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ROLL No.

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TEST BOOKLET No.

0683

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. Please do your rough work only on the space provided for it 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 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.

SEAL



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**TEST FOR LATERAL ENTRY TO B.TECH. DEGREE PROGRAMMES**

**ENGLISH**

**Direction: (Q. Nos. 1 and 2) Choose the word which is most similar in meaning to the word given below.**

1. obliging

- (A) loving (B) kind  
(C) considerate (D) willing to help

2. fiction

- (A) drama (B) imagination  
(C) stories (D) a work of art

**Direction: (Q. Nos. 3 and 4) Choose the word which is most opposite in meaning to the word given below.**

3. prejudice

- (A) liking (B) impartiality  
(C) kindness (D) consideration

4. fidelity

- (A) love (B) hatred  
(C) cruelty (D) disloyalty

**Direction: (Q. Nos. 5 and 6) Select the most suitable meaning for the following sayings.**

5. Marry in haste, repent at leisure

- (A) Marry after proper thinking  
(B) A marriage which is not preplanned will be unsuccessful  
(C) A hasty marriage leads to a lot of problems which will make one repent one's hasty action later  
(D) All hasty marriages end up as failures



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6. Life is not a bed of roses.

- (A) Life is not a bed filled with rose petals
- (B) Life is not as sweet as sweet scented rose flowers
- (C) Human life is not a difficult one
- (D) Human life is a mixture of difficulties and pleasures

**Direction: (Q. Nos. 7 and 8) Pick out the mistaken parts from the following sentences.**

7. Five engineering students, alleging to be members of a hi tech cyber hacking gang  
A B  
were arrested by the Special Task Force.  
C D

8. I can definitely win an election at anywhere  
A B  
but I am a businessman.  
C D

**Direction: (Q. Nos. 9 – 11) Fill in the blanks with the correct question tags.**

9. Let us sing a song, .....?

- (A) can we
- (B) shan't we
- (C) may we
- (D) shall we

10. Something is better than nothing, .....?

- (A) is it
- (B) was it
- (C) isn't it
- (D) wasn't it

11. My daughter dances well, .....?

- (A) has she
- (B) hasn't she
- (C) does she
- (D) doesn't she



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**Direction: (Q. Nos. 12 and 13) Select the correct feminine gender form for the following.**

12. duke

- (A) lady (B) duchess  
(C) princess (D) madam

13. monk

- (A) abbess (B) nun  
(C) priestess (D) sister

**Direction: (Q. Nos. 14 and 15) Select the correct sentence for the following.**

14. I congratulate you at your success.

- (A) I congratulate you in your success  
(B) I congratulate you about your success  
(C) I congratulate you on your success  
(D) I congratulate you for your success

15. A film star's photo was hanged on the wall.

- (A) A film star's photo was put on the wall  
(B) A film star's photo was set on the wall  
(C) A film star's photo was kept on the wall  
(D) A film star's photo was hung on the wall

**Direction: (Q. No. 16) Select the correct form of active voice for the following.**

16. Let the door be closed.

- (A) You close the door (B) Close the door  
(C) He may close the door (D) Anyone can close the door



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**Direction: (Q. Nos. 17 and 18) Select the correct form of passive voice for the following.**

17. The policeman will find out the purse hidden in her suitcase.
- (A) The purse hidden in her suitcase will be found out by the policeman
  - (B) The purse hidden in her suitcase will be found
  - (C) The purse hidden in her suitcase can be found by the policeman
  - (D) The purse hidden in her suitcase would be found out by the policeman
18. That millionaire buys a new car every month.
- (A) A new car was bought by that millionaire every month
  - (B) A new car has been bought by that millionaire every month
  - (C) A new car is bought by that millionaire every month
  - (D) A new car may be bought by that millionaire every month

**Direction: (Q. Nos. 19 and 20) Fill in the blanks with suitable choices given below.**

19. The penalty ..... treachery is death.
- |         |        |
|---------|--------|
| (A) for | (B) to |
| (C) in  | (D) of |
20. He told..... to read a lot.
- |           |                 |
|-----------|-----------------|
| (A) to me | (B) myself      |
| (C) me    | (D) to everyone |

### MATHEMATICS

21. Given  $\sin 2x \cdot \cos 2x = \cos 2x \cdot \cos 3x$ , one of the allowed values of  $x$  is
- |             |             |
|-------------|-------------|
| (A) 18 deg. | (B) 30 deg. |
| (C) 36 deg. | (D) 65 deg. |



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22. Three points A, B, C are said to be collinear if and only if
- (A) the area of the triangle  $ABC \neq 0$
  - (B) slope of AB = slope of BC
  - (C) sum of any two distances is equal to the third
  - (D) they lie of the surface of a sphere.
23. The value of  $\exp(i\pi)$  is
- (A) 0
  - (B) 1
  - (C) -1
  - (D)  $\pi$
24. If  $x, y, z, a, b, c$  are real and satisfy the conditions:  $xy = a, xz = b, yz = c$ , then  $x^2 + y^2 + z^2$  is equal to
- (A)  $[(ab)^2 + (bc)^2 + (ca)^2] / abc$
  - (B)  $abc / [(ab)^2 + (bc)^2 + (ca)^2]$
  - (C)  $[a^2 + b^2 + c^2] / abc$
  - (D)  $abc / [a^2 + b^2 + c^2]$
25. A number when divided by 899 gives a remainder 63. The remainder of the number divided by 29 is
- (A) 18
  - (B) 5
  - (C) 19
  - (D) 21
26. The largest positive integer  $n$  satisfying  $n^{200} < 6^{300}$  is
- (A) 18
  - (B) 5
  - (C) 14
  - (D) 21
27. Among the prime numbers below 100, the number of primes having 7 as the unit digit is
- (A) 8
  - (B) 9
  - (C) 7
  - (D) 6
28. The least possible value of  $21x + 14y$ , if  $xy = 6$  and  $y > 0$  is
- (A) 48
  - (B) 84
  - (C) 96
  - (D) 128



