10213

ROLL No. | | | | | |

TEST BOOKLET No. **941**

TEST FOR LATERAL ENTRY PROGRAMMES IN ENGINEERING AND TECHNOLOGY

Time: 3 Hours | Maximum Marks: 600

INSTRUCTIONS TO CANDIDATES

1. You are provided with a Test Booklet and an Optical Mark Reader (OMR) Answer Sheet to mark your responses. Do not soil the Answer Sheet. Read carefully all the instructions given on the Answer Sheet.

2. Write your Roll Number in the space provided on the top of this page.

3. Also write your Roll Number and Test Code in the columns provided for the same on the Answer Sheet. Darken the appropriate bubbles with **Ball Point Pen.** Put your signature in the column provided on the Answer Sheet in the presence of the Invigilator.

4. This paper consists of 200 objective type questions as detailed below:-

(i)	English	: 20 Nos. (Serial No. 1 to 20)
(ii)	Mathematics	: 50 Nos. (Serial No. 21 to 70)
(iii)	Engineering Mechanics	: 40 Nos. (Serial No. 71 to 110)
(iv)	Engineering Graphics	: 40 Nos. (Serial No. 111 to 150)
(v)	General Engineering	50 Nos. (Serial No. 151 to 200)

5. Each question has four alternative responses marked **A, B, C** and **D** and you have to **darken** the bubble fully by **Ball Point Pen** corresponding to the correct response as indicated in the example shown on the Answer Sheet.

6. Each correct answer carries 3 marks and each wrong answer carries 1 minus mark.

7. Space for rough work is provided at the end of this Test Booklet.

8. You should return the Answer Sheet to the Invigilator before you leave the examination hall. However, you can retain the Test Booklet.

9. Every precaution has been taken to avoid errors in the Test Booklet. In the event of any such unforeseen happenings, the same may be brought to the notice of the Observer/Chief Superintendent in writing. Suitable remedial measures will be taken at the time of evaluation, if necessary.

TEST FOR LATERAL ENTRY TO B.TECH. DEGREE PROGRAMMES

ENGLISH

Direction (Q. Nos. 1 and 2): Select the correct form of active voice for the following.

1 The jackfruits were stolen from our compound

(A) They stole the jackfruits from our compound.
(B) They had stolen the jackfruits from our compound.
(C) Someone stole the jackfruits from our compound.
(D) Someone have stolen the jackfruits from our compound.

2. A meeting is being organised by them

(A) They will organise a meeting.
(B) They are organising a meeting.
(C) They organise a meeting.
(D) They had organised a meeting.

Direction (Q. Nos. 3 and 4): Choose the appropriate word to fill in the blank.

3. No country can itself from international politics.

(A) stand (B) isolate
(C) move (D) change

4. The Alan Shah Cup will be a good exposure several young players.

(A) of (B) for
(C) about (D) towards

Direction: Read the given passage and select the statement which gives the gist of the passage.

5. Our constitution prescribes certain fundamental duties to be performed by citizens (Article 51A). One duty of paramount importance which should be performed is the duty to practise tolerance.

(A) Every citizen of our nation has to perform certain duties.
(B) We have to perform certain fundamental duties.
(C) The constitution describes the duties of each citizen.
(D) According to our constitution one of the most important fundamental duties of a citizen is the duty to practise tolerance.

Direction (Q. Nos. 6 and 7): Choose the correct question tag for the following:

6. You are learning much, ?

(A) don't you (B) are you
(C) aren't you (D) haven't you

7. I am not a good conversationalist, ...?

(A) was I (B) can I
(C) am I (D) shall I

Direction (Q. Nos. 8 and 9): Choose the correct passive voice form for the following.

8. I have known him for a long time.

(A) He has been known to me for a long time.
(B) He is known to me for a long time.
(C) He was known to me for a long time.
(D) He had been known to me for a long time.

9. Where did you keep her text book?

(A) Where was her text book kept by you?
(B) Where had been her text book kept by you?
(C) Where could be her text book kept by you?
(D) Where is her text book kept by you?

Direction (Q. Nos. 10 – 12): Pick out the mistaken parts from the following sentences:

10.	He is (A)	a man (B)	of impolite (C)	manner. (D)
11	He has bought (A)	this book (B)	from a shop (C)	yesterday. (D)
12.	He has been (A)	out of town (B)	since (C)	six days. (D)

Direction (Q. Nos. 13 and 14): Pick out the word which is the nearest in meaning to the word given in question.

13. authentic

(A) authoritative (B) powerful
(C) effective (D) true

14. fable

(A) parable (B) story
(C) comparison (D) wonder

Direction: Select the correct form of reported speech for the following.

15. "Where were you all these days?", Ram said to his son.

(A) Ram asked his son where he was all these days.
(B) Ram wanted to know where his son was.
(C) Ram asked his son where he had been all these days.
(D) Ram asked his son where was his son all these days.

Direction: Choose the correct form of direct speech for the following.

16. The teacher ordered his student to get out of the class.

(A) "You get out of the class", the teacher asked his student.
(B) "Get out of my class", the teacher shouted at his student.
(C) "Get out of the class", the teacher ordered his student.
(D) "Get out", the teacher told his student.

Direction (Q. Nos. 17 and 18): Select the word or expression opposite in meaning for the following.

17. despair

(A) pleasure (B) hope
(C) enjoyment (D) enthusiasm

18. civilised

(A) rude (B) brutal
(C) primitive (D) boastful

Direction (Q. Nos. 19 and 20): Choose the most suitable implied meaning for each of the following sayings.

