to modern society.
(B) Using flash cards to remember specific facts.
(C) Weekly quizzes on dates and events.
(D) Student competitions for most books memorized.

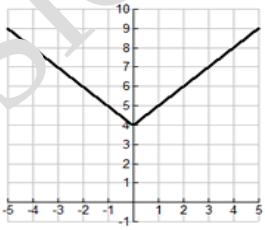
20. Pick out the wrong statement from the sentences given below.

(A) History teaches us about the past.
(B) History helps us to live in the present.
(C) History is boring.
(D) History can teach us about future happenings.

21. If $|2x-3| \leq 5$, then

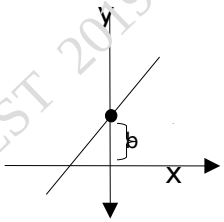
(A) $(x \leq -1 \vee x \geq 4)$
(B) $(x \leq 1 \vee x \geq 4)$
(C) $(x \leq 1 \vee x \geq -4)$
(D) $(x \leq -1 \vee x \geq -4)$

22. The equation representing the graph given below is



(A) $y = |x| - 4$
(B) $y = |x - 4|$
(C) $y = |x| + 4$
(D) $y = |x + 4|$

23. The value of b for the equation of the line $y = 2x + 3$ in the following figure is



(A) 2

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

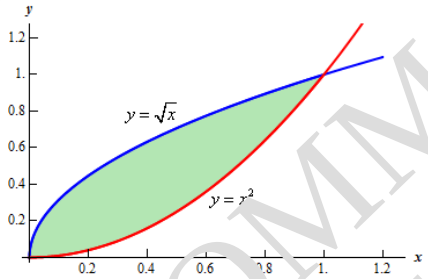
(C) 3

(D) - 3

24. The series $1-\frac{1}{2}+\frac{1}{3}-\frac{1}{4}+\frac{1}{5}-\ldots$ converges to

(A) –log(2)
(B) log(2)
(C) e^2
(D) ∞

25. The integral which represents the area of the shaded region in the given graph is



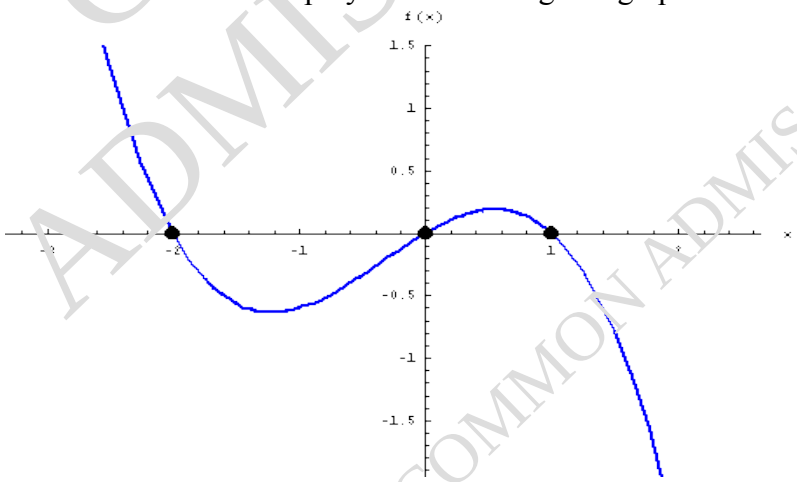
(A) $\int_0^1 \sqrt{x}\,dx$

(B) $\int_0^1 x^2\,dx$

(C) $\int_0^1 \left(\sqrt{x}-x^2\right)dx$

(D) $\int_0^1 \left(\sqrt{x}+x^2\right)dx$

26. The roots of the cubic polynomial in the given graph are



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

27. $\int e^{\sqrt{x}}dx = ¿¿$

(A) $2\sqrt{x}\,e^{\sqrt{x}} - e^{\sqrt{x}} + C$

(B) $2\sqrt{x}\,e^{\sqrt{x}} - 2e^{\sqrt{x}} + C$

(C) $2\sqrt{x}\,e^{\sqrt{x}} + C$

(D) $2\frac{e^{\sqrt{x}}}{\sqrt{x}} - e^{\sqrt{x}} + C$

28. $\int_{-1}^{1} e^{-x^2}dx = k$, then $\int_{-1}^{0} e^{-x^2}dx = ¿¿$

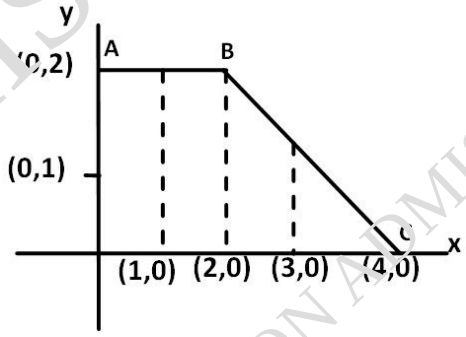
(A) $-k$

(B) $\frac{-k}{2}$

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

(D) $2k$

29. If $f(x) = \begin{cases} 2, 0 \le x \le 2 \\ 2 - x, 2 \le x \le 4 \end{cases}$, then $\int_{0}^{4} f(x)dx$ is



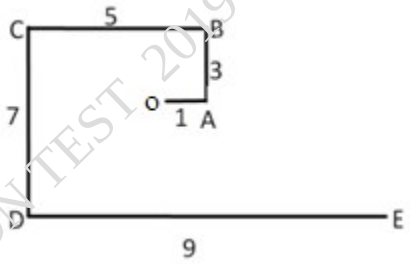
(A) 8

(B) 6

(C) 5

(D) 4

30. In the diagram, all angles are right angles. Which of the following lengths is rational?



(A) OB
(B) OC
(C) OD
(D) OE

31. $\sinh\left(\frac{i\pi}{2}\right) =$

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

32. The smallest positive integer for which the statement $3^{n+1} < 4^n$ holds is

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

33. If the curves $y^2 = 6x$, $9x^2 + by^2 = 16$ intersect each other at right angles, then the value of b is

(A) 9/2
(B) 6
(C) 7/2
(D) 4

34. A wire of length 2 units is cut into two parts which are bent respectively to form a square of side x units and a circle of radius r units. If the sum of the areas of the square and the circle so formed is minimum, then

(A) $2x = r$

(B) $2x = (\pi + 4)r$

(C) $(4 - \pi)x = \pi r$

(D) $x = 2r$

