NUST Past Paper – Engineering

Total Time: 3 Hrs   Total Question: 200

1. $\forall\ a, b, \varepsilon\ R, ab\ \varepsilon\ R$
   a. Commutative law of multiplication
   b. Associative law of multiplication
   c. Closure law of multiplication
   d. Multiplicative identity

2. If the straight lines x= 1+s, y=-3- λs, z=1 + λs, and x =t/2, y = 1 +t, z =2-t with parameters s and t respectively, are co-planar then λ equal to
   a. -2
   b. -1
   c. -1/2
   d. 0

3. The intersection of the spheres x^2 +y2 +z2 +7x -2y –z=13and x2+ y2+z2-3x+3y+4z =8, x2+ y2+z2-3x+3y+4z =8 is same as the intersection of one of the sphere and the plane
   a. X-y-z =1
   b. X-2y-z=1
   c. X-y-2z=1
   d. 2x-y-z=1

4. Let and be three non-zero vectors such that no two of these are collinear. If the vector a + 2b is collinear with c r and b+ 3cr is collinear with a r (being some non-zero scalar) then a +2b +6cr equal to
   a. $\pi_a\overset{\rightarrow}{}$
   b. $\pi_b\overset{\rightarrow}{}$
   c. $\pi_c\overset{\rightarrow}{}$
   d. 0

5. A particle is acted upon by constant forces r 4i + j-3k and 3i+j –k which displace it from a point I +2j+3k to the point 5i +4j+k. the work done in standard units by the forces is given by
   a. 40
   b. 30
   c. 25
   d. 15

6. If $\bar{a}, \bar{b}, \bar{c}$ are n d b λ $\bar{c}$ on coplanar vector an is a real number, then the vectors $\bar{a}+2\bar{b}+3\bar{c}$, λ$\bar{b}$ +4$\bar{c}$ and (2 λ -1)c are non-coplanar for
   a. All value of λ
   b. All expect one value of λ
   c. All expect two value of λ
   d. No value of λ

7. Let $\bar{u}, \bar{v}, \bar{w}$ be such that $|\bar{u}|$ =1 $|\bar{v}|$=2, $|\bar{w}|$=3, if the projection $\bar{v}$ along $\bar{u}$ is equal to $\bar{w}$ along $\bar{u}$ and $\bar{v}$, $\bar{w}$ are perpendicular to each other than |u-v-w| equal to
   a. 2
   b. $\sqrt{7}$
   c. $\sqrt{14}$
   d. 14

8. If z_1 and z_2 are two complex numbers then $|z_1 + z_2|$
   a. $< |z_1| + |z_2|$
   b. $> |z_1| + |z_2|$
   c. $<= |z_1| + |z_2|$
   d. $>= |z_1| + |z_2|$

9. Consider the following statement s: "
   i. Mode can be computed from histogram
   ii. Median is not independent of change of scale
   iii. Variance is independent of change of origin and scale. "

Which of these is/are correct?

   b. Only i
   c. Only ii
   d. Only I and ii
   e. Only I ,ii ,iii

10. In a series of 2n observations, half of them equal a and remaining half equal –a. if the standard deviation of the observation is 2. Then |a| equal to
   a. 1/n
   b. $\sqrt{2}$
   c. 2
   d. $\sqrt{2}/n$

11. The probability that A speaks truth is 4/5, while this probability for b is ¾. The probability that they contradict each other when asked to speak on a fact is
   a. 3/20
   b. 1/5
   c. 7/20
   d. 4/5

12. Division is a binary operation in
    a. The set of rational numbers
    b. The set of real numbers
    c. The set of real numbers
    d. the set R-(0)

13. If z= (1, 2) then z^ (-1) =?
    a. (1/5 ,2/5)
    b. (-1/5, 2/5)
    c. (1/5,-2/5)
    d. (-1/5 ,-2/5)

14. With two forces acting at a point, the max effect is obtained when their resultant is 4 N. If they act at right angles then their resultant is 3 N then the forces are
    a. $(2+\sqrt{2})$ and $(2-\sqrt{2})$
    b. $(2+\sqrt{3})$ and $(2-\sqrt{3})$
    c. (2+ ½ 2) and (2- ½ 2)
    d. (2+ ½ 3) and (2- ½ 3)

15. In right angle ΔABC ,$\angle A = 90^0$ and sides a, b ,c are respectively,5 cm, 4 cm and 3 cm. if a force F has moments 0,9 and 16 in N cm. units respectively about vertices A,B and C, then magnitude of F is
    a. 3
    b. 4
    c. 5
    d. 9

16. Three forces P. Q .R acting along IA, IB and IC where I is the in center of a ΔABC, are in equilibrium. Then P:Q:R us
    a. Cos A/2: cos B/2 : cos c/2
    b. sin A/2: sin B/2 : sin c/2
    c. sec A/2: sec B/2 : sec c/2
    d. cosec A/2: cosec B/2 : cosec c/2

17. towards north from B to C at the rate of 5 km/h. if AB=12 and BC =5km. then its average speed for its journey from A to C and resultant average velocity direct from A to C, are respectively towards east from a point A to a point B at the rate of 4 km/h and then
    a. 17/4Km/h and 13/4 Km/h
    b. 13/4 Km/h and 17/4Km/h
    c. 17/9Km/h and 13/9 Km/h
    d. 13/9 Km/h and 17/9Km/h

18. A velocity ¼ m/s is resolved into two component along OA and OB making angles 30^0 and 45^0 respectively with the given velocity. Then the component along OB is
    a. 1/8 m/s
    b. ¼($\sqrt{3} - 1$)
    c. ¼ m/s
    d. $1/8(\sqrt{6} - \sqrt{2}$)m/s

19. If t1 and t2 are the times of flight of two particles having the same initial velocity u and range R on the horizontal, then t2+ t1 is equal to
    a. U^2/g
    b. $4U^2/g$
    c. $U^2/2g$
    d. 4

20. The differential equation of the family of the curves $x^2 +y^2 -2ax =0$
    a. $X^2-y^2-2xyy''=0$
    b. $Y^2-x^2 =2xyy'$
    c. $X^2+y^2 +2y'' =0$
    d. None

