NUST Past Paper – Engineering

Total Time: 3 Hrs Total Question: 200

1. If $\sin^{-1}x + \sin^{-1} y + \sin^{-1}z = 3\pi/2$ then the value of $x^9 + y^9 + z^9 - 1/ x^9 y^9 z^9$ is equal to
   a. 0
   b. 1
   c. 2
   d. 3
2. Let p, q, r be the sides opposite to the angle P,Q.R respectively in a triangle PQR. If r^2 sin P sin Q = pq then the triangle is
   a. Equilateral
   b. Acute angled but not equilateral
   c. Obtuse angled if sin
   d. Right angled
3. Let p, q, and r be sides opposite to the angles P, Q, R respectively in a triangle PQR. Then 2 prsin (P-Q+R/2) equals
   a. $p^2 + q^2 + r^2$
   b. $p^2 + r^2 - q^2$
   c. $q^2 + r^2 - p^2$
   d. $p^2 + q^2 - r^2$
4. Let P (2,-3), Q (-2, 1) be the vertices of the triangle PQR. If the centroid of ΔPQR lies on the line 2x +3y = 1, then the locus of R is
   a. 2x + 3y = 9
   b. 2x - 3y = 9
   c. 3x + 2y = 5
   d. 3x - 2y = 5
5. If n(A) = m, then n(P(A)) =
   a. 2^n
   b. 2n
   c. 2^m
   d. 2m
6. If f is a real-valued differentiable function such that f(x) f'(x) < 0 for all real x, then
   a. F(x) must be an increasing function
   b. F(x) must be an decreasing function
   c. |F(x)| must be an increasing function
   d. |F(x)| must be an decreasing function

7. Role's theorem is applicable in the interval [-2,2] for the function
   a. $F(x) = x^3$
   b. $F(x) = 4x^4$
   c. $F(x) = 2x^3 + 3$
   d. $F(x) = \pi|x|$
8. The solution of $25\, d^2y/dx^2 - 10dy/dx + y = 0$, $y(0) = 1 y(1) = 2e^{1/5}$ is
   a. $y = e^{5x} + e^{-5x}$
   b. $y = (1 + x)\, e^{5x}$
   c. $y = (1 + x)\, e^{x/5}$
   d. $y = (1 + x)\, e^{-x/5}$
9. Let P be the midpoint of a chord joining the vertex of the parabola $y^2 = 8x$ to another point on it. then the locus of P is
   a. $= 2x$
   b. $y^2 = 4x$
   c. $x^2/4 + y^2 = 1$
   d. $x^2 + y^2/4 = 1$
10. the line $x = 2y$ intersects the ellipse $x^2/4 + y^2 = 1$ at the point P and Q. the equation of the circle with PQ as diameter is
    a. $x^2 + y^2 = 1/2$
    b. $x^2 + y^2 = 1$
    c. $x^2 + y^2 = 2$
    d. $x^2 + y^2 = 5/2$
11. the eccentric angle in the first quadrant of a point on the ellipse $x^2/10 + y^2/8 = 1$ at a distance 3 units from the center of the ellipse is
    a. $\pi/6$
    b. $\pi/4$
    c. $\pi/3$
    d. $\pi/2$
12. The transverse axis of a hyperbola is along the x axis and its length is 2a. The vertex of the hyperbola bisects the line segment joining the center and the focus. The equation of the hyperbola is
    a. $6x^2 - y^2 = 3a^2$
    b. $x^2 - 3y^2 = 3a^2$
    c. $x^2 - 6y^2 = 3a^2$
    d. $3x^2 - y^2 = 3a^2$
13. A point moves in such a way that the difference of its distance from two point (8, 0) and (-8, 0) always remains 4. Then the locus of the point is
    a. A circle
    b. A parabola
    c. An ellipse
    d. A hyperbola

14. The number of integer values of m, for which the x coordinate of the point of intersection of the lines 3x + 4y = 9 and y=mx +1 is also an integer is
    a. 0
    b. 2
    c. 4
    d. 1
15. If a straight line passes through the point (α,β) and the portion of the line intercepted between the axes is divided equally at the point, then x/ α + y/ β is
    a. 0
    b. 1
    c. 2
    d. 4
16. The maximum value of |z| when the Complex number z satisfies the condition |z + 2/z| is
    a. $\sqrt{3}$
    b. $\sqrt{3}+\sqrt{2}$
    c. $\sqrt{3+1}$
    d. $\sqrt{3-1}$
17. If $(3/2 + i\sqrt{3}/2)^{56} = 3^{25}$ (x +iy) , where x and y are real, then the ordered pair (x,y) is
    a. (-3,0)
    b. (0,3)
    c. (0,-3)
    d. (½) ($\sqrt{3}$/2)
18. If z-1/z+1 is purely imaginary, then
    a. |z|= ½
    b. |z|=1
    c. |z|=2
    d. |z|=3
19. Then inverse of q → p is ?
    a. p → q
    b. p → q
    c. q→ p
    d. q →p
20. a vehicle registration number consists of 2 letters of English alphabet followed by 4 digits, where the first digit is not zero. Then the total number of vehicles with distinct registration number is
    a. $26^2 \times 10^4$
    b. ${}^{26}p_2 \times {}^{10}p_2$
    c. ${}^{26}p_2 \times 9 \times {}^{10}p_3$
    d. $26^2 \times 9 \times 10^3$