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29.  $(3x^2 + 8x + 6)^n - (x + 2)^n$  is divisible by
- (A)  $3x + 4$  for all positive integers  $n$   
(B)  $x + 2$  for all positive integers  $n$   
(C)  $3x^2 + 9x + 6$  for some positive integer  $n$   
(D)  $x + 4$  for some positive integer  $n$
30. Given that  $m$  and  $n$  are real numbers greater than 1, which of the following is the greatest?
- (A)  $\frac{m}{n-1}$  (B)  $\frac{2m}{2n-1}$   
(C)  $\frac{2m}{2n+1}$  (D)  $\frac{3m}{3n-1}$
31. The determinant of a rectangular  $m \times n$  matrix  $M = (a_{mn})$
- (A)  $= (a_{nm})$  (B) does not exist  
(C)  $= M^{-1}$  (D)  $= |M^1|$
32. Given the position vector  $i e^{-3t} + j 2 \sin 3t$  of a particle, the magnitude of its velocity at  $t = 0$  is
- (A)  $\sqrt{5}$  (B) 1  
(C) 3 (D)  $3\sqrt{5}$
33. Given  $P = 2\vec{i} - 3\vec{j} - \vec{k}$  and  $Q = \vec{i} + 4\vec{j} - 2\vec{k}$ , their cross product is
- (A)  $3\vec{i} + \vec{j} - 3\vec{k}$  (B)  $10\vec{i} + 3\vec{j} + 11\vec{k}$   
(C)  $1\vec{i} - 7\vec{j} - 3\vec{k}$  (D)  $\vec{0}$
34. What is the next term in the series 1,1,2,3,5,8,13,21,34,55,89, ...?
- (A) 144 (B) 123  
(C) 134 (D) 145



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35. The maxima of  $f(x) = x^3(x-1)^2$  occurs at  $x =$
- (A) 0 (B) 4/5  
(C) 1 (D) 3/5
36. The value of the function  $f(x) = (2-x)^3 / (2-2x)$  at its minima is
- (A)  $\frac{27}{8}$  (B)  $\frac{9}{4}$   
(C) 0 (D)  $\frac{4}{5}$
37. The function  $f(x) = \exp(-x^2)$
- (A) is always increasing (B)  $f(x) \rightarrow 1$  as  $x \rightarrow +\infty$   
(C) is always decreasing (D)  $f(x) \rightarrow 0$  as  $x \rightarrow -\infty$
38. The value of the indefinite integral  $\int \frac{\cos \theta}{\sin \theta} d\theta$  is
- (A)  $\sin \theta + C$  (B)  $\cos \theta + C$   
(C)  $\log |\sin \theta| + C$  (D)  $\log \sin \theta$
39. The value of the indefinite integral  $\int e^{\sin \theta} \cos \theta d\theta$  is
- (A)  $e^{\cos \theta} + C$  (B)  $e^{\tan \theta} + C$   
(C)  $e^{\cot \theta} + C$  (D)  $e^{\sin \theta} + C$
40. The value of the definite integral (between the limits 0 and  $\frac{\pi}{2}$ )
- $\int \frac{\cos \theta}{1 + \sin \theta \sin \theta} d\theta$  is
- (A)  $\pi$  (B)  $\pi/2$   
(C)  $\pi/4$  (D)  $3\pi/4$





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41. Two non-vertical lines are perpendicular to each other if and only if their slopes  $m$  and  $n$  are such that
- (A)  $mn = +1$  (B)  $m + n = 1$   
(C)  $m - n = +1$  (D)  $mn = -1$
42. The second degree equation  $4x^2 + 9y^2 = 36$  represents
- (A) an ellipse with semi-major axis  $a = 3$ , semi-minor axis  $b = 2$   
(B) an ellipse with semi-major axis  $a = 2$ , semi-minor axis  $b = 3$   
(C) a hyperbola with semi-major axis  $a = 3$ , semi-minor axis  $b = 2$   
(D) None of the above
43. The distance between two railway stations is 56 Kms. A train leaves one of the stations and is running at an average speed of 30Kmph, while another starts from the other station and is running at an average speed of 40 Kmph. If they both start at the same time they will cross each other after
- (A) an hour (B) 48 mins.  
(C) 56 mins. (D) 40 mins.
44. The area of an equilateral triangle in which a circle of radius 3 inches is inscribed in
- (A)  $54\sqrt{3}$  (B)  $27\sqrt{3}$   
(C)  $36\sqrt{3}$  (D)  $27\sqrt{2}$
45. The sum of a finite arithmetic sequence is 342. If the mean is 19, the number of terms in the sequence is
- (A) 15 (B) 16  
(C) 17 (D) 18
46. The value of the determinant  $\begin{vmatrix} 2 & -3 & 0 \\ 1 & 1 & -1 \\ 3 & 0 & -1 \end{vmatrix}$  is
- (A) 4 (B) 3  
(C) -4 (D) 0