21. If Y = cos-1(1-1nx/1+1nx) then dy/dx at x=e is
    a. -1/e
    b. -1/2e
    c. 1/2e
    d. 1/e

22. The sun of the series ½ + ¾ + 7/8 +15/16 ……………………….. up to n terms is
    a. n-1 + 1/2n
    b. n + 1 /2n
    c. 2n +1/2n
    d. N +1 +1/2n

23. The equation of the plane passing through the midpoint of the line of the join of the points(1,2,3) and (3,4,5) and perpendicular to it is
    a. X + y+ z =9
    b. X + y+ z =-9
    c. 2X+3y+4z =9
    d. 2X+3y+4z =-9

24. The equation of the circle concentric to the circle $2x^2 +2y^2 - 3x +6y +2 =0$ and having area double the area of this circle is
    a. $8x^2 +8y^2 -24x +48y -13 =0$
    b. $16x^2 +16y^2 +24x -48y -13 =0$
    c. $16x^2 +16y^2 -24x +48y -13 =0$
    d. $8x^2 +8y^2 +24x -48y -13 =0$

25. The domain of the function f(x) cos-1x/|x| is
    a. [-1,0) U {1}
    b. [-1,1]
    c. [-1,1)
    d. None

26. If e and e' are the eccentricities of hyperbolas x2/z2 - y2/b2 =1 and its conjugate hyperbola then the value of 1/e2 + 1/e'2 is
    a. 0
    b. 1
    c. 2
    d. None

27. The value of the $\int \frac{sinx+cos x}{3+sin2x}$ dx is
    a. ¼ in $\frac{2-sinx-cos x}{2+sinx+cos x}$ +C
    b. ½ in $\frac{2+sinx}{2-sinx}$ + C
    c. ¼ in $\frac{1+sinx}{1-sinx}$ + C
    d. None

28. The solution of the differential equation $\frac{dy}{dx}$ - $\frac{tany}{x}$ = $\frac{tanysiny}{x2}$ is
    a. $\frac{x}{siny}$ +in x=c
    b. $\frac{y}{sinx}$ +in =c
    c. In y+ x =c
    d. In x+ y =c

29. Z +$\overline{Z}$ is …………
    a. Real number
    b. Irrational number
    c. 0
    d. Complex number

30. If m($\frac{z-1}{2z+1}$) = -4 then locus of z is
    a. Ellipse
    b. Parabola
    c. Straight line
    d. Circle

31. The equation (x-b)(x-c) +(x-a)(x-b) +(x-a)(x-c) =0 has all its roots
    a. Positive
    b. Real
    c. Imaginary
    d. Negative

32. The sum of coefficients of the expansion $(1/x + 2x)^n$ is 6561. The coefficient of term independent of x is
   a. $16.8c_4$
   b. $8c_4$
   c. $8c_5$
   d. None

33. The area enclosed between the curves $y=x$ and $y =2x -x^2$ is
   a. ½
   b. 1/6
   c. 1/3
   d. ¼

34. The set of all rational numbers between 1 and 2
   a. An empty set
   b. A real set
   c. A finite set
   d. An infinite set

35. In an ellipse the angle between the lines joining the foci with the +ive end of minor axis is a right angle , the eccentricity of the ellipse is
   a. $\frac{1}{\sqrt{2}}$
   b. $\frac{1}{\sqrt{3}}$
   c. $\sqrt{2}$
   d. $\sqrt{3}$

36. If $|a| = 3$, $|b|= 5$ and $|c|= 4$ and $a + b + c =0$, then the value of $a.b +b.c$ is equal to
   a. 0
   b. -25
   c. 25
   d. None

37. The equation of a line is $6x -x2 = 3y -1 = 2z-2$ the direction ratios of the line are
   a. 1,2,3
   b. 1,1,1
   c. 1/3,1/3, 1/3
   d. 1/3,-1/3,1/3

38. $Y =sin -1x/2 + cos-1x/2$ then the value dy /dx is
   a. 1
   b. -1
   c. 0
   d. 2

39. Z=4x +2y, 4x+2y >=46, x+3y<=24 and x and y are greater than or equal to zero, then the max value of z
   a. 46
   b. 96
   c. 52
   d. None

40. On one bank of river there is a tree on another bank, an observer makes an angle of elevation of 60^0 at the top of the tree. The angle of elevation of the top of the tree at a distance 20 m away from the bank is 30^0 .the width of the river is
   a. 20 meters
   b. 10meters
   c. 5 meters
   d. 1 m

41. $\sqrt{0.0001}$ *is*
   a. An integer number
   b. An irrational number
   c. A rational number
   d. An imaginary number

42. If A= [1/x^2, x/4y] and B [-3/1, 1/0] adj. A +B[1/0,0/1] then values of x and y are
   a. 1,1
   b. $\pm$(1,1)
   c. 1,0
   d. None

43. If $\tan^{-1}$ 1-x/1+x = ½ tan-1 x then value of x is
   a. ½
   b. $\frac{1}{\sqrt{3}}$
   c. $\sqrt{3}$
   d. 2

44. The number of values of k for which $(\log x)^2$ -log x –log k =0 is /are
   a. 1
   b. 2
   c. 3
   d. 4

45. The value of limt a$\rightarrow$ 0 $\csc^{-1}(\sec\alpha)$ +$\cot^{-1}$ (tanα)+ $\cot^{-1}$ cos ($\sin^{-1}$ α)/ α is
   a. 0
   b. -1
   c. -2
   d. 1

46. The value of $\int_{\pi}^{2\pi}$ [2 sin x] dx is
   a. π/3
   b. - 4π/3
   c. 4π/3
   d. - π/3

47. $\int_{0}^{10} | x * (x - 1)(x - 2)|$dx
   a. 160.05
   b. 1600.5
   c. 16.005
   d. None

48. The value of lim x→ 0 (1 + sin x −cos x +log (1-x) /3) is
   a. -1
   b. ½
   c. - ½
   d. 1

49. The equation of tangent to the curve $x^2/3 - y^2/2 = 1$ which is parallel to y =x is
   a. Y =x ± 1
   b. Y =x − ½
   c. Y =x + ½
   d. Y = 1- x

50. If $(\frac{z+i}{z-i})$ = 3 then radius of circle is
   a. $\frac{2}{\sqrt{21}}$
   b. $\frac{1}{\sqrt{21}}$
   c. $\frac{\sqrt{21}}{2}$
   d. $\sqrt{21}$