21. The number of the words that can be written using all the letter of the word "irrational" is
    a. $10! / (2!)^3$
    b. $10! / (2!)^2$
    c. $10! /2!$
    d. $10!$
22. Four speakers will address a meeting where speaker Q will always speak after speaker. Then the number of ways in which the order of speakers can be prepared is
    a. 256
    b. 128
    c. 24
    d. 12
23. The number of diagonals in a regular polygon of 100 sides is
    a. 4950
    b. 4850
    c. 4750
    d. 4650
24. Let the coefficients of powers of x in the 2^{nd}, 3^{rd} and 4th terms in the expansion of $(1+x)^n$ where is a +ive integer be in arithmetic progression. Then the sum of the coefficients of odd power of x in the expansion is
    a. 23
    b. 64
    c. 128
    d. 256
25. The sum 1 x 1! + 2 x 2! + ...50 x 50! Equal to
    a. 51!
    b. 51!-1
    c. 51!+1
    d. 51! X 2
26. Six numbers are in AP. Such that their sum is 3 the first term is 4 times the third term. Then the fifth term is
    a. -15
    b. -3
    c. 9
    d. -4
27. The sum of the infinite series 1 + 1/3 + 1.3/1.6 + 1.3.5/3.6.9 + 1.3.5.7/3.6.9.12 + ... Is equal to
    a. $\sqrt{2}$
    b. $\sqrt{3}$
    c. $\sqrt{3/2}$
    d. $\sqrt{1/3}$

28. The equations $x^2 + x + a = 0$ and $x^2 + ax + 1 = 0$ have a common real root
    a. For no value of a
    b. For exactly one value of a
    c. For exactly two value of a
    d. For exactly three value of a
29. If 64, 27, 36, are the P^{th}, Q^{th} and the R^{th} terms of the G.P then P + 2Q is equal to
    a. R
    b. 2R
    c. 3R
    d. 4R
30. The equation $y^2 + 4x + 4y + k = 0$ represents a parabola whose lotus rectum is
    a. 1
    b. 2
    c. 3
    d. 4
31. If the circles $x^2 + y^2 + 2x + 2ky + 6 = 0$ and $x^2 + y^2 + 2ky + k = 0$ intersect orthogonally, then k is equal to
    a. 2 or -3/2
    b. -2 or-3/2
    c. 2 or 3/2
    d. -2 or 3/2
32. If four distinct points(2k,3k),(2,0),(0,3),(0,0) lie on a circle , then
    a. K< 0
    b. 0< K < 1
    c. K = 1
    d. K > 1
33. The line joining a(bcos α, bsin) and B(acos β, asin β) , where a ≠ b, is produced to the point M(x,y) so that AM:MB = b:a. then x cos (α + β/2) +y sin (α + β/2)
    a. 0
    b. 1
    c. -1
    d. $a^2 + b^2$
34. let the foci of the ellipse $x^2/9 + y^2 = 1$ subtend right angle at a point P then the locus of P is
    a. $x^2 + y^2 = 1$
    b. $x^2 + y^2 = 2$
    c. $x^2 + y^2 = 4$
    d. $x^2 + y^2 = 8$

35. the general solution of the differential equation dy /dx =(x+y+1/2x +2y +1) is
    a. Log |3x +3y +2| +3x +6x =c
    b. Log |3x +3y +2| -3x +6x =c
    c. Log |3x +3y +2| -3x -6x =c
    d. Log |3x +3y +2| +3x -6x =c
36. A⊆ B
    a. A ∩ B =A
    b. A ∩ B' =A
    c. A– B =A
    d. A U B =A
37. The value of the integral $\int_0^{\pi/2}$ 1/1 +(tanx)^{101} dx is equal to
    a. 1
    b. π/6
    c. π/8
    d. π/4
38. the integrating factor of the differential equation 3x log x dy/dx +y = 2 log x is given by
    a. log x^3
    b. log (log x)
    c. log x
    d. (log x)$^{1/3}$
39. Number of solutions of the equation tan x + sec x = 2 cos x, x∈ $[0,\pi]$ is
    a. 0
    b. 1
    c. 2
    d. 3
40. The value of the integral $\int_0^{\pi/4}$ sinx + cosx / 3 + sin2x dx is equal to
    a. Log 2
    b. Log 3
    c. ¼ log 2
    d. ¼ log 3
41. Let y= (3^x – 1/3x+1)sinx + log (2 +x) , x >-1 then at x = 0, dy /dx equals
    a. 1
    b. 0
    c. -1
    d. -2
42. Max value of the function f(x) = x/8 + 2/x on the interval [1,6] is
    a. 1
    b. 9/8
    c. 13/12
    d. 17/8