19. Don't make a mountain out of a mole hill

(A) Do not give undue importance to silly things.
(B) Exaggeration is not good.
(C) Do not get worried over unimportant matters.
(D) It is foolish to panic over silly things

20. Every dog has his day.

(A) Everyone will get a day to enjoy.
(B) Everyone will get an opportunity to take revenge.
(C) Everyone can be master of himself one day.
(D) One day or other everyone will be successful.

MATHEMATICS

21. The domain of a function $f(x)=\sqrt{x}$ is the set of all

(A) real numbers
(B) rational numbers
(C) irrational numbers
(D) non-negative real numbers

22. If $f\left(-\frac{3}{2}\right)=\frac{3}{4}$ and its graph has the slope $\frac{3}{4}$, then $f(x)$ is

(A) $3x+4$ (B) $\frac{3}{4}x+4$

(C) $\frac{3}{4}x+\frac{3}{8}$ (D) $\frac{3}{4}x+\frac{15}{8}$

23. $\lim_{x\to 2}\frac{x^2-x-2}{x^2}=$

(A) 0 (B) 1
(C) −2 (D) −1

24. If $f(x)=\frac{2x}{3x-2}$, then $f^{-1}(x)$ is

(A) $\frac{3x-2}{x}$ (B) $\frac{x}{3x-2}$
(C) $\frac{2x}{3x-2}$ (D) $\frac{2x}{x-1}$

25. The value of $\sin\frac{\pi}{12}$ is

(A) $\sqrt{2}$ (B) $\sqrt{6}$
(C) $\frac{\sqrt{6}-\sqrt{2}}{4}$ (D) $\frac{\sqrt{6}-1}{2}$

26. The value of $\sin\left(\frac{\pi}{6}\right)-\cos\left(\frac{\pi}{3}\right)$ is

(A) 1 (B) 0
(C) 2 (D) −1

27. The equation of the straight line with x-intercept $\sqrt{3}$ and y-intercept 1 is

(A) $\sqrt{3}y+x=\sqrt{3}$ (B) $y=\sqrt{3}x+\sqrt{3}$
(C) $\sqrt{3}y=x+\sqrt{3}$ (D) $y=\sqrt{3}x-\sqrt{3}$

28. If the line $y+\sqrt{3}x=4$ is tangent to a circle with centre at the origin, the point of contact of tangent is

(A) $\left(1,\sqrt{3}\right)$ (B) $\left(\sqrt{3},1\right)$
(C) $\left(\sqrt{3},-1\right)$ (D) $\left(-\sqrt{3},1\right)$

29. The equation of the line perpendicular to the line $3x+2y-7=0$ and passing through the right hand focus of the ellipse $4x^2+9y^2=36$ is

(A) $2x-3y-2\sqrt{5}=0$ (B) $x-3y-2\sqrt{5}=0$
(C) $2x-3y+2\sqrt{5}=0$ (D) $x+3y-2\sqrt{5}=0$

30. $\lim_{x\to 1}\dfrac{2x^3+3x^2-2x-3}{x^2-1}=$

(A) 1 (B) -1
(C) 5 (D) 3

31. The function $f(x)=|x|$ is

(A) continuous at $x=0$
(B) differentiable at $x=0$
(C) discontinuous at $x=0$
(D) neither differentiable nor continuous at $x=0$

32. The equation $f(x)=2x^5-15x^4+30x^3-6$ is

(A) an increasing function (B) a decreasing function
(C) an oscillatory function (D) a constant function

33. If $f(x) = 2x^3 - 6x^2 - 210x + 151$, then the maximum and minimum values of $f(x)$ are at

(A) $x = 6,\ x = -5$ (B) $x = 7,\ x = -5$
(C) $x = 7,\ x = -6$ (D) $x = 6,\ x = -7$

34. The value of $\int_1^3 \frac{x^2+1}{\sqrt{x^3+3x}}\,dx$ is

(A) $\frac{1}{3}$ (B) $\frac{5}{3}$
(C) $\frac{7}{3}$ (D) $\frac{8}{3}$

35 The area of the region bounded by the curves $y = x^4$ and $y = 2x - x^2$ is

(A) $\frac{7}{12}$ sq. units (B) $\frac{7}{15}$ sq. units
(C) $\frac{8}{9}$ sq. units (D) $\frac{5}{9}$ sq. units

36. The volume of the solid generated by rotating about the x-axis the region bounded by the line $y = 4x$ and the parabola $y = 4x^2$ is

(A) $\frac{8\pi}{9}$ cubic units (B) $\frac{32\pi}{15}$ cubic units
(C) $\frac{5\pi}{9}$ cubic units (D) $\frac{8\pi}{15}$ cubic units

37. The length of the segment of the curve $y=\frac{2}{3}\left(x^2+1\right)^{\frac{3}{2}}$ from $x=1$ to $x=4$ is

(A) 60 units
(B) 45 units
(C) 30 units
(D) 25 units

38. If $y=(x-1)\log x$, then $\frac{dy}{dx}$ is

(A) $\frac{x\log x+x-1}{x}$
(B) $\frac{x\log x}{x}$
(C) $\frac{x\log x+x}{x}$
(D) $x\log x$

39. $\lim_{x\to 0}\frac{(\tan x-\sin x)}{x\cos x}=$

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

40. The derivative of $\frac{\sec x}{1-\cot x}$ is

(A) $\frac{\sec x\tan x-1}{(1-\cot x)^2}$
(B) $\frac{\sec x}{(1-\cot x)^2}$
(C) $\frac{\sec x\left(\tan x-\operatorname{cosec}^2 x-1\right)}{(1-\cot x)^2}$
(D) $\frac{\sec x\tan x}{(1-\cot x)^2}$