51. Let f(x) = cos x cos 2x cos 4x cos 8x cos16x then the value of f'(π/4) is
   a. $\sqrt{2}$
   b. $-\sqrt{2}$
   c. 2
   d. -2

52. Let (sin a) x^2 + (sin a) x + (1-cos a) = 0 the value of a. For which roots of this equation are real and distinct.
   a. (0 , 2 tan^{-1} ¼)
   b. (0 , 2 π /3)
   c. (0 , π)
   d. (0, 2 π)

53. The angle of elevation of top of a tower from a point on the ground is 30^0 and it is 60^0 when it is viewed from a point located 40 m away from the initial point towards the tower the height of the tower is
    a. $-20\sqrt{3}$
    b. $\frac{\sqrt{3}}{20}$
    c. $-\frac{\sqrt{3}}{20}$
    d. $20\sqrt{3}$

54. The summation of two unit vectors is a third unit vector, then the modulus of the difference of the unit vectors is
    a. $\sqrt{3}$
    b. $1-\sqrt{3}$
    c. $1+\sqrt{3}$
    d. $-\sqrt{3}$

55. A body falls freely from a point A and passes through the point B and C given that AB =2BC. The ratio of the time taken by the body to cover the distances AB and BC is
    a. $(2 + \sqrt{6})/1$
    b. $(2 - \sqrt{6})/1$
    c. $1 - \sqrt{6})/2$
    d. $1 + \sqrt{6})/2$

56. There is a set of m parallel lines intersecting a set of other n parallel lines in a plane. The number of parallelograms formed is
    a. $^{m-1}C_2 \cdot {}^{n-1}C_2$
    b. $^{m}C_2 \cdot {}^{n}C_2$
    c. $^{m-1}C_2 \cdot {}^{n}C_2$
    d. $^{m}C_2 \cdot {}^{n-1}C_2$

57. If in a trial the probability of success is twice the probability of failure. In six trials the probability of at least four successes is
    a. 496/729
    b. 400/729
    c. 500/729
    d. 600/729

58. A force vector mi + nk are applied to a body at a point P (1, 2, and 3). If moment of the force is perpendicular to 3i + 5j +6k then relation between m and n is
    a. N+3m =0
    b. N+3m =1
    c. N +3m=2
    d. N+ 3m=3

59. Then greatest term in the expansion of $(1 + 3x)^{54}$ where $x = 1/3$ is
    a. T_{28}
    b. T_{25}
    c. T_{26}
    d. T_{24}

60. The equation of family of a curve is $y^2 = 4a(X + a)$ then differential equation of the family is
    a. $Y = y' + x$
    b. $Y = y'' + x$
    c. $Y = 2y' x + y^2 y'^2$
    d. $y'' + y' + y^2 = 0$

61. if A.M of two numbers twice of their G.M then the ratio of greatest number to smallest number is
    a. $7 - 4\sqrt{3}$
    b. $7 + 4\sqrt{3}$
    c. 21
    d. 5

62. Let $X^2 + y^2 - 2x - 6y + 6 = 0$ and $X^2 + y^2 - 6x - 4y + 12 = 0$ are two circles, then equation of the circle having diameter as their common chord is
    a. $5X^2 + 5y^2 + 26x - 22y + 54 = 0$
    b. $5X^2 + 5y^2 + 26x + 22y + 54 = 0$
    c. $5X^2 + 5y^2 - 26x - 22y + 54 = 0$
    d. $5X^2 + 5y^2 - 26x - 22y - 54 = 0$

63. For what value of a, $f(x) = -x^3 + 4ax^2 + 2x - 5$ is decreasing x .
    a. (1,2)
    b. (3,4)
    c. R
    d. No value of a

64. The common tangent of the parabolas $y^2 = 4x$ $x^2 = -8y$ is
    a. $Y = x + 2$
    b. $Y = x - 2$
    c. $Y = 2x + 3$
    d. None

65. If the projectile motion range R is max then relation between H and R is
    a. $H = R/2$
    b. $H = R/4$
    c. $H = 2R$
    d. $H = R/8$

66. The foci of the conic section $25x^2 + 16y^2 - 150x = 175$ are
    a. $(0, \pm3)$
    b. $(0, \pm2)$
    c. $(3, \pm3)$
    d. $(0, \pm1)$

67. A line passes through the point of intersection of the lines $3x + y + 1 = 0$ and $2xs - y + 3 = 0$ and makes equal intercepts with axes. Then equation of the line is
    a. $5x + 5y - 3 = 0$
    b. $x + 5y - 3 = 0$
    c. $5x - y - 3 = 0$
    d. $5x + 5y + 3 = 0$

68. In r cos ɵ + risinɵ r and ɵ represents _____ respectively
    a. Absolute value of modulus
    b. Argument and modulus
    c. Modulus and argument
    d. Absolute value modulus and argument

69. The value of limit x➔0 $\dfrac{(4x-1)3}{\sin\frac{x2}{4}\log(1+3)}$ is
    a. $4/3$ (in 4)^2
    b. $4/3$ (in 4)^3
    c. $3/2$ (in 4)^2
    d. $3/2$ (in 4)^3

70. $_0\!\int^3$ |x3 + x2 3x|dx is equal to
    a. $171/2$
    b. $171/4$
    c. $170/4$
    d. $170/3$

71. Let a = $\begin{vmatrix} 1 & 5 \\ -5 & 1 \end{vmatrix}$ and $A^{-1} = xA + yI$, then the value of x and y are

    a. X=-1 ,y =2
    b. X=-1 ,y =-2
    c. X=1 ,y =2
    d. X=1 ,y =-2

72. A plane $x + y + z = -\,^{\alpha}\sqrt{3}$ touches the sphere $2x^2 + 2y^2 + 2z^2 - 2x + 4y - 4z + 3 = 0$
    a. $\pm 1/\sqrt{3}$
    b. $1/2\sqrt{3}$
    c. $1 - \frac{1}{\sqrt{3}}$
    d. $1 + \frac{1}{\sqrt{3}}$

73. The solution of the differential equation $dy/dx + (2x/1 + x2) y = 1/(1 + x2)^2$ is
    a. $Y(1-x^2) = \tan^{-1}x + c$
    b. $Y(1+x^2) = \tan^{-1}x + c$
    c. $Y(1+x^2)^2 = \tan^{-1}x + c$
    d. $Y(1-x^2)^2 = \tan^{-1}x + c$