43. A non-empty set on which a binary operation can be defined is called
    a. Group
    b. Semi group
    c. Groupoid
    d. Ableian group
    e. Monoid
44. The value of the integral $\int_{-2}^{2}$ $(1 + 2\sin x)e^{|x|}$ dx is equal to
    a. 0
    b. $e^2 - 1$
    c. $2(e^2 - 1)$
    d. 1
45. If $(\alpha + \sqrt{\beta})$ and $(\alpha - \sqrt{\beta})$ are the roots of the equation $x + px + q = 0$ where α , β,p,q are real then the roots of the equation$(p^2 - 4q)$ $(p^2 x^2 + 4px) - 16q = 0$ are
    a. $(1/\alpha + 1/\sqrt{\beta})and(1/\alpha - 1/\sqrt{\beta})$
    b. $(1/\sqrt{\alpha} + 1/\beta)and(1/\sqrt{\alpha} - 1/\beta$
    c. $(1/\sqrt{\alpha} + 1/\sqrt{\beta})and(1/\sqrt{\alpha} - 1/\sqrt{\beta})$
    d. $(\sqrt{\alpha} + \sqrt{\beta})$ and $(\sqrt{\alpha} - \sqrt{\beta})$
46. The number of solutions of the equation $\log_2(x^2 + 2x - 1) = 1$ is
    a. 0
    b. 1
    c. 2
    d. 3
47. The sum of the series $1 + 1^n/2\,C1 + 1^n/3\,C2 + \ldots\ldots\ldots\ldots + 1^n/n+1Cn$.
    a. $2^{n+1} - 1 / n+1$
    b. $3(2^n-1)/2n$
    c. $2^n+1/ n+1$
    d. $2^n+1/ 2n$
48. The value of $\sum_{r=2}^{\infty} \frac{1 + 2 + 3 + \cdots \ldots . (r-1)}{r!}$ I sequal to
    a. e
    b. 2e
    c. e/2
    d. 3e/2

49. If P = $\begin{vmatrix} 1 & 2 & 1 \\ 1 & 3 & 1 \end{vmatrix}$ $Q=PP^t$, then the value of the determinant of Q is equal to
    a. 2
    b. -2
    c. 1
    d. 0
50. The remainder obtained when 1! +2! +..... +95! Is divided by 15 is
    a. 14
    b. 3
    c. 1
    d. 0
51. If P, Q R, are angles of triangle PQR then the value of $\begin{vmatrix} -1 & \cos R & \cos Q \\ \cos R & -1 & \cos P \\ \cos Q & \cos P & -1 \end{vmatrix}$ is equal to
    a. -1
    b. 0
    c. ½
    d. 1
52. The number of real values of α for which the system of equations $x +3y +5z =\alpha x$, $5x +y+3z =\alpha y$, $3x + 5y + z = \alpha z$ has infinite number of solutions is
    a. 1
    b. 2
    c. 4
    d. 6
53. The total number of injections(one –one into mappings) from {a1,a2,a3,a4} to {b1,b2,b3,b4,b5,b6,b7} is
    a. 400
    b. 420
    c. 800
    d. 840
54. It the set G = {1, ω, ω2} is an abelian group w.r.t multiplication then inverse of ω is?
    a. 1
    b. ω
    c. ω^2
    d. does not contain an inverse
55. Two decks of playing cards are well shuffled and 26 cards are randomly distributed to a player. Then the probability that the player gets all distinct cards o s
    a. $52C_{26} / 104C_{26}$
    b. $2 \times 52C_{26} / 104C_{26}$
    c. $2^{13} \times 52C_{26} / 104C_{26}$
    d. $2^{26} \times 52C_{26} / 104C_{26}$

56. An urn contains * red 5 white balls. Three balls are drawn at random. Then the probability that balls of both colors are drawn is
    a. 40/143
    b. 70/143
    c. 3/13
    d. 10/13
57. Two coin are available, one fair and the other two headed .choose a coin unbiased coin is chosen with probability ¾ given that the outcome is head the probability that the two headed coin was chosen is
    a. 3/5
    b. 2/5
    c. 1/5
    d. 2/7
58. Let R be the set of real numbers and the functions f:R→R and g : R→ R be defined $f(x) = X^2 + 2x -3$ and g(x) =x +1 then the value of x for which f(g(x)) g(f(x)) is
    a. -1
    b. 0
    c. 1
    d. 2
59. If a ,b,c are in arithmetic progression, then the roots of the equation $ax^2-2bx + c =0$ are
    a. 1 and c/a
    b. -1/a and –c
    c. -1 and –c/a
    d. -2 and –c/2a
60. Let γ be the solution of the differential equation $x\, dy/dx = y^2/1-\log x$ satisfying y(1) =1 then γ satisfies
    a. $Y = x^{y-1}$
    b. $Y = x^{y}$
    c. $Y = x^{y+1}$
    d. $Y = x^{y+2}$
61. The area of the region bounded by the curves y = sin -1x + x(1-x) and y = sin -1x –(1-x) in the first quadrant is
    a. 1
    b. ½
    c. 1/3
    d. ¼
62. The value of the integral $\int_1^5 [|x-3| +1-x|]dx$ is equal to
    a. 4
    b. 8
    c. 12
    d. 16