41. The derivative of $y=\sin^{-1}x^3$ is

(A) $3x^2/\sqrt{1-x^6}$
(B) $3x^2/\sqrt{1-x^3}$
(C) $x^2/\sqrt{1-x^3}$
(D) $x^2/\sqrt{1-x^6}$

42. The integral $\int \frac{x^2 - x}{x+1} dx$ has the value

(A) $\frac{(x-2)^2}{2} + x + c$ (B) $\frac{(x-2)^2}{2} + \log x + c$

(C) $\frac{(x-2)^2}{2} + \log|x+1| + c$ (D) $\frac{(x-2)^2}{2} + 2\log|x+1| + c$

43. $\lim_{x \to \frac{\pi}{4}} \frac{1 - \tan x}{\frac{\pi}{4} - x}$ is

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

(C) 2 (D) 0

44. The centre and radius of the sphere given by $x^2 + y^2 + z^2 - 12x + 14y - 8z + 1 = 0$ are

(A) $(6,-7,4);10$ (B) $(5,-5,2);9$

(C) $(3,-2,1);15$ (D) $(4,-1,3);16$

45. Two jars A and B contain some marbles. If 10 marbles are shifted from A to B, then both the jars have the same number of marbles. If 20 are transferred from B to A, then A has twice the number of marbles as B. How many marbles were in jar B to start with?

(A) 50 (B) 60

(C) 70 (D) 80

46. $f(x) = xe^{-x}$, $x \geq 0$ has a minimum value at the point

(A) $(1,e)$ (B) $\left(1,\frac{1}{e}\right)$

(C) $(e,1)$ (D) $(0,0)$

47. A solution contains water and milk in the ratio 2:1. By evaporating some of the water, a new solution is prepared, which contains water and milk in the ratio 1:2. What is the percentage of water that has evaporated?

(A) 40 (B) 55
(C) 60 (D) 75

48. If a cone of maximum volume is inscribed in a sphere of radius 'a', its height h is

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

49 The equation of the plane passing through $(-1,1,2)$ which is parallel to the plane $2x+y-z=7$ is

(A) $2x+y-z=3$ (B) $2x+y-z=-3$
(C) $2x+y-z=5$ (D) $2x+y-z=-5$

50. If $\vec{a}=(a_1,a_2,a_3)$, $\vec{b}=(b_1,b_2,b_3)$ and $\vec{c}=(c_1,c_2,c_3)$, then $\vec{a}.(\vec{b}\times\vec{c})$ has the value

(A) $\begin{vmatrix} a_1 & a_2 & 0 \\ b_1 & b_2 & 0 \\ 0 & c_2 & c_3 \end{vmatrix}$ (B) $\begin{vmatrix} 0 & a_2 & a_3 \\ b_1 & 0 & b_3 \\ c_1 & 0 & c_3 \end{vmatrix}$

(C) $\begin{vmatrix} a_1 & 0 & a_3 \\ b_1 & b_2 & b_3 \\ c_1 & c_2 & 0 \end{vmatrix}$ (D) $\begin{vmatrix} a_1 & a_2 & a_3 \\ b_1 & b_2 & b_3 \\ c_1 & c_2 & c_3 \end{vmatrix}$

51. The equation of the plane passing through the point $(4,2,5)$ and perpendicular to the line joining the points $(-2,3,6)$ and $(7,-4,1)$ is

(A) $8x+5y-3z-6=0$ (B) $9x-7y-5z+3=0$
(C) $11x-7y-5z+3=0$ (D) $13x-11y+8z-9=0$

52. The value of k if the plane $x+ky-4z+1=0$ is perpendicular to the plane $7x+y+3z+6=0$ is

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

53. The solution for the system of equations

$$x+3y-2z=-7$$
$$2x-y+z=-9$$
$$4x-2y-3z=23$$ is

(A) $(1,-5,0)$ (B) $(-5,0,1)$
(C) $(0,6,1)$ (D) $(0,1,8)$

54. The Laplace transform $L(\sin kt \cos kt)$ is

(A) $\frac{k-s}{k^2+s^2}, s>0$ (B) $\frac{k+s}{k^2+s^2}, s>0$
(C) $\frac{k}{s^2+4k^2}, s>0$ (D) $\frac{k}{s^2-4k^2}, s>0$

55. If $f(x,y)=(x^3+y^2)^5$, find $\frac{\partial^2 f}{\partial y \partial x}$

(A) $5(x^3+y^2)xy$ (B) $60(x^3+y^2)^2 xy^2$
(C) $120x^2y(x^3+y^2)^3$ (D) $150xy(x^3+y^2)^2$

56. An integer n divides 3413 and leaves a remainder of 23. What will be the remainder if n divides $3413+4n$?

(A) 27 (B) 22
(C) 23 (D) 24

57. The quantity $343^{\frac{3}{6}} \times 343^{\frac{-1}{6}}$ has the value

(A) 5 (B) 7
(C) 8 (D) 9

58. Two positive numbers differ by 5. The sum of their reciprocals is $\frac{9}{14}$. Then one of the numbers is

(A) 5 (B) 7
(C) 8 (D) 9

59. The rightmost digit in the decimal representation of 2^{51} is

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

60. For any odd positive integer $n > 1$, then $n\left(n^2 - 1\right)$ is always divisible by

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

61. The 8^{th} term of the sequence 1, 1, 2, 3, 5, is

(A) 18 (B) 21
(C) 24 (D) 40

62. A goods train 300 m long, runs at 90 km/hr, crosses a platform 240 m long. The time it takes to cross the platform, is