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47. If  $\vec{A} \cdot (\vec{B} \times \vec{C}) = 0$ , then the vectors  $\vec{A}$ ,  $\vec{B}$  and  $\vec{C}$  are
- (A) collinear (B) coplanar  
(C) orthogonal (D) parallel
48. The domain of definition of the function  $f(x) = \sqrt{x^2 - 1}$  is
- (A)  $(1, \infty)$  (B)  $(-\infty, -1)$   
(C)  $|x| \geq 1$  (D)  $|x| < 1$
49. If  $f(x) = \frac{1}{1-x}$ , then  $f(f(f(x)))$  is
- (A)  $f(x)$  (B) 1  
(C) 0 (D)  $x$
50. If  $y = \log_{10} x$ , then  $\frac{dy}{dx}$  is
- (A)  $\frac{1}{x}$  (B)  $\frac{\log 10}{x}$   
(C)  $\frac{1}{x \log 10}$  (D)  $\frac{x}{\log 10}$
51. If  $g = f^{-1}$  and  $f'(x) = \frac{1}{1+x^2}$ , then  $g'(x)$  is equal to
- (A)  $1+x^2$  (B)  $1+(g(x))^2$   
(C)  $x^2 + g(x)$  (D)  $x^2 + (g(x))^2$
52. If  $f(x) = (\sin^{-1} x) / \sqrt{1-x^2}$ , then  $(1-x^2)f'(x) - xf(x)$  equals
- (A)  $x$  (B) 1  
(C)  $1-x^2$  (D)  $\sin^{-1} x$



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53. If  $u = x^2 + y^2$ ,  $x = r + 3t$ ,  $y = 2r - t$ , then  $\frac{\partial^2 u}{\partial r^2}$  is
- (A) 10 (B) 12  
(C) 16 (D) 32
54. The angle between the curves  $y = \sin x$  and  $y = \cos x$  is
- (A)  $\tan^{-1}(\sqrt{2})$  (B)  $\tan^{-1}(2\sqrt{2})$   
(C)  $\tan^{-1}(\sqrt{3})$  (D)  $\tan^{-1}(3\sqrt{3})$
55. The value of  $\int \frac{dx}{\sin^2 x \cos^2 x}$  is
- (A)  $\tan x + \cot x + c$  (B)  $\tan x - \cot x + c$   
(C)  $\tan x + c$  (D)  $\cot x + c$
56. The value of  $\int_0^{\pi/2} \frac{\sin^2 x}{\sin x + \cos x} dx$  is
- (A)  $\log(\sqrt{2} + 1)$  (B)  $\sqrt{2} \log(\sqrt{2} + 1)$   
(C)  $\frac{1}{\sqrt{2}} \log(\sqrt{2} + 1)$  (D)  $\log(\sqrt{2} + 2)$
57. If  $f(x)$  is differentiable and satisfies  $f(x+y) = f(x) + f(y)$  for all real  $x, y$ , then  $f'(2)$  is
- (A) 2 (B) 0  
(C)  $f'(0)$  (D) 1



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58. The order and degree of the differential equation  $k \frac{d^2 y}{dx^2} = \left(1 + \left(\frac{dy}{dx}\right)^2\right)^{3/2}$  are respectively
- (A)  $\left(2, \frac{3}{2}\right)$  (B) (2, 3)  
(C) (2, 2) (D) (2, 6)
59. The value of  $\int_{-1}^1 |x| dx$  is
- (A) 0 (B) 1  
(C) 2 (D)  $\frac{1}{2}$
60. The differential equation of the family of rectangular hyperbolas  $xy = c^2$  is
- (A)  $xydy + ydx = 0$  (B)  $x^2 dy + y^2 dx = 0$   
(C)  $xydy + dx = 0$  (D)  $xydx + dy = 0$
61. If  $y = \left(x + \sqrt{1+x^2}\right)^n$ , then  $(1+x^2) \frac{d^2 y}{dx^2} + x \frac{dy}{dx}$  is
- (A)  $x^2 y$  (B)  $-x^2 y$   
(C)  $xy$  (D)  $-xy$
62. The line  $t \vec{a} + (1-t) \vec{b}$
- (A) passes through  $\vec{a}$  and  $\vec{b}$   
(B) passes through  $\vec{a}$  and is parallel to  $\vec{b}$   
(C) passes through  $\vec{b}$  and is parallel to  $\vec{a}$   
(D) does not pass through  $\vec{a}$  or  $\vec{b}$