74. $\displaystyle\sum_{r=3}^{00} \frac{rc3 - 3r}{r!}$ is equal to
    a. 6e2/2
    b. 6e3/2
    c. 9e2/2
    d. 9e3/2

75. Let $\cos(2\tan^{-1}x = \frac{1}{2}$ then the value of x is
    a. $\sqrt{3}$
    b. $\frac{1}{\sqrt{3}}$
    c. $1 - \sqrt{3}$
    d. $1 - \frac{1}{\sqrt{3}}$

76. If $\sin^{-1} a$ is the acute angle between the curves $x^2 + y^2 = 4x$ and $x^2 + y^2 = 8$ at (2,2), then $a =$
    a. 1
    b. 0
    c. $\frac{1}{\sqrt{2}}$
    d. $\frac{\sqrt{3}}{2}$

77. The max area of rectangle that can be inscribed in a circle of radius 2 units is
    a. 8π sq . unit
    b. 4 sq . unit
    c. 5 sq . unit
    d. 8 sq . unit

78. If the length of the subtangent at any point to the curve $x\,y^n = a$ proportional to the abscissa, then 'n' us
    a. Any non-zero real number
    b. 2
    c. -2
    d. 1

79. $\int \frac{cos^{n-1}x}{sin^{n+1}x} dx$, n≠ 0 is

    a. $\frac{cot^n x}{n}$

    b. $\frac{-cot^{n-1}x}{n-1}$

    c. $-\frac{cot^4 x}{n}$

    d. $\frac{cot^{n-1}x}{n-1}$

80. The value of $_{-1}{}^{2}\int |x|/x \, dx$ is

    a. 0

    b. 1

    c. 2

    d. 3

81. Laser is device which can produce

    a. Intense beam of light

    b. Coherent beam of light

    c. Monochromatic beam of light

    d. All of above

82. A magnetic needle lying parallel to a magnetic field is turned through 60^0 the work done on it is w. the torque required to maintain the magnetic needle in the position mentioned above is

    a. $\sqrt{3}$ w

    b. $\frac{\sqrt{3}}{2}$ w

    c. w/2

    d. 2 w

83. A parallel plate capacitor has a capacity 80×10^{-6} when air is present between the plates. The volume between the plates is then completely filled with a dielectric slab of dielectric constant 20. The capacitor is now connected to a battery of 30 v by wires the dielectric slab is then removed. Then the charge that passes now through the wire is

    a. 45.6×10^{-3}c

    b. 25.3×10^{-3} c

    c. 120×10^{-3} c

    d. 120×10^{-3} c

84. Four resistor A, B, C and D form a whetstones bridge is balanced when C =100ʹΩ. If A and B are interchanged, the balances. For c 121ʹΩ the value of D is

    a. 10ʹΩ

    b. 100ʹΩ

    c. 110ʹΩ

    d. 120ʹΩ

85. The magnitude of the resultant of two forces is F. The Magnitude of each force id F. the angle between the forces must be
    a. 300
    b. 600
    c. 450
    d. 1200

86. A primary coil and secondary coil are placed close to each other. The current which changes at the rate of 25 amps. In a millisecond, is present in the primary coil. If the mutual inductance is 92×10^{-6} henneries, then the value of induced Emf in the secondary coil is
    a. 4.6v
    b. 2.3 v
    c. 0.368mV
    d. 0.23mV

87. The de Broglie wave length of an electron moving with a velocity of 1.5×10^8 m/s is equal to that of photon. the ration of K.E of the electron to that of photon (C = 3×10^8 m/s)
    a. 2
    b. 4
    c. ½
    d. ¼

88. The maximum K.E of emitted photoelectrons depend on
    a. Intensity of the incident light
    b. Frequency of the incident light
    c. Temperature of the photosensitive surface
    d. None

89. The half-life of Ra ^{226} is 1620 years then the number of atoms decay in one second in 1 gm of radium (Avogadro number = 6.023×10^{23})
    a. 4.23×10^9
    b. 3.16×10^{10}
    c. 3.61×10^{10}
    d. 2.16×10^{10}

90. The half-life of a radioactive element is 10 hours. The fraction of initial radio activity of the element that will remain after 40 hours is
    a. ½
    b. 1/16
    c. 1/8
    d. ¼

91. In a transistor if $I_c / I_E = \alpha$ and $I_c / I_B = \beta$. If α varies between 20/21 and 100/101. Then value of β lies between
   a. 1-10
   b. 0.95-0.99
   c. 20-100
   d. 200-300

92. Let $[\varepsilon_0]$ denote the dimensional formula of the permittivity of vacuum. It M = mass, L = length, T = time and A = electric current, then
   a. $[\varepsilon_0] = [M^{-1}L^{-3} T^4 A^2]$
   b. $[\varepsilon_0] = [M^{-1}L^2 T^1 A^{-2}]$
   c. $[\varepsilon_0] = [M^{-1}L^2 T^{-1} A]$
   d. $[\varepsilon_0] = [M^{-1}L^{-3} T^2 A]$

93. The gravitational field in a region is given by equation is E = (5i +12j) N/kg. if a particle of mass 2 kg is moved from the origin to the point (12m ,5m) in this region, the change in gravitational P.E is
   a. -225 j
   b. -240 j
   c. -245 j
   d. -250 j

94. The time period of a particle in simple harmonic motion is 8s. At t=0 it is at the mean position. the ratio of the distances travelled by it in the first and second seconds is
   a. ½
   b. $\frac{1}{\sqrt{2}}$
   c. $\frac{1}{\sqrt{2}-1}$
   d. $\frac{1}{\sqrt{3}}$

95. A tension of 22N is applied to a copper wire of cross sectional area 0.02cm. young's modulus of copper is 1.1×10^{11} N/m² and Poisson's ratio 0.32 the decrease in cross sectional area will be
   a. 1.28×10^{-6}cm²
   b. 1.6×10^{-6}cm²
   c. 2.56×10^{-6}cm²
   d. 0.64×10^{-6}cm²