(A) 18 secs (B) 21 secs
(C) 21.6 secs (D) 30.2 secs

63. The length of a chord which is 3.75 cm away from the centre of a circle with radius 6.25 cm is

(A) 8.2 cm (B) 8.5 cm
(C) 9.5 cm (D) 10 cm

64. A father and a son drive two separate cars. They leave Chennai at the same time. The father drives at an average speed of 50 kmph and the son at 80 kmph. The distance between son and father after 2½ hours is

(A) 50 km (B) 75 km
(C) 85 km (D) 100 km

65. The order of the differential equation $\frac{d^2y}{dx^2}+2a\left(\frac{dy}{dx}\right)^3+y=0$ is

(A) 1 (B) 2
(C) 3 (D) None of the above

66. The differential equation obtained from $y=c_1e^{-2x}+c_2e^{3x}$, by eliminating the arbitrary constants c_1 and c_2 is

(A) $y''+y'+5y=0$ (B) $y''-3y'-5y=0$
(C) $y''+3y'-6y=0$ (D) $y''-y'-6y=0$

67. The solution for the differential equation $\left(x^2 - xy + y^2\right)dx - xy\,dy = 0$ is

(A) $(y-x)\tan\left(\frac{y}{x}\right) = c$ (B) $(y-x)\cot\left(\frac{y}{x}\right) = c$

(C) $(y-x)\exp\left(\frac{y}{x}\right) = c$ (D) $(y-x)\left(\frac{y}{x}\right) = c$

68. The family of solutions for the differential equation $\left(x^2 + 2xy - 4y^2\right)dx - \left(x^2 - 8xy - 4y^2\right)dy = 0$ is

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

(C) $x^2 - 4y^2 = c(x+y)$ (D) $x^2 + y^2 = c(x+y)$

69. The orthogonal trajectories of the family of curves $x^3 = 3(y-c)$ are given by

(A) $xy = k$ (B) $x(y-k) = -1$

(C) $x(y+k) = 1$ (D) $xy + k = 1$

70. The Laplace transform $L(\cosh kt)$ is

(A) $\frac{s}{s^2 + k^2}$ for $s > |k|$ (B) $\frac{s}{s^2 - k^2}$ for $s > |k|$

(C) $\frac{s+k}{s^2 + k^2}$ for $s > |k|$ (D) $\frac{s-k}{s^2 + k^2}$ for $s > |k|$

ENGINEERING MECHANICS

71. Lami's theorem is used to form the equilibrium conditions of number of coplanar concurrent forces.

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

72. Angle of friction and angle of repose are

(A) equal
(B) unequal
(C) unrelated quantities
(D) any two angles related to friction

73. Moment of inertia is calculated as the moment of mass with respect to the axis of rotation.

(A) first (B) second
(C) third (D) fourth

74. The moment of inertia of a circular plate of mass 'M' and radius 'r' with respect to an axis passing through its centre and perpendicular to its plane is

(A) $\frac{Mr^2}{2}$ (B) $\frac{Mr^2}{4}$
(C) $\frac{Mr^2}{8}$ (D) Mr^2

75. The product of inertia with respect to a pair of principal axes in a body is

(A) negative (B) positive
(C) zero (D) non-existent

76. A ball dropped from the top of a tower reaches the ground in 6 seconds. The height of the tower is

(A) 1.7658 m (B) 17.658 m
(C) 176.58 m (D) 1765.8 m

77. The greatest height reached by a projectile with initial velocity V_0 and angle of projection α is

(A) $\frac{V_0^2 \sin^2 \alpha}{2g}$ (B) $\frac{V_0^2 \cos^2 \alpha}{2g}$
(C) $\frac{V_0^2 \sin 2\alpha}{2g}$ (D) $\frac{2V_0^2 \sin^2 \alpha}{g}$

78. If the distance between two masses is doubled, the gravitational attraction between them of the first and second cases is in the ratio

(A) 1:0.5 (B) 1:1
(C) 1:0.25 (D) 1:2

79. If a spring is stretched by 1.5 cm, its potential energy is 'U' If it is stretched by 4.5 cm, the potential energy stored will be

(A) U (B) $3U$
(C) $9U$ (D) $27U$

80. In a body if the distance between any two points remains unchanged due to the application of external force is known as

(A) deformable body (B) rigid body
(C) solid body (D) fluid

81. Which of the following is a vector quantity?

(A) Energy (B) Momentum
(C) Mass (D) Angle

82. According to law of triangle of forces

(A) three forces acting at a point will be in equilibrium
(B) three forces acting at a point can be represented by a triangle, each side being proportional to force
(C) if three forces acting upon a particle are represented in magnitude and direction by the sides of a triangle taken in order, they will be in equilibrium
(D) if three forces acting at a point are in equilibrium, each force is proportional to the sine of the angle between other two

83. D' Alembert's principle is used for

(A) reducing the problem of kinetics to equivalent statics problem
(B) stability of floating bodies
(C) determining stresses in the truss
(D) designing safe structures

84. The product of either force of couple with the arm of the couple is called

(A) resulting couple
(B) moment of the couple
(C) moment of the forces
(D) resultant couple

85. Centre of gravity of a solid cone lies on the axis at the height of

(A) one-half of the total height above base
(B) three-eighth of the total height above the base
(C) one-third of the total height above base
(D) one-fourth of the total height above base