35. A man is walking towards a vertical pillar in a straight path, at a uniform speed. At a certain point A on the path, he observes that the angle of elevation of the top of the pillar is 30°. After walking for 10 minutes from A in the same direction, at a point B, he observes that the angle of elevation of the top of the pillar is 60°. Then the time taken (in minutes) by him, from B to reach the pillar, is

(A) 20
(B) 6
(C) 10
(D) 5

36. If $A = \begin{bmatrix} 5 & -b \\ 3 & 2 \end{bmatrix}$ and A adj A = A A^T, then $5a + b$ is equal to

(A) 13
(B) -1
(C) 5
(D) 4

37. The mean and variance of a binomial distribution are 8 and 6 respectively. The value of P[X=2] is

(A) $\frac{31 \times 3^{30}}{4^{30}}$

(B) $\frac{31 \times 3^{2}}{4^{30}}$

(C) $-\frac{31 \times 3^{30}}{4^{30}}$

(D) $\frac{32\times3^{30}}{4^{30}}$

38. If P(A) = 1/3, P(B) =3/4 and $P(A\cup B)=11/12$, then P(A/B) is

(A) 5/6
(B) 3/11
(C) 2/9
(D) 3/5

39. The Boolean expression $\sim(p\vee q)\vee(\sim p\wedge q)$ is equivalent to

(A) ~q
(B) ~p
(C) p
(D) q

40. Let $a=j-k$ and $c=i-k$. Then the vector b satisfying $a\times b+c=0$ and $a\cdot b=3$ is

(A) $-i+j-2k$

(B) $2i-j+2k$

(C) $i-j-2k$

(D) $i+j-2k$

41. If the vectors $a=i-j+2k,\ b=2i+4j+k$ and $c=\lambda i+j+\mu k$ are mutually orthogonal, then (λ, μ) =

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

42. Let $\cos(\alpha+\beta)=4/5$ and $\sin(\alpha-\beta)=5/13$, where $0\le\alpha,\beta\le\pi/4$. Then $\tan 2\alpha$ =

(A) 25/16
(B) 56/33
(C) 19/12
(D) 20/17

43. All the students of a class performed poorly in Mathematics. The teacher decided to give grace marks of 10 to each of the students. Which of the following statistical measures will not change even after the grace marks were given?

(A) median
(B) mode
(C) variance
(D) mean

44. If x, y, z are in A.P. and $\tan^{-1} x$, $\tan^{-1} y$ and $\tan^{-1} z$ are also in A.P., then

(A) $2x = 3y = 6z$

(B) $6x = 3y = 2z$

(C) $6x = 4y = 3z$

(D) $x = y = z$

45. The order and degree of the differential equation $\left(3+\left(\frac{dy}{dx}\right)^2\right)^{\frac{1}{3}} = \left(\frac{d^2y}{dx^2}\right)^{\frac{1}{2}}$ are respectively

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

46. If a particular integral of the differential equation $\frac{d^2y}{dx^2} + 2\frac{dy}{dx} - y = e^{ax}$ is $-\frac{4}{7}e^x$, then the values of 'a' are

(A) $\frac{1}{2}, \frac{3}{2}$

(B) $-\frac{1}{2}, -\frac{3}{2}$

(C) $\frac{-7 \pm 2\sqrt{7}}{7}$

(D) $\frac{-2 \pm \sqrt{15}}{2}$

47. $\lim_{x \to 0} \frac{(1-\cos 2x)(3+\cos x)}{x \tan 4x}$ is equal to

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

48. If the rank of the matrix $\begin{bmatrix} \lambda & -1 & 0 \\ 0 & \lambda & -1 \\ -1 & 0 & \lambda \end{bmatrix}$ is 2, then λ is

(A) 1
(B) 2
(C) 3
(D) any real number

49. If 12 identical balls are to be placed in 3 identical boxes, then the probability that one of the boxes contains exactly 3 balls is

(A) $\frac{55}{3}\left(\frac{2}{3}\right)^{10}$

(B) $55\left(\frac{2}{3}\right)^{10}$

(C) $220\left(\frac{1}{3}\right)^{12}$

(D) $22\left(\frac{1}{3}\right)^{11}$

50. If two different numbers are taken from the set {0, 1, 2, 3, …, 10}, then the probability that their sum as well as absolute difference are both multiple of 4, is