96. The total energy of H-atom in its ground state is
   a. −ive
   b. +ive
   c. 0
   d. None

97. A pipe having an internal diameter 'D' to another pipe of same size, water flow into the second pipe through 'n' holes, each of diameter 'd' . if the water in the first pipe has speed 'V' the speed of water leaving the second pipe is

   a. $D^2 v/nd^2$
   b. $nD^2 v/d^2$
   c. $nd^2 v/D^2$
   d. $d^2 v/nd^2$

98. When a liquid is heated in copper vessel its coefficient of apparent expansion is 6×10^{-6} C. when same liquid is heated in a steel vessel its coefficient of apparent expansion is 24×10^{-6} C. If coefficient of linear expansion for copper is 18×10^{-6} C the coefficient of linear expansion for steel is

99. When the temperature of a body increases from the T to T +ΔT, its moment of inertia increases from I to I +ΔI. if α is the coefficient of linear expansion of the material of the body then is ΔI/I (neglect higher orders of α)

   a. αΔT
   b. 2 αΔT
   c. ΔT/α
   d. 2α/ΔT

100. Work done to increase the temperature of one mole of an ideal $v \propto T^{2/3}$ is ,(R =80314 j/mole/^{0}K) gas by 30^0 C. if it is expanding under the $v \propto T^{2/3}$ is,(R =80314 j/mole/^{0}K) condition

   a. 116.2j
   b. 136.2j
   c. 166.2j
   d. 186.2j

101. Power radiated by black body at temperature T1 is P and it radiates maximum energy at a wavelength λ1. If the temperature of the black body is changed from T1 to T2, it radiates max energy at a wavelength of λ1/2. The power radiated at T2 is.

   a. 2P
   b. 4P
   c. 8P
   d. 6P

102. Which of the following has the high energy photon

   a. Visible light
   b. X rays
   c. Ultraviolet rays
   d. Gamma rays

103. What is minimum energy required to launch a satellite of mass m from the surface of a planet of mass m and radius r in a circular orbit at an altitude of 2R
   a. 2GmM/3R
   b. GmM/2R
   c. GmM/3R
   d. 5GmM/6R

104. When the engine is switched off a vehicle of mass 'M' is moving on a rough horizontal road with momentum P. if the coefficient of friction between the road and tires of the vehicle is μ_k , the distance travelled by the vehicle before it comes to rest is
   a. $P^2 / 2 \mu_k M^2g$
   b. $2 \mu_k M^2g / P^2$
   c. $P^2 / 2 \mu_k g$
   d. $P^2 M^2/ 2 \mu_k g$

105. A projectile is given an initial velocity of I + 2 j where I is along the ground and j is along the vertical if g =10m/s^2, the equation of its trajectory is :
   a. $Y = 2x -5x^2$
   b. $4Y = 2x -5x^2$
   c. $4Y = 2x -25x^2$
   d. $Y = x -5x^2$

106. The escape velocity from the earth gravitational field depend upon
   a. Rotation of earth
   b. Mass of body
   c. Radius of earth
   d. Mass of earth

107. If the earth is treated as a sphere of radius R and mass m its angular momentum about the axis of its rotation with period T is :
   a. $\pi MR^3/T$
   b. $\pi MR^2/T$
   c. $2\pi MR^2/5T$
   d. $4\pi MR^2/5T$

108. The velocity 'V' reached by a car of mass 'm' at certain distance from the starting point driven with constant power 'P' is such that
   a. Vα 3P/m
   b. $V^2 \alpha$ 3P/m
   c. V $^3\alpha$ 3P/m
   d. Vα (3P/m)^2

109. It is possible to project a particle with a given velocity in two possible ways so as to make them pass through a point P at a horizontal distance r from the point of projection, if t1 and t2,are times taken to reach this going in two possible ways, then the product t1t2 is proportional to
    a. $1/r$
    b. r
    c. r^2
    d. $1/r^2$

110. Sum of magnitudes of two forces acting at appoint is 16N, if their resultant is normal to smaller force and has a magnitude 8N, and then forces are
    a. 6N, 10N
    b. 8N, 8N
    c. 4N , 12N
    d. 2N , 1!4N

111. The length of a pendulum is measured as 1.01 m and time for 30 oscillations is measured as one minute 3 sec. error length is 0.01 m and error in time is 3 sacs. The percentage error in the measurement of acceleration due to gravity is
    a. 1
    b. 5
    c. 10
    d. 15

112. A tension of 20 N applied to a copper wire of cross sectional area 0.01cm^2, young's modulus of copper is 1.1 x 10^{11}N/m^2 and Poisson's ratio is 0.32. the decrease in cross sectional area of wire is
    a. 1.16 x 10 $^{-6}$ cm^2
    b. 1.16 x 10 $^{-5}$ m^2
    c. 1.16 x 10 $^{-4}$ m^2
    d. 1.16 x 10 $^{-3}$ cm^2

113. A capillary tube of radius r is immersed in water and water rises to a height of 'h'. Mass of water in the capillary tube is5 x 10 $^{-3}$kg. The same capillary tube in now immersed in a liquid whose surface tension is $\sqrt{2}$ times the surface tension of water. The angle of contact between the capillary tube and this is liquid is 45^0. The mass of liquid which rises into the capillary tube now is .(in kg)
    a. 5 x 10 $^{-3}$
    b. 5 x 10 $^{-3}$
    c. 5 $\sqrt{2x\ 10}$ $^{-3}$
    d. 3.5 x 10 $^{-3}$

114. The terminal velocity of a liquid drop of radius 'r' ; falling through air is v if two such drops are combined to form a bigger drop, the terminal velocity with which the bigger drop falls through air is (ignore any buoyant force due to air)
   a. $\sqrt{2}$V
   b. $2v$
   c. $\sqrt[3]{4}v$
   d. $\sqrt[3]{2}v$

115. A glass flask of volume one liter is filled completely with mercury at 0^0c. The flask is now heated to 100^0c. Coefficient of volume expansion of mercury is 1.82 x $10^{-4/0}$C and coefficient of linear expansion of glass is 0.1 x $10^{-4/0}$C. during this process, amount of mercury which overflow is
   a. 21.2cc
   b. 15.2cc
   c. 2.12cc
   d. 18.2cc

116. On a temperature scale y, water freezes at -160^0 y and boils at -50^0y. on this y scale, a temperature of 340K is
   a. -106.3^0 y
   b. -96.3^0 y
   c. -86.3^0 y
   d. -76.3^0 y