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63. If  $\vec{a}, \vec{b}, \vec{c}$  are position vectors of points  $A, B, C$  in the plane, then the area of the triangle  $A, B, C$  is
- (A)  $\frac{1}{2}|\vec{a} \times \vec{b}|$  (B)  $\frac{1}{2}|\vec{a} \times \vec{b} + \vec{b} \times \vec{c}|$   
(C)  $\frac{1}{2}|\vec{a} \times \vec{b} + \vec{b} \times \vec{c} + \vec{c} \times \vec{a}|$  (D)  $\frac{1}{2}[a, b, c]$
64. Vector product of vectors is
- (A) commutative and associative  
(B) associative but not commutative  
(C) commutative but not associative  
(D) neither associative nor commutative
65. If  $\vec{a} \neq \vec{b}, \vec{b} \neq \vec{c}$  and  $\vec{a} \times \vec{b} = \vec{c} \times \vec{d}, \vec{a} \times \vec{c} = \vec{b} \times \vec{d}$ , then
- (A)  $\vec{a}$  and  $\vec{d}$  are parallel (B)  $\vec{b}$  and  $\vec{c}$  are parallel  
(C)  $\vec{a} - \vec{d}$  is parallel to  $\vec{b} - \vec{c}$  (D)  $\vec{a} - \vec{b}$  is parallel to  $\vec{c} - \vec{d}$
66. If  $G$  is the centroid of a triangle  $ABC$  then  $\vec{GA} + \vec{GB} + \vec{GC}$  is equal to
- (A)  $3\vec{AB}$  (B)  $3\vec{BC}$   
(C)  $3\vec{CA}$  (D) 0
67. If  $|\vec{a}| = |\vec{b}| = 1$  and  $|\vec{a} + \vec{b}| = \sqrt{3}$ , then  $(3\vec{a} - 4\vec{b}) \cdot (2\vec{a} - 5\vec{b})$  is
- (A) 9 (B)  $\frac{29}{2}$   
(C)  $-\frac{29}{2}$  (D) -9



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68. The distance between the parallel planes  $2x - y + 2z + 3 = 0$  and  $4x - 2y + 4z + 5 = 0$  is
- (A) 2 (B) 8  
(C) 10 (D)  $\frac{1}{6}$
69. The condition under which the line  $\frac{x-x_0}{l} = \frac{y-y_0}{m} = \frac{z-z_0}{n}$  is parallel to  $xy$  plane is
- (A)  $l=0$  (B)  $l=m=0$   
(C)  $l=m=n=0$  (D)  $n=0$
70. If  $X = \begin{pmatrix} \log_a a & \log_b b \\ \log_b e & \log_a e \end{pmatrix}$ , then  $\det X$  is
- (A) 1 (B) -1  
(C) 0 (D)  $e$

**ENGINEERING MECHANICS**

71. A force is completely defined when we specify
- (A) magnitude (B) direction  
(C) point of application (D) All of the above
72. Which of the following do not have identical dimensions?
- (A) Momentum and impulse  
(B) Torque and energy  
(C) Kinetic energy and potential energy  
(D) Moment of a force and angular momentum
73. Two non-collinear parallel equal forces acting in opposite direction
- (A) balance each other (B) constitute a moment  
(C) constitute a couple (D) constitute a resultant couple



74. D'Alembert's principle is used for
- (A) reducing the problem of kinetics to equivalent statics problem
  - (B) stability of floating bodies
  - (C) determining stress in the truss
  - (D) solving kinematic problems
75. A framed structure is perfect if it contains members equal to
- (A)  $2n-1$
  - (B)  $n-1$
  - (C)  $2n-3$
  - (D)  $3n-2$
76. The possible loading in various members of framed structures are
- (A) compression or tension
  - (B) shear or tension
  - (C) buckling or shear
  - (D) bending
77. 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 the circular plate.
- (A) 0.5 cm
  - (B) 1.0 cm
  - (C) 1.5 cm
  - (D) 2.5 cm
78. M.I of a thin circular ring of radius  $r$  and mass  $M$  about an axis perpendicular to plane of ring is
- (A)  $Mr^2$
  - (B)  $\frac{2}{3} Mr^2$
  - (C)  $Mr^2/2$
  - (D)  $\frac{2}{5} Mr^2$
79. The ratio of limiting friction and normal reaction is known as
- (A) coefficient of friction
  - (B) angle of friction
  - (C) angle of repose
  - (D) friction resistance
80. Coulomb friction is the friction between
- (A) bodies having relative motion
  - (B) two dry surfaces
  - (C) solids and liquids
  - (D) electrically charged particles



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81. Tangent angle of friction is equal to
- (A) kinetic friction (B) limiting friction  
(C) friction force (D) coefficient of friction
82. The effort required to lift a load  $W$  on a screw jack with helix angle  $\alpha$  and angle of friction  $\phi$  is equal to
- (A)  $W \tan (\alpha + \phi)$  (B)  $W \tan (\alpha - \phi)$   
(C)  $W \cos (\alpha + \phi)$  (D)  $W \sin (\alpha - \phi)$
83. If  $n$  = number of members and  $j$  = number of joints, then for a perfect frame,  $n =$
- (A)  $j - 2$  (B)  $3j - 2$   
(C)  $2j - 3$  (D)  $2j - 1$
84. A flywheel on a motor goes from rest to 1000 rpm in 6 seconds. The number of revolutions made is nearly equal to
- (A) 25 (B) 50  
(C) 100 (D) 250
85.  $y^2 = (9/16)x^2 - 36$  is the equation of a
- (A) circle (B) ellipse  
(C) parabola (D) hyperbola
86. The Moment of Inertia of hollow circular section about a central axis perpendicular to section as compared to its M.I about horizontal axis is
- (A) same (B) double  
(C) half (D) four times
87. Which of the following is the example of lever of first order?
- (A) arm of man (B) pair of scissors  
(C) pair of clinical tongs (D) All of the above