63. If f (x) and g(X) are twice differentiable functions on (0,3) satisfying f"(x) =g"(x), f(1) =4 g(1)=6 f(2) =3 g(2) =9 then f(1)-g(1) is
    a. 4
    b. -4
    c. 0
    d. -2
64. Let (x) denote the greater integer less than or equal to x, then the value of the integral $\int_{-1}^{1}$ [|x| -2[x]]dx is equal to
    a. 3
    b. 2
    c. -2
    d. -3
65. The points representing the complex number z for which arg(z-2/z+2) =π/3 lies on
    a. A circle
    b. A straight line
    c. An ellipse
    d. A parabola
66. Let a, b, c, p, q, r be positive real numbers such that a, b ,c are in G.P and $a^p = b^q = c^r$ then A,B,C
    a. p, q rare in G.P
    b. p, q rare in A.P
    c. p, q rare in H.P
    d. p^2,q^2 and r^2 rare in A.P
67. a compound statement at the form "If p then q " is called
    a. implication
    b. hypothesis
    c. tautology
    d. contingency
68. The quadratic equation $2x^2(a^3 +8a -1)$ x a^2 -4a =0 possesses roots of opposite sign. then
    a. $a \leq 0$
    b. 0<a<4
    c. $4 \leq a < 8$
    d. a≥8
69. if log (x2 -16) $\leq \log(4x - 11)$, $then$
    a. 4<x≤ 5
    b. X< -4 0r x>4
    c. -1≤ $x \leq 5$
    d. X<-1 0r x>5

70. The coefficient of x^{10} in the expansion of $1+(1+x)+\ldots\ldots\ldots\ldots\ldots+(1+x)^{10}$ is
    a. $^{19}C_9$
    b. $^{20}C_{10}$
    c. $^{21}C_{11}$
    d. $^{22}C_{12}$
71. The system of linear equation $\lambda x+ y+ z =3$, $x-y-2z=6$, $-x + y +z =\mu$
    a. Infinite number of solutions for $\lambda \neq -1$ and all μ
    b. Infinite number of solutions for $\lambda = -1$ and all $\mu = 3$
    c. No solution for $\lambda \neq -1$
    d. Unique solution for $\lambda = -1$ and all $\mu = 3$
72. Let A and B be two events with $P(A^c) = 0.3$, $P(B)=0.4$ and $P(A \cap B') = 0.5$ Then $P(B/(AUB'))$ is equal to
    a. ¼
    b. 1/3
    c. ½
    d. 2/3
73. The set of real number is a subset of
    a. Set at natural number
    b. Set of whole number
    c. Set of……..
    d. Set of complex number
74. Let C_1 and C_2 denote the cents of the circles $x^2 + y^2 = 4$ and $(x-2)^2+ y^2 = 1$ respectively and let P and Q be their Points of intersection. Then the area of triangle C_1PQ and C_2PQ are in ration
    a. 3:1
    b. 5:1
    c. 7:1
    d. 9:1
75. A Straight line through the point of intersection of the lines $x +2y =4$ and $2x +y =4$ meet the coordinates axes at A and B the locus of the midpoint of AB is
    a. $3(x + y) = 2xy$
    b. $2(x + y) = 3xy$
    c. $2(x + y) = xy$
    d. $(x\ y) = 3xy$
76. Let P and Q be the points on the parabola $y^2 = 4x$ so that the line segment PQ subtends right angle at the vertex. If PQ intersects the axis of the parabola at R then the distance of the vertex from R is
    a. 1
    b. 2
    c. 4
    d. 6

77. The set {{a , b}} is called
    a. Singleton set
    b. Proper
    c. Overlapping set
    d. Improper set
78. The value of lim x→ ∞ $(n!)^{1/n}/n$ is
    a. 1
    b. $1/e^2$
    c. 1/2e
    d. 1/e
79. The area of the region bounded by the curve y =x3 ,y =(1/x) x=2 is
    a. 2 –log2
    b. ¼ - log2
    c. 3 –log2
    d. 15/4 –log 2
80. Let $f(x) =ax^2 +bx +c$, $g(x) =px^2 + qx +r$ such that f(1) =g(2),f(2) =g(2) and f(3) –g(3) =2.then f(4) – g(4) is
    a. 4
    b. 5
    c. 6
    d. 7
81. If the measuring scale has a least count of 10 kg then in 8000 kg the significant figures are
    a. 4
    b. 1
    c. 3
    d. 0
82. Which one of the following series are observed in the visible region of electromagnetic radiation
    a. Lyman series
    b. Balmer series
    c. Bracket series
    d. Pfunds series
83. The number 1678.9 should be written in scientific notation as
    a. 16.789×10^3
    b. 1.6789×10^3
    c. 1678.9×10^3
    d. None