117. Efficiency of heat engine whose sink is at a temperature of 300k is 40%. To increase the efficiency to 60% , keeping the sink temperature constant, the source temperature must be increased by
   a. 750K
   b. 500K
   c. 250K
   d. 1000K

118. We can hear sound around the corner but cannot see because of:
   a. Interference
   b. Diffraction
   c. Polarization
   d. Dispersion

119. An air column in a tube 32 cm long closed at one end, is in resonance with; a tuning fork. The air column in another tube, open at both ends of length 66cm is in resonance with another tuning fork. When these two tuning forks are sounded together, they produce 8 beats per second then the frequencies of the two tuning forks are. (Consider fundamental frequencies only).
   a. 250 Hz. 258 Hz
   b. 240 Hz. 248 Hz
   c. 264hz. 256 Hz
   d. 280 Hz. 272 Hz

120. A wire of uniform cross section A , length 1 and resistance R is cut into two equal pieces. The resistivity of each piece will be
   a. The same
   b. One fourth
   c. Double
   d. One half

121. A microscope consist of an objective of focal length 1.9 cm and eye piece of focal length 5 cm. the two lenses are kept at a distance of 10.5 cm. if the image is to be formed at least distance of distinct vision, the distance at which the object is to be placed before the objective is (least distance of distinct vision is 25 cm).
   a. 6.2cm
   b. 2.7cm
   c. 21.0cm
   d. 4.17cm

122. Fresnel diffraction is produced due to light rays falling on a small obstacle. The intensity of light at a point on a screen beyond an obstacle depends on
   a. The focal length of lens used for observation
   b. The number of half period zones that superpose at the point
   c. The square of the sum of the number of half period zones
   d. The thickness of the obstacle

123. A short bar magnet having magnetic moment 4 Am^2, placed in a vibrating magneto meter, vibrates with a time period of 8 seconds. Another short bar magnet having a magnetic moment 8 Am^2 vibrates with a time period of 6 seconds. If the moment of inertia of the second magnet is 9 x10^{-2}kg m^2 the moment of inertia of the first magnet is (assume that both magnets are kept in the same uniform magnetic induction field)
   a. 9 x 10^{-2} kg m^2
   b. 8 x 10^{-2} kg m^2
   c. 5.33 x 10^{-2} kg m^2
   d. 12.2 x 10^{-2} kg m^2

124. Two short bar magnets have their magnetic moments 1.2Am^2 and1.0 Am^2. They are placed on a horizontal table parallel to each other at a distance of 20 cm between their centers, such that their north poles pointing towards geographic south. They have common magnetic

equatorial line. Horizontal component of earth's field is 3.6 x 10^{-5}T.then,the resultant horizontal magnetic induction at mid-point of the line joining their centers

a. 3.6 x 10^{-5}T
b. 1.84 x 10^{-4}T
c. 2.56 x 10^{-4}T
d. 5.8 x 10^{-5}T

125.   The S.I unit of magnetic flux is weber which is equal to

a. NmA^{-1}
b. Nm^2/A
c. NA/m
d. Nm/A^{-2}

126.   If E.M, J and g respectively denote energy ,mass, angular momentum and universal gravitational constant the quantity, which has the same dimensions as dimensions of EJ^2 /M^2G^2

a. Time
b. Angle
c. Mass
d. length

127.   the work done in moving an object from origin to a point whose position vector is r =3i +2j -5k by a force F= 2i –j –k is

a. 1 unit
b. 9 units
c. 13 units
d. 60 units

128.   A particle is projected from the ground with an initial speed of v at an angle of projection q the average velocity of the particle between its time of projection and times it reaches highest point of trajectory is

a. v/2($\sqrt{1 + 2cos2\ q}$)
b. v/2($\sqrt{1 + 2sin2\ q}$)
c. v/2($\sqrt{1 + 3cos2\ q}$)
d. v cos q

129.   A ball at rest is dropped form a height of 12m. It loses 25% of its K.E on striking the ground and bounces back to a height 'h'. then value of 'h' is

a. 3m
b. 6m
c. 9m
d. 12m

130. Two bodies of mass 4kg and 5 kg are moving along east and month directions with velocities 5 m/s and 3m/s respectively .magnitude of the velocity of center of mass of the systems is
    a. 25/9 m/s
    b. 9/25 m/s
    c. 41/9 m/s
    d. 9 /41 m/s

131. A mass of 2.9 kg is suspended from a string of length 50cm and is at rest. Another body of mass 100g. Which is moving horizontally with a velocity of 150 m/s strikes and sticks to it. Subsequently when the string makes an angle of 60^0 with vertical, the tension in the string is (g =10 m/s^2).
    a. 140N
    b. 135N
    c. 125N
    d. 90N

132. The upper half of an inclined plane with an angle of inclination f, is smooth while the lower half is rough. A body starting from rest at the top of the inclined plane comes to rest at the bottom of the inclined plane. Then the coefficient of friction for the lower half is
    a. 2tanf
    b. tanf
    c. 2sinf
    d. 2cosf

133. Moment of inertia of a body about an axis is 4 kg /m^2. The body is initially at rest and a torque of 8 Nm starts acting on it along the same axis. Work done by the torque in 20 sec. in Jules, is
    a. 40
    b. 640
    c. 2560
    d. 3200

134. A uniform circular disc of radius R, lying on a frictionless horizontal plane is rotating with an angular velocity 'w' about its own axis. Another identical circular disc is gently placed on the top of the first disc coaxially. The loss in rotational K.E due to friction between the two disc, as they acquire common angular velocity is (1 is moment of inertia of the disc)
    a. 1/8 Iw^2
    b. 1/4 Iw^2
    c. 1/2 Iw^2
    d. Iw^2

135. The ratio of volumetric stain to volumetric stress is called
   a. Compressibility
   b. Young's modulus
   c. Bulk's modulus
   d. Shear's modulus

136. The base current in a transistor circuit changes from 45 mA to 140 mA. Accordingly, the collector current changes from 0.2mA to 4 mA. The gain in current is
   a. 9.5
   b. 1
   c. 40
   d. 20

137. A U^{235} nuclear reactor generates energy at the rate of 3.70 x 10^7 j/s .each fission liberates 185 MeV useful energy. If the reactor has to operate for 144 x 10^4 seconds, then, the mass of the fuel needed is (Assume Avogadro's number =6 x 10^{23}, 1eV =1.6 10^{-19}j)
   a. 70.5kg
   b. 0.705kg
   c. 13.1 kg
   d. 1.31kg