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88. The angle which an inclined plane makes with the horizontal when a body placed on it is about to move down is known as angle of
- (A) friction (B) limiting friction  
(C) repose (D) static friction
89. When  $P$  is the effort and  $W$  is the load, then linear law of machines is given by the relation
- (A)  $W = mP + c$  (B)  $P = mW + c$   
(C)  $W = mP - c$  (D)  $P = c - mW$
90. A man wishes to slide a heavy block over a concrete floor by a rope. At what angle ( $\alpha$ ) the rope should be inclined with the horizontal so that the man has to exert minimum force to pull it ( $\Phi$  = angle of friction)
- (A)  $\alpha > \Phi$  (B)  $\alpha < \Phi$   
(C)  $\alpha = \Phi$  (D) Any angle irrespective of  $\Phi$
91. A body of weight  $W$  is resting at a plane inclined at  $30^\circ$  to the horizontal. If it is attached to a string making an angle of  $60^\circ$  with horizontal, find the tension in the string, if the friction angle is  $30^\circ$ .
- (A) Zero (B)  $W$   
(C)  $2W$  (D)  $W/2$
92. For a machine to be self locking its efficiency should be
- (A) 100% (B) Less than 50%  
(C) More than 67% (D) None of the above
93. The efficiency of a screw jack is maximum when its helix angle  $\alpha$  is equal to
- (A)  $45^\circ - \Phi/2$  (B)  $45^\circ + \Phi/2$   
(C)  $45^\circ - \Phi/4$  (D)  $90^\circ - \Phi$
94. A jet engine works on the principle of conservation of
- (A) energy (B) mass  
(C) angular momentum (D) linear momentum



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95. For perfectly elastic bodies, the value of the coefficient of restitution is
- (A) Zero (B) 1.0  
(C) 0.5 (D) Between 0 and 1
96. The work done by a body in moving down a smooth inclined plane in comparison to being dropped vertically downwards from same height will be
- (A) more  
(B) equal  
(C) less  
(D) depends on slope of inclined plane.
97. A body of mass  $m$  moving with a constant velocity  $v$  hits another body of same mass at rest and sticks to it. The velocity of both together will be equal to
- (A)  $v$  (B)  $2v$   
(C)  $v/2$  (D) Unpredictable
98. A marble ball is rolled on a smooth floor of a room to hit a wall. If the time taken by the ball in returning to the point of projection is twice the time taken in reaching the wall, the coefficient of restitution between the ball and the wall is
- (A) 0.25 (B) 0.50  
(C) 0.75 (D) 1.0
99. Periodic time of a particle moving with simple harmonic motion is the time taken by the particle for
- (A) half oscillation (B) quarter oscillation  
(C) complete oscillation (D) None of the above
100. The force which produces an acceleration of  $1 \text{ m/sec}^2$  in a mass of  $1 \text{ kg}$  is known as
- (A) kg (B) Newton  
(C) Joule (D) erg



101. A body is thrown vertically upwards with a velocity of 980 cm/sec, then the time the body will take to reach the ground will be
- (A) 1 sec (B) 2 sec  
(C) 4 sec (D) 5 sec
102. 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) 210
103. The first law of motion provides the definition of
- (A) acceleration (B) momentum  
(C) energy (D) force
104. When the spring of watch is wound it will possess
- (A) wound energy (B) heat energy  
(C) kinetic energy (D) potential energy
105. A body is moving with a constant speed of 10 m/sec in a circle of radius 10cm, then its angular acceleration will be
- (A) Zero (B) 1 radian/sec<sup>2</sup>  
(C) 10 radians/sec<sup>2</sup> (D) 100 radians/sec<sup>2</sup>
106. A body is thrown up at an angle of 45° with a velocity of 100 m/sec so as to describe a parabola. Its velocity on point of return down will be
- (A) 50 m/sec (B) 100m/sec  
(C) 100/√2 (D) 130m/sec
107. The escape velocity in relation to orbital velocity is
- (A) same (B) 2 times  
(C) 1/√2 times (D) √2 times



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108. If a system in equilibrium consists of six equal concurrent coplanar forces, each force acting in a different direction, then the angle between any pair of forces is
- (A)  $30^\circ$  (B)  $45^\circ$   
(C)  $60^\circ$  (D)  $75^\circ$
109. A body is vibrating at 10 vibrations/sec in SHM of 10 cm amplitude. The maximum velocity in cm/sec will be
- (A)  $100\pi$  (B) 100  
(C)  $200\pi$  (D) 200
110. In seconds pendulum, the pendulum executes
- (A) one beat per second (B) two beats per second  
(C) half beat per second (D) ten beats per second

### ENGINEERING GRAPHICS

111. An oblique line has
- (A) no traces (B) only one trace  
(C) only two traces (D) three traces
112. The section obtained by cutting a right circular cone by a section plane inclined to the axis of the cone and parallel to one of the generators is
- (A) ellipse (B) parabola  
(C) circle (D) hyperbola
113. The perpendicular from any point on a conic to its axis is called
- (A) abscissa (B) vertex  
(C) directrix (D) ordinate
114. .... is a solid bounded by regular planes called faces whose edges are of equal length
- (A) Polyhedra (B) Oblique solid  
(C) Regular polyhedra (D) Octahedron