84. Which one of the following groups has quantities that do not have the same dimensions
    a. Velocity, speed
    b. Pressure, stress
    c. Force, impulse
    d. Work , energy
85. The %age errors in the measurement of mass and speed are 3% and 4% respectively. The maximum error in the measurement of K.E is
    a. 11%
    b. 10 5
    c. 8%
    d. 9%
86. The vector product of two vectors is zero, when
    a. They are parallel to each other
    b. They are equal vectors
    c. They are perpendicular to each other
    d. They are inclined at angle of 60^0
87. In right hand rule, the direction of the product vector will be
    a. Along the thumb erect
    b. Perpendicular to the erect thumb
    c. Along the rotation of fingers
    d. None
88. When an object slides at constant speed down an inclined plane, the coefficient of friction may be approximately be
    a. sinΘ
    b. cos Θ
    c. tan Θ
    d. cot Θ
89. Two forces 3N and ?N are at an angle Θ such that the resultant is R the first force is now increased to 6N and the resultant becomes 2R. the value of Θ is
    a. 30^0
    b. 60^0
    c. 90^0
    d. 120^0
90. Torque acting on a body determines
    a. Acceleration
    b. Linear acceleration
    c. Angular acceleration
    d. Direction of motion of the body

91. If the velocity of a body is uniform the velocity –time graph is a straight line which is
    a. Parallel to x axis
    b. Parallel
    c. At an angle of 45^0 with the x-axis
    d. Along the y-axis
92. At what angle of projection the horizontal range of a projectile is max?
    a. 30^0
    b. 45^0
    c. 60^0
    d. 90^0
93. What will be the ratio of the distance moved by a freely falling body from rest in 4^{th} and 5^{th} second of journey
    a. 4: 5
    b. 7:9
    c. 16:25
    d. 1:1
94. According to the postulates of the theory of relativity, a fourth dimension has been added to the three dimensions already associated with a Cartesian frame of reference. Which is the fourth dimension?
    a. Space
    b. Inertial frame of reference
    c. Speed of light
    d. Time
95. If the water fall from a dam to into a turbine wheel 19.6m below, then the velocity of water at the turbine is (Take g =9.8m/s^2)
    a. 9.8m/s
    b. 19.6 m/s
    c. 39.2 m/s
    d. 98.0 m/s
96. The escape velocity of earth in Km/s
    a. 9.75
    b. 11.2
    c. 12.3
    d. 15.6
97. Which is constant for a satellite in orbit?
    a. Velocity
    b. K.E
    c. Angular momentum
    d. P.E

98. How much water a pump of 2kw can raise in one minute to a height of 10 m, (Take g =10m/s^2)
    a. 1000 liters
    b. 1200 liters
    c. 100 liters
    d. 2000 liters
99. The escape velocity from the earth's surface is 11km/s. A certain planet has a radius twice that of the earth but its mean density is the same as that of the earth. The value of the escape velocity from this planet would be
    a. 24km/s
    b. 11km/s
    c. 5.5km/s
    d. 16.5km/s
100. If force and displacement of particle in the direction of force are doubled. work would be
    a. Double
    b. 4 times
    c. Half
    d. ¼ time
101. An electric motor is required to haul a cage of mass 400kg up a mineshaft through a vertical height of 1200m in 2 minutes. What will be the electrical power required if the overall efficiency is 80%
    a. 3.2kw
    b. 5kw
    c. 32kw
    d. 50kw
102. A couple produces
    a. Purely linear motion
    b. Purely rotational motion
    c. Linear and rotational motion
    d. No motion
103. The units of angular acceleration I s
    a. Radian
    b. Radian per second
    c. Radian per second^2
    d. None
104. Once the space shuttle is in orbit at a radius R from earth's center, what force does the seat exerts on the astronaut?
    a. Mg
    b. Zero newton
    c. M/g
    d. Ng/R^2

105. In which case application of angular velocity is useful?
   a. When body is rotating
   b. When velocity of body is in a straight line
   c. When velocity is in a straight line
   d. None

106. If the area of a circle is equal to its circumference the radius of this circle is
   a. 1
   b. 2
   c. 3
   d. 4

107. Rotational K.E of a disc is
   a. $K.E_{rot} = 1/2\ mv^2$
   b. $K.E_{rot} = 1/3\ mv^2$
   c. $K.E_{rot} = 1/4\ mv^2$
   d. None

108. Which of these statements is not correct
   a. Moment of inertia is independent of shape and size of the body
   b. Moment of inertia depends on choice of axes
   c. Momentum of inertia does not depend on the mass of body
   d. None

109. A particle is moving in a vertical circle. The tensions the string when passing through two positions at angles 30^0 and 60^0 from vertical (lowest positions) are T_1 and T_2 respectively. Then
   a. $T_1 = T_2$
   b. $T_2 > T_1$
   c. $T_1 > T_2$
   d. Tension in the string always remains the same

110. At terminal velocity, fluid friction is
   a. Maximum
   b. Minimum
   c. Zero
   d. Decreasing

111. $v = \sqrt{2g(h1 - h2)}$ *shows the*
   a. Equation of continuity
   b. Bernoulli's theorem
   c. Torricelli's theorem
   d. Equation for compressible fluids

112. With the increase of temperature viscosity
   a. Increase
   b. Decrease
   c. Remain constant
   d. Doubles

113. In case of streamed lined flow of liquid the loss of energy is
   a. Maximum
   b. Minimum
   c. Infinite
   d. Equal to what is in turbulent flow