138. Fissions reaction can be produced in $_{92}U^{238}$ by:
   a. Fast neutron
   b. Slow neutron
   c. Thermal neutron
   d. All of these

139. The work function of a metal is 2 eV. If a radiation of wavelength 3000 A^0 is incident on it, the maximum K.E of the emitted photoelectrons is (Planck's constant h =6.6 x 10^{-34} is velocity of light c =3 x10^8 m/s   1 eV =1.6 x 10^{-19}j)
   a. 4.4 x 10^{-19}j
   b. 5.6 x 10^{-19}j
   c. 3.4 x 10^{-19}j
   d. 2.5 x 10^{-19}j

140. Initially a photon of wavelength 11 falls on photocathode and emits an the wavelength of the incident photon is changed to I_2, the maximum energy of electron emitted becomes E_2. Then value of hc (Planck's constant =h ,c = velocity of light) is
   a. $hc = \frac{(E1+E2)I1I2}{I2-I1}$
   b. $hc = \frac{(E1-E2)I1I2}{I2-I1}$
   c. $hc = \frac{(E1+E2)(I2-I1)}{I1I2}$
   d. $hc \frac{(I2-I1)}{I1I2\ E2}E1$

141. The gas leaked from a storage tank of union carbide plant in Bhopal gas tragedy was
    a. methylamine
    b. ammonia
    c. phosgene
    d. methylisocyanate

142. Which of the following exists as covalent crystal in the solid state?
    a. Silicon
    b. Sculphture
    c. Phosphorous
    d. Iodine

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

144. In which of the following pairs molecules /ions both the species are not likely to exist?
    a. H^-_2 : He^{2-}_2
    b. H^{2+}_2 : He_2
    c. H^-_2 : He^{2+}_2
    d. H^+_2 : He^{2-}_2

145. One would expect proton to have very large
    a. Ionization potential
    b. Radius
    c. Charge
    d. Hydration energy

146. The mass of 1 mole of electron is
    a. 9.1×10^{-28} g
    b. 1.008 mg
    c. 055mg
    d. 9.1×10^{-27} g

147. The C_{14} to C_{12} ratio in a wooden article is 13% that of the fresh wood calculate the age of the wooden article. Given that the half–life of $C_{14 \, is}$ 5770 yr.
    a. 16989 yr
    b. 16858 yr
    c. 15675 yr
    d. 17700 yr

148. The number of neutron s in the parent nucleus which gives N^{14} on β emission is '
    a. 7
    b. 14
    c. 6
    d. 8

149.   A reversible chemical reaction is having two reactants in equilibriums if the concentration of the reactants are doubled then equilibrium constant will be
   a. Doubled
   b. One fourth
   c. Halved
   d. Remain same
150.   Which is the phenomenon who help us to calculate lattice energy of ionic crystal
   a. Hess law
   b. Enthalpy of formation
   c. Born Haber process
   d. None
151.   Which of the following will have highest coagulating power for As_2S_2 colloids.
   a. Al^{3+}
   b. PO_4^{3-}
   c. SO_4^{2-}
   d. Na^-
152.   This low density of ice compared to water is due to
   a. Induced dipole induced dipole interactions
   b. Dipole induced dipole interactions
   c. Hydrogen bonding interaction
   d. Dipole dipole interaction

153.   The bond order in N_2^+ is
   a. 1.5
   b. 3.0
   c. 2.5
   d. 2
154.   The oxidation number of N in NH_3 is
   a. +3
   b. +5
   c. -3
   d. 0
155.   Which one of the following reactions involves oxidation reductions?
   a. $H_2 + Br_2 \rightarrow 2\ HBr$
   b. $NaBr + HCl \rightarrow NaCl + HBr$
   c. $HBr + AgNO_3 \rightarrow AgBr + HNO_3$
   d. $2NaOH + H_2SO_4 \rightarrow Na_2SO_4 + 2H_2O$

156. How can we predict whether a reaction will be a spontaneous or not
   a. By calculating its energy
   b. By understanding its free energy
   c. By changing energy levels
   d. None
157. What is the molarity of 0.2N Na_2CO_3 solution?
   a. 0.1M
   b. 0M
   c. 0.4M
   d. 0.2M
158. Spontaneous reaction is one
   a. Directional ,irreversible ,real process
   b. Unidirectional reversible imaginary process
   c. Irreversible, unidirectional and real process
   d. Imaginary irreversible reaction
159. One liter oxygen gas at S.T.P. will weight:
   a. 1.43g
   b. 2.24g
   c. 11.2g
   d. 22.4g
160. Rate of reaction
   a. Decreases with increase in temperature
   b. Increases with increase in temperature
   c. May increase or decrease with increase in temperature
   d. Does not depend on temperatures
161. Which of these polymers is an addition polymer?
   a. Nylon
   b. Polystyrene
   c. Terylene
   d. Epoxy resin
162. A catalyst is a substance which
   a. Is always in the same phase as in the reactions
   b. Alters the equilibrium in a reaction
   c. Does not participate in the reaction but alters the rate of reaction
   d. Participates in the reaction and provide an easier pathway for the same
163. Which structure of protein gives the sequence of amino acids only?
   a. Primary structure
   b. Secondary structure
   c. Tertiary structure
   d. Quaternary structure

164. An aqueous solution of glucose is 10% in strength. The volume in which 1 g/moll of it is dissolved, will

    a. 9 l

    b. 1.8l

    c. 8l

    d. 0.9l

165. The strongest Bronsted base is

    a. ClO_3^-

    b. ClO_2^-

    c. ClO_4^-

    d. ClO^-

166. A solution contains 10 m 0.1 NaOH and 10 ml. 0.05 N H_2SO_4. pH of this solution is

    a. Less than 7

    b. 7

    c. 0

    d. Greater than 7

167. A saturated solution of Ag_2SO_4 is 2.5×10^{-2} M the value of its solubility products is

    a. 62.5×10^{-6}

    b. 6.25×10^{-4}

    c. 15.625×10^{-6}

    d. 3.125×10^{-6}

168. What is the freezing point of a solution containing 8.1 g HBr in 100 g of the water assuming the acid to be 90% ionized? (k_f for water = 1.86 k/mol)

    a. 0.85^0C

    b. -3.53^0C

    c. 0^0C

    d. -0.35^0C

169. The pH value for 1/1000 N-KOH solution is

    a. 3

    b. 10^{-11}

    c. 2

    d. 11

170. All fats are

    a. carbohydrates

    b. Hydrocarbons

    c. Aldehydes

    d. Esters

171.   We went to pace and bought _____ wedding suit for the bride
   a. New
   b. A new
   c. The new
   d. An new

172.   Citizens have right that everyone should have _____ opportunity to have job
   a. An equal
   b. A equal
   c. The equal
   d. Equal