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115. Find out the scale of drawing if an actual length of terminal strip of 10 mm is represented by 50 mm length on drawing
- (A) 1:5 (B) 10:50  
(C) 50:10 (D) 5:1
116. A rectangular area of 36 square kilometers is represented on a certain map by a similar rectangle area of 1 cm<sup>2</sup>. Its R F value is
- (A) 1/60000 (B) 1/600000  
(C) 1/360000 (D) 1/600
117. One of the engineering applications of parabolic conic section is
- (A) stuffing box (B) channel  
(C) glands (D) suspension bridges
118. State the location of the point, when its front and top views are on the reference line XY
- (A) The point is on both HP and VP  
(B) The point is on HP in front of VP  
(C) The point is on VP above HP  
(D) None of the above
119. The intersection of the horizontal and vertical plane is called
- (A) reference line (B) ground line  
(C) xy-line (D) All of the above
120. State the location of the point, when its front view is on the reference line XY
- (A) The point is on H.P  
(B) The point is on V.P  
(C) The point is on both H.P and V.P  
(D) All of the above
121. If a line is parallel to both reference planes, such a line has
- (A) neither H.T nor V.T (B) horizontal trace on HP  
(C) vertical trace on VP (D) both H.T and V.T on XY line



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122. In first angle projection
- (A) the object is assumed to be in fourth quadrant
  - (B) front view is always below the top view
  - (C) transparent planes are placed in between the object and observer
  - (D) the object lies between the observer and planes of projection
123. If a point divide a line segment in the ratio 1:2, the projection of this point will divide the respective projection of the line segment
- (A) in the same ratio
  - (B) in a ratio 1:4
  - (C) in a ratio 2:1
  - (D) in a ratio 2:1
124. The line which will not appear in true length in projection on to any of the principal planes of projection is called
- (A) oblique line
  - (B) vertical line
  - (C) profile line
  - (D) horizontal line
125. Dimension line in graphics is a
- (A) long chain line
  - (B) continuous thin
  - (C) chain thin double dashed
  - (D) continuous thick
126. When an oblique line is projected on a plane of projection, then the apparent inclination is always
- (A) smaller than the true inclination angle
  - (B) equal to the true inclination angle
  - (C) greater than the true inclination angle
  - (D) half of the true inclination
127. A triangular pyramid will become a ....., if the length of the slant edge is equal to the length of the sides of the base
- (A) octahedron
  - (B) hexahedron
  - (C) tetrahedron
  - (D) dodecahedron
128. The solid generated by the revolution of a right angled triangle about one of its perpendicular sides which is fixed is called
- (A) sphere
  - (B) cone
  - (C) torus
  - (D) cylinder



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129. An octahedron has
- (A) 8 edges (B) 10 edges  
(C) 12 edges (D) 16 edges
130. Right solid is a solid whose axis is ..... to its base or end face
- (A) inclined (B) parallel  
(C) perpendicular (D) bisector
131. When a plane is perpendicular to both the reference planes, its traces are
- (A) parallel to XY (B) perpendicular to XY  
(C) inclined to XY (D) All of the above
132. The front view of the line is a point and the top view is a straight line perpendicular to the reference line when the straight line is
- (A) perpendicular to the vertical plane of projection  
(B) parallel to the vertical plane of projection  
(C) perpendicular to the horizontal plane of projection  
(D) parallel to the horizontal plane of projection
133. The true length of an oblique line is viewed
- (A) always in horizontal plane  
(B) in a plane that makes any angle to the line  
(C) always in vertical plane  
(D) in a plane parallel to the line
134. In perspective projection, horizon is
- (A) the horizontal plane at observer's eye level  
(B) the horizontal plane at ground level  
(C) the vertical plane in front of the viewer  
(D) vertical plane behind the viewer
135. In perspective projection, the imaginary vertical plane that passes through the station point and the centre of vision is called
- (A) ground plane (B) auxiliary ground plane  
(C) picture plane (D) central plane



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136. In orthographic projection, it is assumed that observer is looking at the object from
- (A) a distance which is equal to minimum dimension of the object
  - (B) a distance which is equal to maximum dimension of the object
  - (C) infinite distance
  - (D) finite distance
137. Perspective projection is a method of graphic representation of an object on a plane called
- (A) picture plane
  - (B) vertical plane
  - (C) profile plane
  - (D) auxiliary plane
138. If the principal face of the object viewed is parallel to the picture plane, the perspective formed is called
- (A) angular perspective
  - (B) oblique perspective
  - (C) parallel perspective
  - (D) two point perspective
139. If .....is to be drawn, all dimensions taken should be true lengths except the radius for a sphere
- (A) isometric projection
  - (B) isometric view
  - (C) perspective view
  - (D) multi view
140. Centre of vision is a point on the
- (A) axis of vision
  - (B) picture plane
  - (C) horizon plane
  - (D) All of the above
141. The size of the perspective obtained will be larger when the object is .....the picture plane
- (A) behind
  - (B) in front of
  - (C) top of
  - (D) None of the above
142. What is the ratio of isometric length to the actual length?
- (A)  $2/\sqrt{3}$
  - (B)  $\sqrt{2}/\sqrt{3}$
  - (C)  $\sqrt{2}/3$
  - (D)  $3/\sqrt{2}$