(A) 6/55

(B) 12/55

(C) 14/45

(D) 7/55

51. The variance of first 50 even natural numbers is

(A) 833/ 4
(B) 833
(C) 437
(D) 437 /4

52. If z is a complex number such that $|z| \geq 2$, then the minimum value of $\left|z + \frac{1}{2}\right|$

(A) is equal to 5/2
(B) lies in the interval (1, 2)
(C) is strictly greater than 5/2
(D) is strictly greater than 3/2 but less than 5/2

53. If $a + ib = \frac{1+i}{1-i}$, then $a^2 + b^2$ is

(A) i
(B) -i
(C) 1
(D) -1

54. If 'n' is any integer, then the value of $i^n + i^{n+2} + i^{n+4} + i^{n+6}$ is

(A) 1
(B) 0
(C) 3
(D) 4

55. If α and β are the roots of $x^2 - ax + b = 0$, then $\lim_{x \to \alpha} \frac{e^{x^2 - ax + b}}{x - \alpha}$ is

(A) $2\alpha + \beta$

(B) 1

(C) $\alpha - \beta$

(D) $\beta - \alpha$

56. The curve represented by x=3(cos t + sin t) and y = 4(cos t - sin t) is

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

57. If the line $y = 3x + \lambda$ touches the hyperbola $9x^2 - 5y^2 = 45$, then the value of λ^2 is

(A) 45
(B) 36
(C) 6
(D) 15

58. The integrating factor of the differential equation $\log x \left(\frac{dy}{dx}\right) + \frac{y}{x} = \sin 2x$ is

(A) log x
(B) log (log x)
(C) x
(D) 1/x

59. The decimal representing a second of an hour is

(A) 0.0025
(B) 0.0256
(C) 0.00027
(D) 0.000126

60. If $\frac{|x-2|}{x-2} > 0$, then x belongs to

(A) [2, ∞)
(B) (2, ∞)
(C) (-∞, 2)
(D) (-2, ∞)

61. $\sin(45° + \theta) - \sin(45° - \theta) =$

(A) $\frac{1}{\sqrt{2}}\sin\theta$

(B) $\sin\theta$

(C) $\sqrt{2}\sin\theta$

(D) $\cos\theta$

62. The element of the sequence $\frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}+\sqrt{2}}, \frac{1}{\sqrt{3}+2\sqrt{2}}, \ldots$ form an

(A) AGP
(B) HP
(C) GP
(D) AP

63. $\log_3 5 \log_{25} 27 =$

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

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

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

(D) $\frac{5}{3}$

64. $\log_{a^2} a \log_{b^2} b \log_{c^2} c =$

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

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

(C) $\frac{1}{10}$

(D) $\frac{1}{8}$

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65. If $\bar{a} = \hat{i} - \hat{j} + 5\hat{k}$ and $\bar{b} = 3\hat{i} - 2\hat{k}$, then $\bar{a}.\bar{b}$ is

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

66. The angle between the vectors $\bar{a} = \hat{i} + \hat{j} + \hat{k}$ and $\bar{b} = \hat{i} + \hat{j} - \hat{k}$ is

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

(B) $\cos^{-1}\left(\frac{1}{2}\right)$

(C) $\cos^{-1}\left(\frac{1}{4}\right)$

(D) $\cos^{-1}\left(\frac{1}{3}\right)$

67. If $|\bar{a} + \bar{b}| = 60$, $|\bar{a} - \bar{b}| = 40$ and $|\bar{b}| = 46$, then $|\bar{a}|$ is

(A) 42
(B) 12
(C) 22
(D) 32

68. If $y = \frac{1}{a - z}$, then $\frac{dz}{dy}$ is

(A) $(a - z)^2$

(B) $-(z - a)^2$

(C) $-(z + a)^2$

(D) $(z + a)^2$

69. The derivative of $f(x) = x|x|$ at $x = -3$ is

(A) 6
(B) -6
(C) 0
(D) □

70. If $A = \begin{bmatrix} 0 & 0 \\ 0 & 5 \end{bmatrix}$, then A^{12} is

(A) $\begin{bmatrix} 0 & 0 \\ 0 & 60 \end{bmatrix}$

(B) $\begin{bmatrix} 0 & 0 \\ 0 & 5^{12} \end{bmatrix}$

(C) $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$

(D) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

71. Impulse gives a measure of the product of

(A) force and displacement
(B) mass and acceleration
(C) force and time
(D) force and velocity

72. Which of the following pair of concurrent forces cannot have a resultant of 4 N?

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

73. The resultant of two equal forces is equal to either of them. The angle between the forces is

(A) 0

(B) 60
(C) 90
(D) 120

74. Four forces P, 2P, 3P and 4P act along the sides, taken in order, of a square. The resultant force is

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

75. A car P moving at 45 m/s chases another car Q moving at 70 m/s ahead of it in the same direction. A man in car P fires a bullet at car Q. If the muzzle speed of bullet is 80 m/s, the speed with which the bullet hits car Q is

(A) 25 m/s
(B) 35 m/s
(C) 55 m/s
(D) 105 m/s

76. When two bodies move uniformly towards each other, the distance between them decreases by 6 m/s. If both bodies move in the same direction with the same speed, the distance between them increases by 4 m/s. Then the speeds of the two bodies are:

(A) 3 m/s and 3 m/s
(B) 4 m/s and 2 m/s
(C) 5 m/s and 1 m/s
(D) 8 m/s and 5 m/s

77. A body is allowed to fall from the top of a tower. It falls through half the height in 2 seconds. The total time taken to reach the ground is nearly

(A) 4.5 s
(B) 4 s
(C) 3.2 s
(D) 2.8 s

78. The displacement-time graph for two particles A and B are straight lines inclined at angles of 30° and 45° with the time axis. The ratio of velocities V_A:V_B will be about

(A) 0.33:1

(B) 0.5:1
(C) 0.58:1
(D) 0.87:1

79. The position of a particle is expressed as $x = 2t^3$, $y = t^2 + 4t$, $z = 3t - 5$ in terms of time parameter. At $t = 1$, the acceleration of the particle would be about

(A) 7.8 m/s^2
(B) 9.0 m/s^2
(C) 10.2 m/s^2
(D) 12.2 m/s^2

80. A body moving with a velocity of 1 m/s has a kinetic energy of 1.5 Joules. If $g = 10$ m/s^2, the mass of the body is

(A) 1.5 kg
(B) 3 kg
(C) 30 kg
(D) 0.3 kg

81. A constant force F = (20i + 3j + 10k) kN moves a particle from position $r_1 = (10i + 20j)$ m to $r_2 = (15i + 20j + 30k)$ m. The work done by the force in kJ is

(A) zero
(B) 300 kJ
(C) 800 kJ
(D) 1100 kJ

82. A tennis ball is dropped onto a plane surface from height 1 m. After rebound, the ball rises to 0.64 m height. The coefficient of restitution is

(A) 0.64
(B) 0.8
(C) 0.97
(D) 0.51

83. For maximum horizontal range, the angle of projection of a projectile should be

(A) 30°
(B) 45°
(C) 60°
(D) 75°

84. The maximum velocity and maximum acceleration of a particle executing simple harmonic motion are 2 m/s and 20 m/s^2 respectively. The time period (s) of motion equals

(A) π
(B) π/5
(C) π/10
(D) π/3

85. The angular speed of seconds hand of a clock is

(A) π rad/s
(B) π/6 rad/s
(C) π/15 rad/s
(D) π/30 rad/s

86. The shaft of a motor starts from rest and attains full speed of 1800 rpm in 10 seconds. The shaft has an angular acceleration of

(A) 3π rad/s^2
(B) 6π rad/s^2
(C) 12π rad/s^2
(D) 24π rad/s^2

87. A grindstone has a moment of inertia of 1600 kgm^2. When subjected to a couple, it acquires a speed of 5π rad/s after 10 seconds starting from rest. The applied couple has the value

(A) 200 π
(B) 350 π
(C) 800 π
(D) 1050 π

88. Two bodies of mass *M* and *m* are moving in concentric orbits of radii *R* and *r* such that their time periods are same. Then the ratio between their angular velocities is

(A) R : r

(B) mR : Mr

(C) 1 : 1

(D) $\sqrt{R/r} : m/M$

89. 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

90. The moment of inertia of a triangle of base width b and height h with respect to its base would be

(A) $bh^3/8$
(B) $bh^3/12$
(C) $bh^3/24$
(D) $bh^3/36$

91. The ratio of moment of inertia of a circular body about its x-axis to that about y-axis is

(A) 0.25
(B) 0.5
(C) 1.0
(D) 2.0

92. If I_x and I_y denote the moment of inertia of a lamina about x-axis and y-axis respectively, then the moment of inertia of the lamina about z-axis would be

(A) $I_x + I_y$

(B) $I_x \times I_y$

(C) $\sqrt{(I_x + I_y)}$

(D) $I_x - I_y$

93. A block of weight 100 N is placed on a rough horizontal plane. If a horizontal force of 60 N just causes the body to slide over the horizontal plane, the coefficient of friction between the block and the plane is

(A) 0.15
(B) 0.3
(C) 0.4
(D) 0.6

94. A zero angle of friction implies that

(A) frictional force is infinite
(B) frictional force is zero
(C) frictional force acts normal to the plane
(D) frictional force acts along the direction of motion

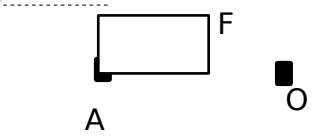
95. A block of weight W=100 N is resting on a plane inclined at 30°. If the block is on the verge of moving down, what is the magnitude of the frictional force?

(A) 50 N
(B) 86.6 N
(C) 100 N
(D) 25 N

96. The unit of angular momentum is

(A) kg.m
(B) kg.m.s^{-1}
(C) kg.m^2
(D) kg.m^2.s^{-1}

97. A force F = 10 N is acting at 30° from point A. What is the moment of the force with respect to the moment centre O, which is 10 cm to the right of A?