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

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

87. The centre of gravity of a triangle lies at the point of

(A) intersection of diagonals
(B) intersection of bisector of angles
(C) concurrence of the medians
(D) intersection of its altitudes

88. From a circular plate of diameter 6 cm, a circle is cut out, whose diameter is the radius of the plate. Find the C.G. of the remainder from the centre of circular plate

(A) 0.5 cm (B) 1.0 cm
(C) 1.5 cm (D) 2.5 cm

89 The coefficient of friction depends on

(A) strength of surfaces (B) nature of surface
(C) shape of surfaces (D) area of contact

90. The ratio of limiting friction and normal reaction is known as

(A) angle of friction (B) coefficient of friction
(C) friction resistance (D) angle of repose

91. On the ladder resting on the ground and leaning against a smooth vertical wall, the force of friction will be

(A) perpendicular to the wall at its upper end
(B) zero at its upper end
(C) downwards at its upper end
(D) upwards at its upper end

92. A body of weight W on an inclined plane of $\propto$ being pulled up by a horizontal force P will be on the point of motion up the plane when P is equal to

(A) W (B) W sine $(\propto+\phi)$
(C) W tan $(\propto-\phi)$ (D) W tan $(\propto+\phi)$

93. A particle moves along a straight line such that distance (x) traversed in t seconds is given by $x = t^2 (t - 4)$. The acceleration of the particle will be given by the equation

(A) $3t^2 - 2t$ (B) $6t - 8$
(C) $3t^2 + 2t$ (D) $6t - 4$

94. The escape velocity from the surface of the Earth is approximately equal to

(A) 9.81 km/sec (B) 11.2 km/sec
(C) 14 km/sec (D) None of the above

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

(A) 30° (B) 60°
(C) 45° (D) 36°

96. Tangent of angle of friction is equal to

(A) angle of repose (B) limiting friction
(C) kinetic friction (D) coefficient of friction

97. The effort required to lift a load W on a screw jack with helix angle α and angle of friction ϕ is equal to

(A) $W \tan(\alpha+\phi)$ (B) $W \tan(\alpha-\phi)$
(C) $W(\sin\alpha+\cos\phi)$ (D) $W \sin(\alpha-\phi)$

98. A body moves from rest with a constant acceleration of 5 m per sec^2 The distance covered in 5 sec is most nearly

(A) 38 m (B) 96 m
(C) 62.5 m (D) 124 m

99. If n = number of members and j = number of joints, then for a perfect frame, n =

(A) j –2 (B) 2j–3
(C) 2j–l (D) 3j–2

100. The C.G. of a right circular solid cone of height h lies at which of the following distance from the base?

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

101. The M.I. of hollow circular section about a central axis perpendicular to section as compared to its M.I. about horizontal axis is

(A) same (B) half
(C) double (D) four times

102. In ideal machines

(A) mechanical advantage is greater than velocity ratio
(B) mechanical advantage is less than velocity ratio
(C) mechanical advantage is equal to velocity ratio
(D) mechanical advantage is unity

103. A cable with a uniformly distributed load per horizontal metre run will take the following shape

(A) straight line (B) parabola
(C) hyperbola (D) elliptical

104. Impulse is defined as

(A) mass × velocity (B) mass acceleration
(C) force × time (D) force × distance

105. A body of mass m moving with a constant velocity v hits another body of same mass at rest and sticks to it. The resultant velocity of the bodies together will be equal to

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

106. Periodic time of a particle moving with simple harmonic motion is the time taken by the particle for

(A) complete oscillation (B) half oscillation
(C) quarter oscillation (D) None of the above.

107. For a particle moving with a simple harmonic motion, the frequency is

(A) directly proportional to its angular velocity
(B) inversely proportional to its angular velocity
(C) inversely proportional to periodic time
(D) directly proportional to periodic time

108. A stone falls from the top of a building 200 m high and at the same time another is projected vertically upwards with a velocity of 50m/sec. Then the two will meet

(A) after 1 sec (B) after 2 sec
(C) after 4 sec (D) after 5 sec

109. When a body falls freely under gravitational force, it possesses

(A) no weight (B) minimum weight
(C) no effect on its weight (D) maximum weight

110. A 10 cm diameter wheel is rotating at 420 rpm. Its angular speed in radians/sec is equal to

(A) 42 (B) 44
(C) 84 (D) 420

ENGINEERING GRAPHICS

111. A line is perpendicular to VP. Which statement is true?

(A) Front view is a point
(B) Top view is true length
(C) Side view is true length
(D) All of the above

112. When a line is parallel to both HP and VP

(A) side view give true length
(B) only top view give true length
(C) only front view give true length
(D) both front and top views give true length

113. There is a straight railway line 20 km long with slope of 20° connecting Palakkad to Valayar. Another straight railway line 25 km long connects Valayar and Coimbatore which are in the same level. If Valayar is exactly to the eastern side of Palakkad, and Coimbatore is at 30° east of north with respect to Valayar, what is the slope of the newly proposed straight railway line connecting Palakkad to Coimbatore?

(A) 20°
(B) $< 20°$
(C) $> 20°$
(D) 0°

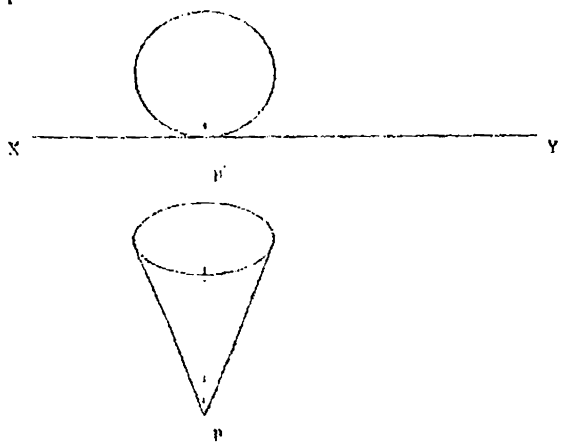
114. A line AB of length 10 cm measures 7.2 cm in the top view and 8.1 cm in the front view. What is the inclination of the line AB to VP?