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143. Auxiliary vertical plane is the plane which is
- (A) inclined to both horizontal and vertical plane
  - (B) inclined to horizontal plane but perpendicular to vertical plane
  - (C) inclined to vertical plane but perpendicular to horizontal
  - (D) perpendicular to both horizontal and vertical plane
144. The frustum of a cone is
- (A) the remaining lower portion and removing the top portion of the cone, when the cone is cut by a plane parallel to its base
  - (B) the remaining top portion and removing the lower portion of cone, when cone is cut by a plane parallel to its base
  - (C) the remaining lower portion and removing the top portion of the cone, when the cone is cut by a plane inclined to its base
  - (D) the remaining top portion and removing the lower portion of the cone, when the cone is cut by a plane inclined to its base
145. Isometric drawing of square is
- (A) square
  - (B) rhombus
  - (C) rectangle
  - (D) quadrilateral
146. A circle will appear as a circle in perspective view when the circle is
- (A) perpendicular to picture plane
  - (B) parallel to picture plane
  - (C) parallel to ground plane
  - (D) perpendicular to ground plane
147. To understand a solid, the orthographic projection must have at least
- (A) two views
  - (B) one view
  - (C) three views
  - (D) four views
148. Profile plane is also called a
- (A) auxiliary vertical plane
  - (B) vertical plane
  - (C) horizontal plane
  - (D) auxiliary horizontal plane



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149. In perspective drawing, all vertical lines
- (A) vanishes to a single point
  - (B) represent their respective true lengths
  - (C) will remain vertical
  - (D) will be converted to horizontal lines
150. In perspective projection method, the projectors converge to a point called
- (A) picture point
  - (B) central point
  - (C) horizon point
  - (D) station point

### GENERAL ENGINEERING

151. Quantity of cement required to 1 m<sup>3</sup> of 1:2:4 concrete works out to
- (A) 130 kg
  - (B) 230 kg
  - (C) 330 kg
  - (D) 430 kg
152. 1:2:4 for concrete mix is designated as
- (A) M<sub>12</sub>
  - (B) M<sub>15</sub>
  - (C) M<sub>24</sub>
  - (D) M<sub>124</sub>
153. Thermo Mechanical Treatment (TMT) is given to
- (A) cement
  - (B) machine sand
  - (C) steel
  - (D) concrete
154. Indian Standard Angles (ISA) are specified by
- (A) the length and thickness of the legs
  - (B) the length of leg and weight per meter length
  - (C) weight in kg per meter length of angle
  - (D) weight in ton for 100m length of angle



155. Good quality brick earth should have Alumina, Silica and other materials in the proportion
- (A) 50 : 20 : 30 (B) 20 : 30 : 50  
(C) 1 : 2 : 4 (D)  $1 : \frac{11}{2} : 3$
156. The saving of bricks in Rat Trap bond is
- (A) 10% (B) 20%  
(C) 30% (D) No saving at all
157. Combination mortar is made of
- (A) cement, earth and lime (B) cement, sand and lime  
(C) cement, sand and coarse aggregate (D) clay, sand and lime
158. Height of collimation is related to the RL of
- (A) Bench Mark (B) Change point  
(C) Intermediate point (D) Line of sight
159. Plate Load test is done to determine
- (A) the strength of steel plates  
(B) the bearing capacity of soil  
(C) compressive strength of concrete mix using utm  
(D) load on a pile foundation
160. Bulking of sand increases the volume of sand. So volume of wet sand used for concrete should be
- (A) decreased by 40%  
(B) increased by 40%  
(C) same as dry sand  
(D) double the volume of dry sand
161. 1 bar in SI unit is
- (A)  $1 \times 10^5$  Pa (B) 100kPa  
(C) 0.987atm (D) All of the above



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162. The first law of Thermodynamics deals with
- (A) heat and work
  - (B) quality of energy
  - (C) balance of quantity of energy
  - (D) measurement of energy transfer
163. At the critical point, the temperature of water is equal to
- (A)  $0^{\circ}\text{C}$
  - (B)  $100^{\circ}\text{C}$
  - (C)  $374^{\circ}\text{C}$
  - (D)  $-100^{\circ}\text{C}$
164. A process that does not involve heat transfer is called
- (A) isothermal process
  - (B) isolated process
  - (C) polytropic process
  - (D) adiabatic process
165. During a throttling process
- (A) internal energy remains constant
  - (B) enthalpy of fluid remains constant
  - (C) pressure remains constant
  - (D) temperature remains constant
166. In a thermal power plant, turbine does 10000 kJ of work, pump consumes 10 kJ of work and the boiler receives 30000 kJ of heat. Thermal efficiency of the plant is
- (A) 27%
  - (B) 33.3%
  - (C) 35%
  - (D) 40%
167. Entropy is a function of
- (A) work transfer
  - (B) volume
  - (C) temperature
  - (D) pressure
168. For a given compression ratio among Otto, Diesel and Dual cycles
- (A) Diesel cycle is most efficient
  - (B) Otto cycle is most efficient
  - (C) Dual cycle is most efficient
  - (D) None of the above

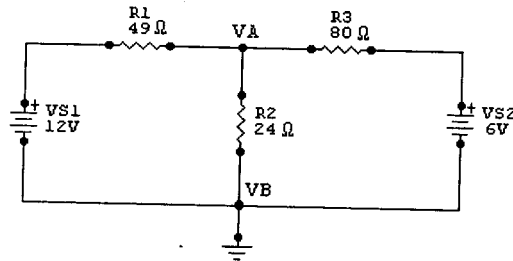


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169. Thermal efficiency of Rankine cycle can be improved by steam
- (A) superheating
  - (B) reheating
  - (C) regeneration
  - (D) None of the above

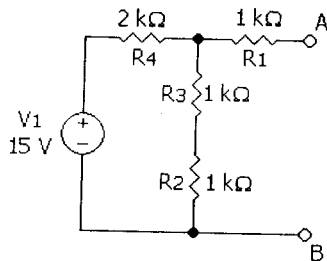
170. The natural draft is produced by
- (A) fan before the furnace
  - (B) fan after the furnace
  - (C) chimney height
  - (D) None of the above