(A) 100 N.cm clockwise
(B) 100 N.cm counter clock wise
(C) 50 N.cm clockwise
(D) 50 N.cm counter clock wise

98. Two forces can be in equilibrium only if they are

(A) equal
(B) opposite
(C) collinear
(D) All of the above

99. The moment of the resultant of a system of forces about a moment centre is equal to the algebraic sum of moments of its components about the same moment centre. This is the statement of

(A) Equilibrium law
(B) Parallelogram law
(C) Varignon's theorem
(D) Newton's law

100. Which of the following statements are correct?

(i) Three forces can be in equilibrium only if they are concurrent
(ii) Two equal and parallel forces produce a couple
(iii) Centre of gravity is the point through which the resultant of parallel gravity forces act

(A) only (i) and (ii)
(B) only (i) and (iii)
(C) only (ii) and (iii)
(D) (i), (ii) and (iii)

101. A simply supported beam of 3 m length is carrying a vertical load of 10 kN at its centre. The support reactions will be

(A) 10 kN, 10 kN
(B) 5 kN, 5 kN
(C) 3 kN, 7 kN
(D) 10 kN, 0

102. Which of the following is the equation connecting the number of bars (n) and number of joints (j) in a perfect plane truss?

(A) n=2j-3
(B) n=2j+3
(C) n=j+3
(D) n=j-3

103. The co-ordinates of the centroid of a quarter circular area with respect to its bounding radii are

(A) $4r/\pi$, $4r/\pi$
(B) $2r/\pi$, $2r/\pi$
(C) $4r/\pi$, 0
(D) $4r/3\pi$, $4r/3\pi$

104. If the angle of friction is 30°, the coefficient of friction is

(A) ½
(B) $1/\sqrt{3}$
(C) $\sqrt{3}/2$
(D) 1

105. A particle is moving in straight line with a velocity $v=2t^3-t^2-2t+4$. What is its acceleration when t=6s?

(A) 202 m/s^2
(B) 100 m/s^2
(C) 50 m/s^2
(D) 22 m/s^2

106. A man weighing 700 N is moving down in a lift with an acceleration of $5m/s^2$. What is the force that he exerts on the floor of the lift (assume g=10 m/s^2)?

(A) 700 N
(B) 1050 N
(C) 350 N
(D) 0

107. The moment of inertia of a circular area of diameter 'd' with respect to its diameter is

(A) $\pi d^3/4$
(B) $\pi d^4/4$
(C) $\pi d^4/32$
(D) $\pi d^4/64$

108. If two objects of 30 kg and 10 kg move with equal kinetic energy, then what is the ratio of magnitudes for linear momentum?

(A) $\sqrt{3} : 1$
(B) $1 : \sqrt{3}$
(C) $1 : 3\sqrt{3}$
(D) $1 : 3$

109. Work done by an engine in 6 seconds is 996 J. What is the power generated by the engine in Watt?

(A) 5976
(B) 600
(C) 166
(D) 600

110. What is the distance of the centroid of an equilateral triangle of side 2 m from the base?

(A) $\sqrt{3}$
(B) $1/\sqrt{3}$
(C) $1/3\sqrt{3}$
(D) 2/3

111. Which statement is true about unidirectional dimensioning?

(A) The dimensions can be read from the bottom or from the right hand side of the drawing
(B) The dimensions are placed such that they can be read from the bottom of the drawing
(C) The angular dimensions are placed in a 30° zone
(D) All of the above

112. To bisect a circular arc AB, the radius 'r' of the arcs required to be drawn is

(A) r = AB
(B) r = AB/4
(C) r < AB/2
(D) r > AB/2

113. Which statement about conics is not true?

(A) Conics are closed/open curves
(B) Conics are obtained by cutting only generators of the cone at different angles
(C) Circle is a conic
(D) Conic is a curve generated by the intersection of a plane and a circular cone

114. In which curve the ratio of lengths of consecutive radius vectors enclosing equal angles is always constant?

(A) Archimedean spiral
(B) Logarithmic spiral
(C) Helix
(D) Involute

115. The main scale of a vernier scale is

(A) plain scale
(B) diagonal scale
(C) enlarging scale
(D) comparative scale

116. The curve obtained when the section plane cuts the double cone is

(A) ellipse
(B) parabola
(C) hyperbola
(D) isosceles triangle

117. When a line is contained by a profile plane, the sum of the angles of inclination with VP and HP is

(A) equal to 90°
(B) less than 90°
(C) greater than 90°
(D) equal to 180°

118. If a circular lamina is kept inclined at 30° to the HP and 0° to the VP, the plan will be

(A) a circle with true diameter
(B) a straight line having the length of true diameter
(C) a circle with reduced diameter
(D) an ellipse with major axis as true diameter

119. The horizontal trace (HT) of a line is always seen on

(A) front view
(B) top view
(C) side view
(D) auxiliary view

120. When a plane is perpendicular to both its principal planes

(A) it has no traces
(B) its traces will be in the traces of the planes
(C) its traces lie on a straight line perpendicular to xy line
(D) its traces lie on a straight line parallel to xy line

121. Select the incorrect statement about a pyramid

(A) it is a polyhedron
(B) it has got a plane figure as its base
(C) it has a number of triangular faces as its faces
(D) it has two similar faces parallel to each other

122. Which can be a solid of revolution?

(A) Prism
(B) Pyramid
(C) Octahedron
(D) Cone

123. When a hemisphere is placed with its flat surface on the ground, then

(A) its front view is a semicircle and top view is a circle
(B) its front view is a circle and top view is a semicircle
(C) both front view and top view are semicircles
(D) both views are circles