173.   They had an accident in _____ car they painted last month
   a. An new car
   b. The new car
   c. A new car
   d. New car

174.   _____ is a virtue.
   a. Honesty
   b. An honesty
   c. A honesty
   d. The honesty

175.   His _____ father is eighty years old, and he still runs fasts
   a. A
   b. An
   c. The
   d. None

Educational planning should aim at meeting the educational needs of the entire population of all age groups. While the traditional structure of education as a three layer hierarchy from the primary stage to the Universities represents the court, we should not overlook the periphery which is equally important. Under modern conditions, workers need to rewind, or renew their enthusiasm, or strike out in a new direction or improve their as much as any university professors. The retired and the aged have their needs as well. Educational planning, in their words, should take care of the needs of every one.

Our structure of education have been built up on the assumption that there is a terminal point to education. This basic defect has become all the more harmful today. A UNESCO report entitled "Learning to be" prepared by edger Faure and others in 1973 asserts that the education of children must prepare the future adult for various forms of self-learning a viably education system of the future should consist of modules with different kinds of functions serving a diversity of constituents. And performance, not the period of study, should be the basis for credentials. The writing is already on the wall.

In view of the fact that the significance of a commitment of lifelong learning and lifetime education is being discussed only a recent year even in educationally advanced countries, the possibility of the idea becoming an integral part of educational thinking in to be a far cry. For, to move in the direction means such more than some simple rearrangement of the present organization of education but a good beginning can be made by developing open university programs for older learners of different categories and introducing extension service in the conventional colleges and schools also these Institutions should learn to cooperate with the numerous community organizations such as libraries, museums, municipal recreational programs, health service etc..

176. What is the main thrust of the author?
   a. Traditional systems should be strengthened
   b. Formal education is more important than non-formal.
   c. One should never cease to learn
   d. It is impossible to meet the needs of everyone

177. Which of the following describes the purpose of the author?
   a. To criticize the present educational system
   b. The strengthen the present educational practice
   c. To support non-conventional educational organizations
   d. To present a pragmatic point of view

178. According to the passage, the present education structure assume which of the following?
   a. All people can be educated as per their needs
   b. Present educational planning is very much practical
   c. Education is a onetime process
   d. Simple rearrangement of the present educational system is a must

179. What should be the measure characteristic of the future educational system?
   a. Different modules with the same function
   b. Same modules for different groups
   c. No modules but standard compulsory program for all
   d. None of these

180. According to the author, educational plan should attempt to
   a. Train the people at the core
   b. Encourage conventional schools and colleges
   c. Decide a terminal point to education
   d. Fulfill the educational needs of everyone

181. Iron: blacksmith (analogy)
   a. Cotton : cloth
   b. Food :gourmet
   c. Clay :potter

d. Silver; miner
182. Fish : scales (analogy)
   a. Book : papers
   b. Snakes : fangs
   c. Birds : feather
   d. Car : wheels
183. Nose : smell (analogy)
   a. Tongue : speak
   b. Foot : hit
   c. Hand : finger
   d. Teeth : chew
184. Collage : images (analogy)
   a. Cement : building
   b. Medley : songs
   c. furniture : sofa
   d. Grains : tree
185. Sketch : artist (analogy)
   a. Secret : confident
   b. Cell : prisoner
   c. Palette : painter
   d. Draft :writer
186. Fragile : (synonyms)
   a. Strong
   b. Grave
   c. Weak
   d. Showy
187. Esoteric : (synonyms)
   a. Fair
   b. Popular
   c. Alluring
   d. Private
188. Synchronized : (antonym)
   a. Arrhythmic
   b. Resonating
   c. Harmonized
   d. Brought into accord
189. Chaotic : (antonym)
   a. Immersive
   b. Orderly
   c. Hectic
   d. Steady

190. Bombastic : (antonym)
   a. Creative
   b. Selfish
   c. Astounded
   d. Polite
191. The current president of European union belong to which country
   a. Greece
   b. Austria
   c. Germany
   d. Latavia
192. Chief Minister of Punjab?
   a. Javed mehmood
   b. Shahbaz sharif
   c. Captain arif Nadeem
   d. none
193. Who visited Pakistan and agreed to enhance their defense cooperation and support each other's position on regional issues, including Syria and Afghanistan?
   a. Saudi foreign minister
   b. American foreign minister
   c. German foreign minister
   d. French foreign minister
194. The international day of peace sometime unofficially known as world peace day, is observed annually on:
   a. 21st September
   b. 23rd September
   c. 12th October
   d. None of these
195. International day for the elimination of violence against racial discrimination is observed annually on:
   a. 23rd may
   b. 21st march
   c. 1st march
   d. None of these
196. The 'KASHAF-UL-MAHJUB' was written by?
   a. HAZRAT DATA GUNJ BUKSH(R.A)
   b. Maulana Altaf Hussain Hali
   c. Maulana Shibli Nomani
   d. Maulana Zakaullah

197. Which are five international languages of the world that has been classified as the classical languages?
   a. Chinese , Sanskrit, Arabic, Russian, and Latin
   b. Chinese , French , English , Greek , and Latin
   c. Chinese , Sanskrit, Arabic, Greek, and Latin
   d. None of these
198. In which nuclear plant of japan did the radioactive water leak of 100 tones took place?
   a. Ikata nuclear power plant
   b. Kashiwazaki ,karima nuclear power plant
   c. Fukushima nuclear power plant
   d. Hamaoka nuclear power plant
199. The book titled "the Meaning of success: Insight from women" has been released by which world famous university to address the decline of women professors in the university?
   a. Oxford university
   b. London school of economics
   c. Cambridge university
   d. Harvard university
200. FIA Stand for
   a. Federal investigation agency
   b. Federal internal agency
   c. Foreign investigation agency
   d. none