(A) 44°
(B) 46°
(C) 36°
(D) 54°

115. Triangle ABC is lying on HP. If the corner C is lifted with AB remaining on HP, the top view of the path of corner C is

(A) circle with AC as radius and A as centre
(B) circle with BC as radius and B as centre
(C) circle with radius equal to the length of the line connecting C to the centre of AB
(D) line drawn through C perpendicular to side AB

116. The drawings represent the top view and front view of a cone in I quadrant. Which statement about the cone is true?



(A) Lying on HP on a generator which is perpendicular to VP
(B) Lying on a HP on a generator with the plane containing that generator and axis perpendicular to HP
(C) Lying on a HP on a generator with the plane containing the axis and generator perpendicular to VP
(D) All of the above

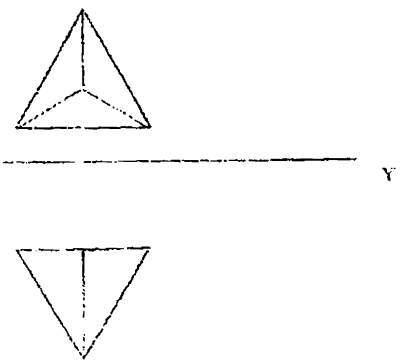
117 Four spheres of diameter "d" rest on the ground with each one touching the other two such that their centres lie at the corners of a square. What is the diameter of the sphere that can just remain in the gap (without falling down) formed by the four spheres?

(A) d (B) d/2
(C) 0.414 d (D) 1.414 d

118. A cylinder 50 mm diameter and 70 mm height stands on HP on a point of its base circle with the generator containing this point making 40° to HP and 35° to VP. What is the inclination of the axis to VP?

(A) 40° (B) 35°
(C) $< 45°$ (D) $> 35°$

119. Which statement is true for the tetrahedron given here?

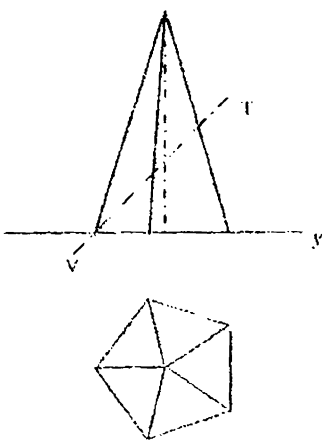


(A) One triangular face is parallel to HP
(B) One triangular face is parallel to VP
(C) Base is on VP
(D) Base is on HP

120. A cone 102 mm diameter and 100 mm axis is lying on HP on one of its generators which is perpendicular to VP. What is the inclination of the axis to HP?

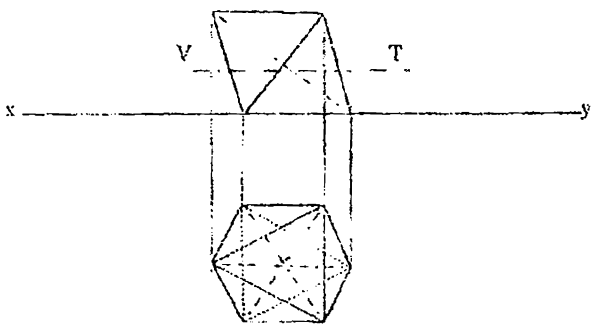
(A) 30° (B) 60°
(C) 27° (D) 54°

121 Front and top views of a pentagonal pyramid are given. When it is cut by a cutting plane as shown, what is the true shape of section obtained?



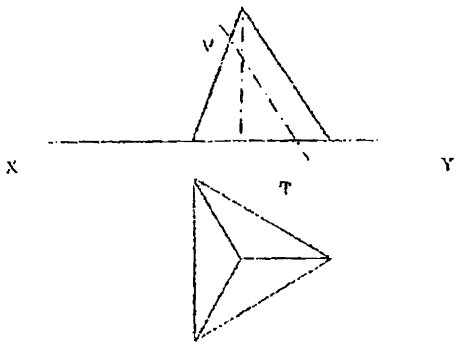
(A) Regular pentagon
(B) Irregular pentagon
(C) Triangle
(D) Square

122. An octahedron is cut by a section plane as shown. What is the true shape of section?



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

123. A tetrahedron resting on HP as shown is cut by a cutting plane. What is the true shape of section?



(A) Square
(B) Triangle
(C) Rectangle
(D) Parallelogram

124. The front view of station point lies on

(A) ground line
(B) horizon line
(C) picture plane
(D) line of heights

125. Isometric projection of a circle of 80 mm diameter is an ellipse with

(A) 40 mm minor axis
(B) 80 mm major axis
(C) (80×0.815) mm major axis
(D) $(80/0.8915)$ mm major axis

126. A length of 2.5 km is represented by a line of length 10 mm in a drawing. What is the scale?

(A) 10 : 2.5
(B) 25 : 100
(C) 1 : 250000
(D) 1 : 2500

127 A plain scale is drawn with length 20 cm and its RF is 1: 25. What is the maximum distance that can be measured using this scale?