124. When the axis of the solid is parallel to both HP and VP ---------- view reveals the true shape of the base.

(A) top
(B) front
(C) side
(D) auxiliary

125. When the section plane is inclined to the HP and perpendicular to the VP, then

(A) the section in the front view coincides with the VT of the section plane
(B) the section in the top view coincides with the HT of the section plane
(C) the section in the front view coincides with the HT of the section plane
(D) the section in the top view coincides with the VT of the section plane

126. When a sphere is cut by a section plane, the true shape of the section is

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

127. If a cutting plane is parallel to the face of the tetrahedron, the section obtained will be

(A) rectangle
(B) square
(C) isosceles triangle
(D) equilateral triangle

128. Which type of development is employed in the case of pyramids?

(A) Parallel line
(B) Approximation method
(C) Triangulation
(D) Radial line

129. A right circular cylinder resting on its base on the HP is cut by a plane inclined to the HP bisecting its axis. The true shape of the section is

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

130. The development of the lateral surface of a pyramid consists of a number of

(A) squares
(B) rectangles
(C) triangles
(D) parallelograms

131. The view drawn with true isometric scale is called

(A) isometric drawing
(B) isometric view
(C) isometric projection
(D) isometric figure

132. Which of the following solids takes the identical shape either in plan or elevation or in isometric view?

(A) Sphere
(B) Prism
(C) Pyramid
(D) Cone

133. When an object is viewed from different directions and different distances, the appearance of the object will be different. Such a view is called

(A) oblique projection
(B) perspective projection
(C) isometric projection
(D) axonometric projection

134. In perspective projection, the point where the eye of the observer is located while viewing the object is called

(A) ground point
(B) horizon point
(C) centre of vision
(D) station point

135. When the top view of a line is a point, the line is

(A) lying on HP
(B) inclined to HP and VP
(C) perpendicular to VP
(D) perpendicular to HP

136. The side view of a line is true length. Which statement about this line is true?

(A) The line is in profile plane
(B) The line is parallel to VP
(C) The line is parallel to both planes
(D) The line is parallel to HP

137. If the top view of a line crosses XY line, which statement given below is true?

(A) The line crosses HP
(B) The line crosses VP
(C) The line is in II quadrant
(D) The line is in IV quadrant

138. A cube is suspended on a string fixed at a corner. What is the shape of its top view?

(A) A regular hexagon
(B) A rectangle
(C) A square
(D) A parallelogram

139. A hexagonal pyramid has 30 mm side of base and 70 mm axis length. What will be the length of its slant edge?

(A) 70 mm
(B) 76.16 mm
(C) 75.55 mm
(D) 74.67 mm

140. A cone is standing on HP on a point P of its base circle with axis parallel to VP and making 40° to HP. The generator containing P in this position will be

(A) parallel to VP making 40° to HP
(B) parallel to VP and making less than 40° to HP
(C) parallel to HP and making 40° to VP
(D) parallel to VP and making more than 40° to HP

141. A cylinder 60 mm diameter standing on its base is cut by a plane perpendicular to VP and inclined to HP such that the true shape of section is the biggest possible ellipse with major axis 100 mm. What is the height of the cylinder?

(A) 100 mm
(B) 120 mm
(C) 80 mm
(D) 60 mm

142. To get the true shape as the biggest possible triangle when a cone is cut

(A) cutting plane should cut the base
(B) cutting plane should pass through the apex
(C) cutting plane should be parallel to end generator
(D) cutting plane should contain the axis

143. Perspective views of lines that are parallel to ground plane

(A) will be parallel to ground line
(B) will not be parallel to ground line
(C) will be parallel to each other
(D) will lie on ground line

144. An equilateral triangle 50 mm side lies on ground plane with one side on picture plane. The station point is 60 mm in front of picture plane, 70 mm above ground plane and the central plane passes through the centre of the triangle. What is the shape of its perspective view?

(A) Scalene triangle
(B) Equilateral triangle
(C) A line
(D) Isosceles triangle

145. Horizon plane in perspective projection is

(A) a plane passing through the axis of solid
(B) a plane passing through the eye parallel to ground plane
(C) a plane passing through the eye perpendicular to ground plane
(D) a plane passing through the horizontal axis of solid

146. Isometric projection of a sphere with radius "R" is

(A) an ellipse with major axis 2R
(B) an ellipse with major axis R
(C) a circle of radius R
(D) a circle of radius (Rx0.816)

147. In a diagonal scale, the unit on the left side is metre. The height is divided into 20 equal parts and marked 0, 5, 10, 15, 20... up to 100. What is the suitable unit for this?

(A) Decimetre
(B) Centimetre
(C) Decametre
(D) Millimetre

148. What is meant by eccentricity of a parabola?

(A) Abscissa/double ordinate
(B) Distance of vertex from double ordinate/ distance of focus from double ordinate
(C) Distance of a point on the curve from vertex/ distance of the same point on the curve from the focus
(D) Distance of a point on the curve from the focus/ distance of the same point on the curve from the directrix

149. Length of transverse axis of a hyperbola is

(A) distance between the vertices
(B) distance between the foci
(C) radius of outer auxilliary circle
(D) distance between vertex and centre

150. The curve satisfying Boyle's Law is a

(A) rectangular hyperbola
(B) parabola
(C) cycloid
(D) hyperbola

151. Type of bond provided in brick masonry for carrying heavy loads is

(A) Single Flemish Bond
(B) Double Flemish Bond
(C) English Bond
(D) Zig Zag Bond

152. The last reading taken from the levelling instrument is called

(A) End sight
(B) Free sight
(C) Fore sight
(D) Back sight

153. _____ footing is used in load bearing masonry construction.