114. A car engine is based on the principle of
   a. Bernoulli's equation
   b. Ventura relation
   c. Torricelli's theorem
   d. None

115. When a beam of light traveling in a rare medium is reflected from a denser medium it
   a. Suffers no phase change
   b. Undergoes a phase change of 180^0
   c. Undergoes a phase change of 270^0
   d. Undergoes a phase change of 90^0

116. Two water pipes of diameters 4 cm and 8 cm are connected with a supply line. The velocity of flow of water in the pipe 4 cm diameter is
   a. ¼ times
   b. 4 times
   c. Twice
   d. ½ of 8 cm diameter pipe

117. The density of water in F.P.S system is
   a. $50lb/ft^2$
   b. 50ft/lb
   c. $50ft/lb^3$
   d. $50lb/ft^3$

118. Total pressure on 1 m x 1 m gate immersed vertically at a depth of 2 m below the free water surface will be
   a. 1000 kg
   b. 2000kg
   c. 4000kg
   d. 8000 kg

119. The frequency of second pendulum is
   a. 1 hertz
   b. 2 hertz
   c. 0.5 hertz
   d. None

120. The type of motion in which an oscillating disturbance is transmitted from one position to the next without the actual rectilinear translation of the particles of the medium is called
   a. Periodic motion
   b. Rotatory motion
   c. Wave motion
   d. Rectilinear motion

121. A ball is just allowed to fall from the window of a moving train it will hit the ground following a
   a. Circular path
   b. Hyperbolic path
   c. Straight line path
   d. Parabolic path

122. Which one of the following is a simple harmonic motion?
   a. Wave moving through a string fixed at both end
   b. Earth spinning about its own axis
   c. Ball bouncing between two rigid vertical walls
   d. Particle moving in a circle with uniform speed.

123. A block weighting 40 kg extends a spring by 0.16m from its unscratched position. What is the value of k
   a. 170 kg/s^2
   b. 245 kg/s^2
   c. 215 kg/s^2
   d. 201 kg/s^2

124. A simple harmonic oscillator has a period T and energy E. the amplitude of the oscillator is doubled choose the correct answer
   a. Period and energy get double
   b. Period gets doubled while energy remain same
   c. Energy gets doubled while Period remain same
   d. Period remain same and Energy becomes 4 times

125. A particle performs simple harmonic motion of amplitude 0.020 m and frequency 2.5Hz. What is its max speed?
   a. 0.008m/s
   b. 0.050 m/s
   c. 0.125 m/s
   d. 0.314 m/s

126. Which if electromagnetic radiation has the longest wavelength?
   a. γ rays
   b. UV
   c. Microwaves
   d. X rays

127. The length of a spring is α when a force of 4 N is applied on it the length is β when 5 N forces is applied then the length of spring when 9N force is applied is
   a. 5β - 4α
   b. β - α
   c. 5α -4β
   d. 9(β – α)

128. Two springs of spring constant k1 and K2 are joined in series. The effective spring constant of combination is given by
   a. (k1 +k2)/2
   b. K1+ K2
   c. K1k2/(k1 + k2)
   d. $\sqrt{k1k2}$

129. The various features of wave phenomenon can be very conveniently studies by an apparatus called
   a. Sonometer
   b. Ripple tank
   c. hydrometer
   d. barometer

130. A highly directional beam of ultrasonic wave can be made to travel in water in
   a. many meters
   b. many kilometers
   c. several kilometers
   d. none

131. Applications of the result of scientific studies of sound in the designs of building etc. is called
   a. Optics
   b. Wave mechanics
   c. Acoustics
   d. Statics

132. Laplace formula is derived from
   a. Isothermal; change
   b. Adiabatic change
   c. Isobaric change
   d. Isochoric change

133. In the absence of an external torque the angular momentum of a rotating body is
   a. Constant
   b. Variable
   c. Unstable
   d. Zero

134. Progressive waves of frequency 300 Hz are superimposed to produce a system of stationary waves in which adjacent nodes are 1.5m apart. What is the speed of the progressive waves?
   a. 100m/s
   b. 200m/s
   c. 450 m/s
   d. 900 m/s

135. Which one of the following could be the frequency of ultraviolet radiation
   a. 1.0×10^{6} Hz
   b. 1.0×10^{9} Hz
   c. 1.0×10^{12} Hz
   d. 1.0×10^{15}Hz

136. To hear a clear echo, the reflecting surface must be at a minimum distance of
   a. 10m
   b. 16.5m
   c. 33m
   d. 66m

137. Which one is not a produced by sound wave in air
   a. Polarization
   b. Diffraction
   c. Refraction
   d. Reflection

138. The conduction due to charges produced by pair generation in a semi-conductor is called
   a. Polarity
   b. Intrinsic conduction
   c. Electrostatic
   d. Amplitude modulation

139. Ever point of a wave front may be considered as a
   a. Source
   b. Source of wave front
   c. Source of secondary wave front
   d. None