171. Find the node voltage  $V_A$



- (A) 6V
- (B) 12V
- (C) 4.25V
- (D) 3V

172. Thevenin resistance of the circuit across its terminals A and B is ..... ohm



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

173. The kWh meter can be classified as a/an ..... instrument.

- (A) deflecting
- (B) indicating digital
- (C) recording
- (D) indicating



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174. The moving system of an indicating type of electrical instrument is subject to
- (A) a deflecting torque                      (B) a controlling torque  
(C) a damping torque                      (D) All of the above
175. Moving iron instruments can be used for measuring
- (A) direct currents and voltages  
(B) alternating currents and voltages  
(C) radio frequency currents  
(D) Both (A) and (B)
176. A sine wave has a frequency of 50Hz. Its angular frequency is .....  
radian/seconds
- (A)  $50 / \pi$                                       (B)  $50 / 2\pi$   
(C)  $50\pi$                                       (D)  $100\pi$
177. If power factor of a circuit is unity, its reactive power is
- (A) a maximum                              (B) equal to  $I^2R$   
(C) zero                                      (D) a negative quantity
178. If the star connected circuit is transformed into delta connected circuit, which of the following statements is true?
- (A)  $R_a = \frac{R_1R_2 + R_2R_3 + R_1R_3}{R_3}$                       (B)  $R_a = \frac{R_3}{R_1 + R_2}$   
(C)  $R_a = \frac{R_3}{R_1R_2 + R_2R_3 + R_1R_3}$                       (D)  $R_a = \frac{R_1 + R_2 + R_3}{R_1 + R_2}$
179. When the pointer of an analog ohmmeter reads close to zero, the resistor being measured is
- (A) overheated                              (B) shorted  
(C) open                                      (D) reversed



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180. The magnetic reluctance of a material
- (A) increases with increasing cross-sectional area of material
  - (B) decreases with increasing cross-sectional area of material
  - (C) does not vary with increasing cross-sectional area of material
  - (D) does vary from small increase in cross-sectional area of material
181. The type of atomic bonding most common in semi-conductor is
- (A) metallic
  - (B) ionic
  - (C) covalent
  - (D) chemical
182. Which of the following is acceptor impurity element?
- (A) Antimony
  - (B) Gallium
  - (C) Arsenic
  - (D) Phosphorus
183. Once a Zener diode goes into breakdown, its ..... does not change much
- (A) voltage
  - (B) current
  - (C) dynamic impedance
  - (D) capacitance
184. In a bridge rectifier, the lowest ripple frequency is
- (A)  $f/2$
  - (B)  $f$
  - (C)  $2f$
  - (D)  $3f$
- where  $f$  is the frequency of input sinusoid voltage
185. The maximum rectification efficiency in case of half wave rectifier is
- (A) 100%
  - (B) 81.2%
  - (C) 66.6%
  - (D) 40.6%
186. Which of the following metal is not used in making resistance-temperature detectors?
- (A) Copper
  - (B) Platinum
  - (C) Tungsten
  - (D) Nickel



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187. A strain gauge has a
- (A) piezo-electric effect
  - (B) piezo-resistive effect
  - (C) piezo-capacitive effect
  - (D) piezo-inductive effect
188. Which of the following device can measure pressure directly?
- (A) LVDT
  - (B) Strain gauge
  - (C) Rota meter
  - (D) Bourdon tube
189. In AM, power content of the modulated wave is maximum when modulation index equals
- (A) 0
  - (B) 1
  - (C) 0.8
  - (D) 0.5
190. One of the serious disadvantages of FM transmission is its
- (A) high static noise
  - (B) limited line of sight range
  - (C) expensive equipment
  - (D) adjacent channel interference
191. BCD is
- (A) Binary Coded Decimal
  - (B) Bit Coded Decimal
  - (C) Binary Coded Digit
  - (D) Bit Coded Digit
192. In analog computer
- (A) input is first converted to digital form
  - (B) input is never converted to digital form
  - (C) output is displayed in digital form
  - (D) All of the above
193. A pointer is
- (A) a keyword used to create variables
  - (B) a variable that stores address of an instruction
  - (C) a variable that stores address of other variable
  - (D) All of the above





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194. Which of the following cannot be checked in a *switch-case* statement?
- (A) Character (B) Integer  
(C) Float (D) Enum
195. Why do we use the `exit()` method in c?
- (A) To change the method (B) To stop the execution  
(C) To stop compilation (D) None of the above
196. The keyword used to transfer control from a function back to the calling function is
- (A) `switch` (B) `go to`  
(C) `go back` (D) `return`
197. Which of the following is not a correct variable type?
- (A) Double (B) Float  
(C) Int (D) Real
198. What is a Firewall in Computer Network?
- (A) The physical boundary of Network  
(B) An operating System of Computer Network  
(C) A system designed to prevent unauthorized access  
(D) A web browsing Software
199. What is the meaning of Bandwidth in Network?
- (A) Transmission capacity of a communication channel  
(B) Connected Computers in the Network  
(C) Class of IP used in Network  
(D) None of the above
200. What is the use of Bridge in Network?
- (A) To connect LANs (B) To separate LANs  
(C) To control Network Speed (D) All of the above

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