(A) Isolated
(B) Strap
(C) Strip
(D) Pile

154. Slump test is done to determine the ……. of concrete

(A) Durability
(B) Strength
(C) Workability
(D) Elasticity

155. A cross staff is used to

(A) Determine reduced levels
(B) Set a line perpendicular to another line
(C) Measure the angle between any two lines
(D) Find the bearing of a line

156. Gypsum is added in the manufacture of Portland Cement in order to

(A) shorten the setting time of cement
(B) lengthen the setting time of cement
(C) decrease burning temperature
(D) decrease the grinding time

157. The modular ratio is the ratio of

(A) Young's Modulus of steel to Young's Modulus of concrete
(B) Young's Modulus of concrete to Young's Modulus of steel
(C) Load carried by concrete to Load carried by steel
(D) None of the above

158. When an inclined or horizontal member is carrying mainly axial loads, it is termed as

(A) strut
(B) column
(C) beam
(D) All of the above

159. The representative fraction of 1/2500 means that the scale is

(A) 1 cm = 2.5 m
(B) 1 cm = 15 m
(C) 1 cm = 25 m
(D) 1 cm = 2.5 km

160. The contour lines can cross one another on map only in case of

(A) overhanging cliff
(B) vertical cliff
(C) saddle
(D) valley

161. A cycle consisting of one constant pressure, one constant volume and two isentropic processes is known as

(A) Carnot cycle
(B) Stirling cycle
(C) Otto cycle
(D) Diesel cycle

162. The basis for measuring thermodynamic property of temperature is given by

(A) zeroth law of thermodynamics
(B) first law of thermodynamics
(C) second law of thermodynamics
(D) Avogadro's hypothesis

163. Impulse turbine requires

(A) High head and low discharge
(B) High head and high discharge
(C) Low head and low discharge
(D) Low head and high discharge

164. Mollier diagram is a plot of

(A) temperature and entropy
(B) temperature and enthalpy
(C) pressure and enthalpy
(D) enthalpy and entropy

165. Which of the following refers to steam boiler use as accessory?

(A) safety valve
(B) stop valve
(C) water level indicator
(D) Economiser

166. For a practical petrol engine working on Otto cycle, the compression ratio usually lies in the range

(A) 3-5
(B) 6-8
(C) 10-15
(D) 16-22

167. Alloy of copper and zinc is

(A) Bronze
(B) Steel
(C) Lead
(D) Brass

168. Product of blast furnace is known as

(A) Pig iron
(B) Cast iron
(C) Wrought iron
(D) Carbon steel

169. Galvanizing is done with a layer of

(A) copper
(B) zinc
(C) lead
(D) cadmium

170. Which among the following is not a heat treatment process?

(A) Tempering
(B) Normalizing
(C) Turning
(D) Annealing

171. At resonance, which of the following condition is true?

(A) Inductive reactance is equal to capacitive reactance
(B) Inductive reactance is greater than capacitive reactance
(C) Inductive reactance is less than capacitive reactance
(D) None of the above

172. Two circuits having the same ohmic impedance are joined in parallel. The p.f of one circuit is 0.8 and the other is 0.6. What is the power factor of the combination?

(A) 0.6
(B) 1.0
(C) 0.707
(D) 0.8

173. The power consumed in a single phase a.c circuit having a voltage of 230 V, load current of 10A and a lagging p.f of 0.8 will be

(A) 184 kW
(B) 184 W
(C) 1840 W
(D) 1840 kW

174. A cylindrical wire 1 m in length has a resistance of 20 ohms. What would be the resistance of a wire made from the same material if the length is doubled and cross sectional area is halved?

(A) 80 ohms
(B) 40 ohms
(C) 160 ohms
(D) 120 ohms

175. In the Faraday's law of electro magnetic induction e= - dʎ/dt
e: denotes electro motive force and
ʎ: denotes

(A) flux
(B) flux linkage
(C) magnetic force
(D) None of the above

176. In a house hold single phase energy meter, the meter reading can be reversed by

(A) reversing the load terminals
(B) reversing either the potential coil or current coil terminals
(C) reversing the supply terminals
(D) reversing both current and potential coil terminals

177. The deflection angle in hot wire instruments is

(A) directly proportional to the current
(B) directly proportional to the square of current
(C) inversely proportional to the current
(D) inversely proportional to the square of current

178. The most commonly used connections for power systems as a step-up and step-down transformer are

(A) Star-delta, star-star
(B) Delta-star, star-delta
(C) Star-star, delta-delta
(D) Star-delta, delta-star

179. An inductance of 8.0 mH is in series with two inductances in parallel, one of 3.0 mh and the other 6.0 mH. Find the equivalent inductance.