(A) 20 m (B) 25 m
(C) 2.5 m (D) 5 m

128. In a diagonal scale, the unit on the left side is meter. The height is divided into 20 equal parts and marked 0,5,10,15,20... upto 100. What is the smallest distance that can be represented on this scale?

(A) 1 decimeter (B) 1 centimeter
(C) 5 decimeter (D) 5 centimeter

129. A ball is thrown from the ground and it just passes over a tree 5 m tall and falls to the ground tracing a parabolic path. The focus of the curve is on the ground itself. What is the size of the rectangle in which the curve can be drawn?

(A) 5m×5m (B) 5m×10m
(C) 5m×20m (D) 5m×25m

130. Length of transverse axis of a hyperbola is

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

131. The curve traced out by a point on a straight line which rolls on a circle without slipping is called

(A) cycloid (B) epicycloids
(C) hypocycloid (D) involute

132. Projection of an object shown by three views is known as

(A) perspective (B) isometric
(C) oblique (D) orthographic

133. The recommended symbol for indicating the angle of projection shows two views of the frustum of a

(A) square pyramid (B) triangular pyramid
(C) cone (D) any of these

134. The profile of a gear teeth is in the form of

(A) parabola (B) involute
(C) spiral (D) helix

135. The curve generated by a point on the circumference of a circle, which rolls without slipping along outside of another circle is known as

(A) Hypocycloid (B) Epicycloid
(C) Cycloid (D) Trochoid

136. If the Vertical Trace (V.T.) of a line lies 30 mm above XY, then its position will be

(A) 30 mm infront of V.P. (B) 30 mm behind V.P.
(C) 30 mm above H.P. (D) 30 mm below H.P.

137. Which of the following object gives a circular section, when it is cut completely by a section plane (irrespective of the angle of the section plane)?

(A) Cylinder (B) Sphere
(C) Cone (D) Circular lamina

138. Comparative scale is a pair of scale having common

(A) units (B) representative fraction
(C) length of scale (D) least count

139. Which type of solid has two bases that are parallel equal polygons?

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

140. The solid having a polygon for a base and triangular lateral faces intersecting at a vertex is

(A) pyramid (B) prism
(C) cone (D) torus

141. Which types of projectors converge at a vanishing point?

(A) Perspective (B) Parallel
(C) Orthographic (D) Oblique

142. Isometric view of a sphere is always

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

143. The shape of the section obtained, when a cone is cut by a plane inclined to the axis is

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

144. A plain curve generated by a point, which moves in such a way that at any position the sum of its distance from a fixed point is always constant, is known as

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

145. When a point lies in HP, its views from the front will lie

(A) on XY (B) below XY
(C) above XY (D) None of the above

146. When the solid is resting with its base on HP, which view will give the true shape and size of the base?

(A) Front view (B) Top view
(C) Side view (D) Isometric view

147. Which geometrical shape has to be rotated in order to get a cylinder?

(A) Right angle triangle (B) Semicircle
(C) Cone (D) Rectangle

148. The angle between isometric axes is

(A) 30° (B) 45°
(C) 60° (D) 120°

149. If two lines are inclined at 90 degree in the orthographic view, what will be its inclination in isometric view?

(A) 30° (B) 120°
(C) 60° (D) 45°

150. Centre of vision is a point on the

(A) axis of vision
(B) picture plane
(C) horizon line
(D) axis of vision, picture plane and horizon line

GENERAL ENGINEERING

151. The frog of the brick in brick masonry is generally kept on

(A) bottom face (B) top face
(C) shorter side (D) longer side

152. Quick lime is
i) slow in setting ii) rapid in slacking iii) good in strength
The correct answer is

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

153. Three basic raw materials which are needed in large quantities for production of steel are

(A) iron ore, coal and sulphur
(B) iron ore, carbon and sulphur
(C) iron ore, coal and lime stone
(D) iron ore, carbon and lime stone

154. A mortar joint in masonry which is normal to the face of the wall is known as

(A) bed joint (B) wall joint
(C) cross joint (D) bonded joint

155. The correction of sag is

(A) always additive
(B) always subtractive
(C) always zero
(D) sometimes additive and sometimes subtractive

156. A series of closely spaced contour lines represent a

(A) steep slope (B) gentle slope
(C) uniform slope (D) plane surface

157. When the concrete mix is too wet, it causes

(A) segregation (B) low density
(C) excess laitance at the top (D) All of the above

158. The process of mixing clay, water and other ingredients to make bricks is known as

(A) tempering (B) pugging
(C) kneading (D) moulding

159. Theodolite is an instrument used to measure

(A) horizontal angles only
(B) vertical angles only
(C) horizontal and vertical angles
(D) linear measurements

160. In M20, 20 stands for

(A) crushing strength
(B) tensile strength
(C) characteristic compressive strength
(D) None of the above

161. The zeroth law of thermodynamics defines

(A) pressure
(B) temperature
(C) enthalpy
(D) internal energy

162. Isothermal and adiabatic processes become identical at

(A) the saturation temperature
(B) the critical point
(C) the triple point
(D) the absolute zero

163. The first law of thermodynamics refers to the conservation of

(A) momentum
(B) mass
(C) energy
(D) force

164. In a Carnot cycle the addition and rejection of heat takes place at a

(A) constant pressure
(B) constant volume
(C) constant temperature
(D) constant enthalpy

165. The critical temperature of steam is

(A) 373K
(B) 347.15°C
(C) 374.15°C
(D) 409°C

166. The Clapeyron equation is used to determine the

(A) dryness fraction of steam
(B) total heat of saturation of steam
(C) entropy of superheated vapour
(D) specific volume of steam at any temperature and pressure