140. The phenomenon of polarization occurs only in which of the following wave type
   a. Electromagnetic
   b. Longitudinal
   c. Mechanical waves
   d. Matter waves
141. Spontaneous reaction is one
   a. Directional, irreversible, real process
   b. Unidirectional , reversible , imaginary reaction
   c. Irreversible, Unidirectional, real process
   d. Imaginary, reversible reaction
142. Which one of the following solution has the highest boiling point?
   a. 0.1M $BaCl_2$
   b. 0.1M glucose
   c. 0.1M urea
   d. 0.1M NaCl
143. The pH of 0.005 molar solution of sulphuric acid is approximately:
   a. 0.010
   b. 1
   c. 2
   d. 0.005
144. Given that heat of neutralization of strong acid and strong base as – 57.1 kg. The head produced when 0.25 mole of HCl is neutralized with 0.25 mole NaOH in aqueous solution is
   a. 14.275kj
   b. 57.1kj
   c. 22.5kj
   d. 28.6kj
   e. All
145. Number of moles of NaOH present in 2L of 0.5 M NaOH is
   a. 1.5
   b. 2.0
   c. 1.0
   d. 2.5
146. The molar solution of sulphuric acid is equal to
   a. N/2 solution
   b. N solution
   c. 2N solution
   d. 3N solution

147. Substances exist because they posses
   a. Material
   b. Molecular bonds
   c. Volume
   d. Heat

148. The equilibrium constant for a reaction A+2B→ 2C is 40. The equilibrium constant for reaction C→B +(1/2)A is
   a. 40
   b. $[1/40]^2$
   c. 1/40
   d. $1/[40]^{1/2}$

149. In the reaction 2A +B → A_2B, if the concentration of A is doubled and that of B is halved, then the rate of the reaction will :
   a. Increase 2 times
   b. Increase 4 times
   c. Decrease 2 times
   d. Remain same

150. Correct order among the following is
   a. 1 erg> 1j > 1 call
   b. 1 call > 1j > 1 erg
   c. 1 erg >1 call >1j
   d. 1j > 1 call > 1 erg

151. Which is the phenomenon who help us to calculate lattice energy of ionic crystals
   a. Hess law
   b. Enthalpy of formation
   c. Born haber process
   d. None

152. The volatile metal is
   a. Fe
   b. Zn
   c. Cu
   d. Ag

153. Gypsum on heating 120^0 C -130^0 C gives
   a. Anhydrous salt
   b. Hemihydrate
   c. Monohydrate
   d. Dehydrates

154. Substances exit because they posses
   a. Material
   b. Molecular bonds
   c. Volume
   d. Heat

155. O_2,N_2 are present in the ratio of 1:4 by weight the ratio of number of molecules is
   a. 7:32
   b. 1:4
   c. 2:1
   d. 4:1

156. Chlorine upon reaction with NaOH in cold yields
   a. NaCl,NaClO, H_2O
   b. NaCl,$NaClO_3$, H_2O
   c. NaClO,$NaClO_3$, H_2O
   d. NaCl , H_2O

157. Farming's salt is
   a. NaCl
   b. HF
   c. KHF_2
   d. $KClO_3$

158. Which of the following is least polarizable?
   a. Ne
   b. He
   c. Xe
   d. Kr

159. Transfer of heat from hot surrounding too cold refrigerator is an example of
   a. Spontaneous reaction
   b. Non spontaneous reaction
   c. First law of thermodynamics
   d. All of above

160. Alkaline $KMnO_4$ converts ethylene into
   a. Methanol
   b. Ethanol
   c. Ethane
   d. Ethylene glycol

161. Which one of the following is not an isotope of hydrogen?
   a. Deuterium
   b. Tritium
   c. Ortho hydrogen
   d. None

162. Blue litmus turn s red in a solution of pH
   a. Below 7
   b. 7
   c. Above 7
   d. at all pH

163. maximum ionization potential is of
   a. Ca
   b. Na
   c. Be
   d. Mg

164. Strongest acid among the following is
   a. CCL_3COOH
   b. CH_3COOH
   c. CF_3COOH
   d. CBr_3COOH

165. Which molecule is planar?
   a. SF_4
   b. XeF_4
   c. NF_3
   d. SiF_4

166. A certain radioactive isotope has a half-life of 50 days. Fraction of the material left behind after 100days will be
   a. 125%
   b. 25%
   c. 50%
   d. 75%

167. The Rams speed at NTP of a gas can be calculated from the expression:
   a. $\sqrt{\left(\frac{3P}{d}\right)}$
   b. $\sqrt{\left(\frac{3PV}{M}\right)}$
   c. $\sqrt{(3RT\phi M)}$
   d. All of these

168. Prussian blue is
   a. $K_2Fe[Fe(CN)_6]$
   b. $K_4[Fe(CN)_6]$
   c. $Fe_4(Fe(CN)_6)$
   d. $K_3(Fe(CN)_6)$

169. Following are fundamental ways of transferring energy
   a. Pressure and work
   b. Volume and pressure
   c. Heat and work
   d. Pressure and heat

170. A mixture of camphor and benzoic acid can be separated by
   a. Fractional crystallization
   b. Sublimation
   c. Chemical method
   d. Extraction with solvent

171. _____ is a very difficult profession for a lazy person as you are
   a. That copper mining
   b. It is copper mining
   c. Although copper mining
   d. Copper mining

172. She read_____
   a. Several chapters in the library last night
   b. Last night several chapters in the library
   c. Last night in library several chapters
   d. In the library several chapters last night

173. He is taking some _____ this semester
   a. Histories class
   b. History classes
   c. History class
   d. None

174. The _____ death
   a. wages of sins are
   b. Wage of sin are
   c. Wages of sin is
   d. Wage of sins are

175. Murtaza scored _____ in his last entry test
   a. The least points
   b. A least points
   c. The fewest points
   d. The fewer points

Read the passage carefully and answer the following question given at the end of passage.