(A) 17 mH
(B) 14 mH
(C) 10.0 mH
(D) 11 mH

180. The time constant of an RC series circuit is

(A) 1/RC
(B) √RC
(C) C/R
(D) RC

181. The RMS value of a half wave rectifier current is 10 A. Its value for full wave rectification would be

(A) 10 A
(B) 14.14 A
(C) (20/π) A
(D) 20 A

182. The transistor is said to be in quiescent state when

(A) It is unbiased
(B) No current flows through it
(C) No signal is applied to the input
(D) Emitter junction is just biased equal to collector junction

183. The sensitivity factor of strain gauge is normally of the order of

(A) 1 to 1.5
(B) 1.5 to 2.0
(C) 0.5 to 1.0
(D) 5 to 10

184. The main use of an emitter follower is

(A) power amplifier
(B) impedance matching device
(C) low input impedance device
(D) constant current source

185. Negative feedback in amplifiers leads to

(A) build up of oscillations
(B) reduced voltage gain
(C) de-stabilization of voltage gain
(D) increased voltage gain

186. LVDT is a

(A) pressure transducer
(B) displacement transducer
(C) velocity transducer
(D) acceleration transducer

187. The gauge factor of a semiconductor strain gauge is about

(A) 2
(B) 10
(C) 100
(D) 1000

188. A zener diode

(A) has a high forward voltage rating
(B) has a sharp breakdown at low reverse voltage
(C) is useful as an amplifier
(D) has a negative resistance

189. Threshold of a measurement system is

(A) the smallest change in input which can be detected
(B) a measure of linearity of the system
(C) the smallest input which can be detected
(D) a measure of precision of the system

190. The temperature being sensed by a negative temperature coefficient (NTC) type thermistor

(A) linearly increases with temperature
(B) exponentially increases with temperature
(C) linearly decreases with temperature
(D) exponentially decreases with temperature

191. Banker's Algorithm is used to

(A) rectify deadlock
(B) detect deadlock
(C) prevent deadlock
(D) solve deadlock

192. Where are data and programme stored when the processor uses them?

(A) Main memory
(B) Secondary memory
(C) Disk memory
(D) Programme memory

193. The device used to carry digital data on analogue lines is called as

(A) Modem
(B) Multiplexer
(C) Modulator
(D) Demodulator

194. When a computer is switched on, the booting process performs

(A) Integrity test
(B) Power-On Self-Test
(C) Correct functioning test
(D) Reliability test

195. ..... is computer software designed to operate the computer hardware and to provide platform for running application software

(A) Application software
(B) Operating system
(C) Software
(D) System software

196. Hardware or software designed to guard against unauthorized access to a computer network is known as

(A) Hacker-proof program
(B) Firewall
(C) Hacker-resistant server
(D) Encryption safe wall

197. Which header file is essential for using strcmp() function?

(A) text.h
(B) strings.h
(C) string.h
(D) strcmp.h

198. What will be the output of the following C code?

```
#include <stdio.h>
void main()
{ int x = 1, y = 0, z = 5;
int a = x && y || z++;
printf("%d", z);
}
```

(A) 6
(B) 5
(C) 0
(D) varies

199. The keyword used to transfer control from a function back to the calling function is

(A) switch
(B) goto
(C) go back
(D) return

200. With every use of memory allocation function, what function should be used to release allocated memory which is no longer needed?

(A) dropmem()
(B) dealloc()
(C) free()
(D) release()

B.TECH LET - ANSWER KEY (Page 1)

TEST CODE: 102

QN. NO.	KEY	QN. NO.	KEY	QN. NO.	KEY	QN. NO.	KEY	QN. NO.	KEY
1	D	26	B	51	B	76	C	101	B
2	C	27	B	52	B	77	D	102	A
3	D	28	C	53	C	78	C	103	D
4	C	29	B	54	B	79	D	104	B
5	A	30	B	55	C	80	B	105	A
6	C	31	A	56	A	81	B	106	C
7	D	32	D	57	B	82	B	107	D
8	D	33	A	58	A	83	B	108	A
9	C	34	D	59	C	84	B	109	C
10	A	35	D	60	A	85	D	110	B
11	D	36	C	61	C	86	B	111	B
12	D	37	A	62	B	87	C	112	D
13	A	38	C	63	C	88	C	113	B
14	A	39	B	64	D	89	A	114	B
15	B	40	A	65	A	90	B	115	A
16	C	41	C	66	D	91	C	116	C
17	B	42	B	67	C	92	A	117	A
18	A	43	C	68	A	93	D	118	D
19	A	44	D	69	A	94	B	119	B
20	C	45	B	70	B	95	A	120	C
21	A	46	B	71	C	96	D	121	D
22	C	47	C	72	D	97	C	122	D
23	C	48	A	73	D	98	D	123	A
24	B	49	A	74	B	99	C	124	C
25	C	50	A	75	C	100	B	125	A

B.TECH LET - ANSWER KEY (Page 2)

TEST CODE: 102

QN. NO.	KEY	QN. NO.	KEY	QN. NO.	KEY
126	B	151	C	176	B
127	D	152	C	177	B
128	D	153	C	178	D
129	D	154	C	179	C
130	C	155	B	180	D
131	C	156	B	181	B
132	A	157	A	182	C
133	B	158	A	183	B
134	D	159	C	184	B
135	D	160	A	185	B
136	A	161	D	186	B
137	B	162	A	187	C
138	A	163	A	188	B
139	B	164	D	189	C
140	D	165	D	190	D
141	C	166	B	191	C
142	D	167	D	192	A
143	B	168	A	193	A
144	D	169	B	194	B
145	B	170	C	195	D
146	C	171	A	196	B
147	B	172	C	197	C
148	D	173	C	198	A
149	A	174	A	199	D
150	A	175	B	200	C