167. The Otto cycle normally operates with a compression ratio in the range

(A) 6 – 10 (B) 10 – 15
(C) 2 – 4 (D) 15 – 20

168. Knocking in CI engines takes place

(A) at the onset of combustion
(B) at the end of combustion
(C) at almost halfway the combustion is complete
(D) None of the above

169 The state of the steam at the outlet of the condenser in the Rankine cycle has a dryness fraction of

(A) 1 (B) 0.5
(C) any value between 0 and 1 (D) zero

170. Rankine cycle efficiency of a good steam power plant may be in the range of

(A) 15–20% (B) 35–45%
(C) 70–80% (D) 90–95%

171. At any instant the algebraic sum of currents meeting at a junction is zero. This is called

(A) KVL (B) KCL
(C) Faraday's law (D) Coulomb's law

172. Unit of reluctance is

(A) Wb/A
(B) Ω
(C) Ω^{-1}
(D) A/Wb

173. Slow and continuous rotation of energy meter disc when the load current is zero and voltage coil is energised is called

(A) crawling
(B) vibration
(C) creeping
(D) no load rotation

174. According to Faraday's law, magnitude of induced emf is

(A) directly proportional to rate of change of flux linkage
(B) directly proportional to rate of change of current
(C) inversely proportional to rate of change of current
(D) inversely proportional to rate of change of flux linkage

175. An alternating voltage is given by v= 20 sin 157 t. The frequency of alternating voltage is

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

176. Power factor is

(A) lagging for a capacitive circuit
(B) leading for an inductive circuit
(C) unity for an RLC circuit
(D) unity for a resistive circuit

177. Active power in a purely inductive circuit is

(A) maximum
(B) zero
(C) minimum
(D) unity

178. Unit of mmf is

(A) Ampere turns (B) Wb/m
(C) A/m (D) Tesla

179. In a star connected network

(A) $3V_{phase} = V_{line}$; $I_{phase} = I_{line}$
(B) $\sqrt{3}\ V_{phase} = V_{line}$; $I_{phase} = I_{li}$
(C) $V_{phase} = V_{line}$; $\sqrt{3}\ I_{phase} = I_{line}$
(D) $V_{phase} = V_{li}$; $3I_{phase} = I_{li}$

180. The reactive power is given by

(A) $VI\cos\theta$ (B) VI
(C) $VI\sin\theta$ (D) IR

181. A superhetrodyne radio receiver with an intermediate frequency of 455kHz is tuned to a station operating at 1200kHz. The associated image frequency is

(A) 900 kHz (B) 1655 kHz
(C) 2110 kHz (D) 745 kHz

182. In a bipolar transistor at room temperature, if the emitter current is doubled the voltage across its base-emitter junction

(A) doubles (B) halves
(C) increases by about 20 mV (D) decreases by about 20 mV

183. Crossover distortion behavior is a characteristic of

(A) Class A output stage (B) Class B output stage
(C) Class AB output stage (D) Common- Base output stage

184. n-type silicon is obtained by doping silicon with

(A) germanium (B) aluminium
(C) boron (D) phosphorus

185. The mass-action law in semiconductors states that at thermal equilibrium, with usual notation

(A) n / p is a constant (B) $n.p = n_i^2$
(C) $n > n_i^2 / p$ (D) $n < n_i^2 / p$

186. The Fermi level of an n-type semiconductor lies

(A) near the conduction band edge
(B) near the valence band edge
(C) at the middle of forbidden gap
(D) None of the above

187. Capacitive transducers are normally used for

(A) static measurements
(B) dynamic measurements
(C) both static and dynamic measurements
(D) transient measurements

188. A transducer converts

(A) mechanical energy into electrical energy
(B) mechanical displacement into electrical signal
(C) electrical energy into mechanical energy
(D) one form of energy into another form of energy

189. In a megger, the controlling torque is provided by

(A) spring (B) gravity
(C) coil (D) eddy current

190. A Darlington pair is used for

(A) low distortion
(B) high frequency range
(C) high power gain
(D) high current gain

191. The size of a computer memory is specified in

(A) GHz
(B) bits/second
(C) M bytes
(D) None of the above

192. A pen drive can be considered as a

(A) storage device
(B) storage device and an I/O unit
(C) primary memory
(D) CPU

193. An operating system is

(A) an application software
(B) a middleware
(C) a system software
(D) None of the above

194. The function of a compiler is to

(A) check for logical errors
(B) check for run time errors
(C) execute the program
(D) translate a high level language into machine language

195. In star topology of networks, devices are connected via a centralized network component known as

(A) node
(B) bus
(C) client
(D) hub

196. The four different storage classes in C are

(A) integer, float, character, static
(B) auto, extern, static, register
(C) auto, extern, intern, float
(D) None of the above

197. What will be the output of the following program?

```
Main()
{
  int x=10, y=5, p,q;
  p=x>9;
  q=x>3 && y!=3;
  printf ("p=%d q=%d "  p,q);

}
```

(A) p=0 q=0 (B) p=0 q=1
(C) p=1 q=0 (D) p=1 q=1

198. A ' C' function

(A) has exactly one return statement
(B) has many return statements
(C) has no return statement
(D) may or may not have a return statement

199. In a while loop, the statements in the while block

(A) will be executed once irrespective of the condition
(B) will be executed only if the condition is satisfied
(C) will not be executed at all
(D) will always be executed

200. The elements of an array in C

(A) should be of the same data type
(B) may be of different data types
(C) should be integers
(D) should be characters

***