Democratic societies from the earliest times have expected their governments to protect the weak against the strong. No 'era of good feeling' can justify discharging the police force or giving up the idea of public control over concentrated private wealth. On the other hand, it is obvious that a spirit of self-denial and moderation on the part of those who hold economic power will greatly soften the demand for absolute equality. Men are more interested in freedom and security than in an equal distribution of wealth. The extent to which government must interfere with business, therefore, is not exactly measured by the extent to which economic power is concentrated into a few hands. The required degree of government interference depends mainly on whether economic powers are oppressively used, and on the necessity of keeping economic factors in a tolerable state of balance. But with the necessity of meeting all these dangers and threats to liberty, the powers of government are unavoidably increased, whichever political party may be in office. The growth of government is a necessary result of the growth of technology and of the problems that go with the use of machines and science. Since the government in our nation, must take on more powers to meet its problems, there is no way to preserve freedom except by making democracy more powerful.

176. The advent of science and technology has increased the
   a. freedom of people
   b. tyranny of political parties
   c. powers of the government
   d. chances of economic inequality

177. A spirit of moderation on the economically sound people would make the less privileged
   a. unhappy with the rich people
   b. more interested in freedom and security
   c. unhappy with their lot
   d. clamour less for absolute equality

178. The growth of government is necessitated to
   a. make the rich and the poor happy
   b. curb the accumulation of wealth in a few hands
   c. monitor science and technology
   d. deploy the police force wisely

179. 'Era of good feeling' in the second sentence refers to
   a. time of prosperity
   b. time of adversity
   c. time without government
   d. time of police atrocities

180. 'Tolerable state of balance' in the last sentence may mean
   a. an adequate level of police force
   b. a reasonable level of economic equality
   c. a reasonable amount of government interference
   d. a reasonable check on economic power

181. race : fatigue (analogy)
   a. fasting : hunger
   b. round :boxing
   c. flower: colors
   d. Hiking : gangrene

182. Strut : walking (analogy)
   a. Sweating : wrestling
   b. Hunter : fire
   c. Speech : stage
   d. Stammer : talk

183. Industries : hardworking (analogy)
   a. Sky : blue
   b. Muddy: unclear
   c. Book :reading
   d. Pond: lake

184. Scholar : ignorant (analogy)
   a. Hardworking : lazy
   b. Knife : sword
   c. Courage : bold
   d. Luxury : wealth

185. Cool : frozen:: (analogy)
   a. Sharp :cut
   b. Warm: hot
   c. Hassock : stool
   d. Freedom : liberty

186. Admonish(synonym)
   a. Hypnotic
   b. Honor
   c. Encourage
   d. scold
   e. Prepare

187. Animosity (antonym)
   a. Friendliness
   b. Anxiety
   c. Eagerness
   d. Reliability

188. Portly (synonym)
   a. Briskly
   b. Vessel
   c. Slender
   d. Entirely

189. Impetuous (antonym)
   a. Defensive
   b. Ardent
   c. Hobbyist
   d. Wary

190. Valid (antonym)
   a. Laud
   b. Feeble
   c. Due
   d. Dump

191. An index that estimate true rate of exchange among the currencies is
   a. Human development index
   b. Exchange rate
   c. Purchasing rate
   d. None

192. LRR is stand for
   a. Lahore ring road
   b. Large ring road
   c. Lahore ring road
   d. Long ring road

193. Who is allegedly the current head of al-Qaida?
   a. Khalid sheikh MOHAMMAD
   b. Osama bin laden (late)
   c. Ayman ul Zawahiri
   d. None

194. Who is chancellor of Germany
   a. Joachim Gauck
   b. Angela Merkel
   c. John Atta Mills
   d. Laszlo Kover

195. Which of the following academies grants the noble prize in literature?
   a. London academy
   b. Norwegian academy
   c. Swedish academy
   d. New York academy

196. BCB stand for
   a. Bhutan cricket board
   b. Bangladesh cricket board
   c. Belgium cricket board
   d. None

197. Who was honored with highest cultural award of France the commander of the order on 17th July 2013
   a. David bowie
   b. Paul hewson
   c. Bruce Willis
   d. Bob Dylan

198. Identify the current hajj year
   a. 1432
   b. 1433
   c. 1434
   d. 1435

199. Faf Du plessis is player of
   a. Hockey
   b. Cricket
   c. Foot ball
   d. Snooker

200. Easy jet is air line of
   a. Uk
   b. Malaysia
   c. Spain
   d. Turkey