SET VII

1. The ratio of escape velocity to the orbital velocity is

[1 Marks]

a. $\sqrt{2}$:1

b. 2:1

c. 1: $\sqrt{2}$

d. 1:2

2. The elongation of a wire under a given load is

[1 Marks]

a. Directly proportional to diameter

b. Inversely proportional to diameter

c. Directly proportional to square of diameter

d. Inversely proportional to square of diameter

3. What happens when water at 4℃ is heated further

[1 Marks]

a. Mass increases slightly

b. Mass decreases slightly

c. Volume increases slightly

d. Volume decreases slightly

4. Specific heat of a gas undergoing adiabatic changes is

[1 Marks]

a. Zero

b. Infinite

c. Positive

d. Negative

5. In the equation of progressive wave $y = Rsin\omega t - kx$ the maximum transverse speed of wave is

[1 Marks]

a. $\frac{\omega}{k}$

b. $\frac{d\omega}{dk}$

c. $R\omega$

d. k / ω

6. The transverse nature of light is shown by

[1 Marks]

a. Interference

b. Diffraction

c. Polarization

d. Dispersion

7. If I is the intensity of scattered light by medium then according to Rayleigh's law of scattering,

[1 Marks]

a. $I \propto \lambda^4$

b. $I \propto \frac{1}{\lambda^4}$

c. $I \propto \frac{1}{\lambda^3}$

d. $I \propto \frac{1}{\lambda^2}$

8. The speed of sound in gas is v. The rms speed of molecules of this gas is c. if $\gamma = \frac{C_P}{C_V}$, the ratio of v to c is

[1 Marks]

a) $\frac{3}{\gamma}$

b) $\frac{\gamma}{3}$

c) $\sqrt{\frac{3}{\gamma}}$

d) $\sqrt{\frac{\gamma}{3}}$

9. A parallel plate capacitor is immerged in an oil of dielectric constant K. The capacitance:

[1 Marks]

a. Decreases K times

b. Increases K times

c. Increases K^2 times

d. Remains same

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d. Remains same

11. The temperature of the cold junction of thermocouple is 0℃ and the temperature of hot junction is T℃. The emf is $E = 16T - 0.04T^2\ \mu V$. The temperature of inversion is

[1 Marks]

a. 200℃

b. 400℃

c. 100℃

d. 300℃

12. Which of the following is suitable for the core of electromagnets?
[1 Marks]

a. Bismuth

b. Chromium

c. Soft iron

d. Cu-Ni alloy

13. Cathode rays have particle nature because of the fact that
[1 Marks]

a. They can propagate in vacuum

b. They are deflected by electric and magnetic fields

c. They produce fluorescence

d. They cast shadows

14. Planck's constant has the dimension of
[1 Marks]

a. Energy

b. Mass

c. Frequency

d. Angular momentum

15. The angular momentum of electron in the second orbit of hydrogen atom is
[1 Marks]

a. $\frac{h}{2\pi m}$

b. $\frac{h}{\pi}$

c. $\frac{2\pi}{h}$

d. $\frac{h}{2\pi}$

16. Which of the following is not the property of Higgs boson

[1 Marks]

a. It is charge less

b. Its spin is zero

c. its mean life time is 1.56×10^{-22}sec

d. its mass is less than boson

17. A chain of length L and mass M is kept on a rough horizontal table having coefficient of friction μ. The maximum length of chain that can hang outside without sliding is

[2 Marks]

a. $\frac{\mu L}{\mu + 1}$

b. $\frac{L}{\mu}$

c. μL

d. $\frac{L}{\mu + 1}$

18. A body of mass M and radius R, rolling on horizontal surface, without slipping, with velocity v, rises up an incline plane to maximum height $\frac{7v^2}{10g}$, the body is

[2 Marks]

a. Hollow sphere

b. Solid sphere

c. Disc

d. Ring

19. 8 equal drops are falling through air with steady velocity of 5cm/s. If drops coalesce, new terminal velocity will be

[2 Marks]

a. 10cm/s

b. 5cm/s

c. 20cm/s

d. 40cm/s

20. Air is filled in a container at 60℃. The temperature should it be heated in order that 1/3 of air may escape out of the container is

[2 Marks]

a. 444℃

b. 121℃

c. 222℃

d. 171℃

21. An observer moves towards a stationary source of sound with a velocity one-fifth of the velocity of sound. The percentage change in apparent frequency is

[2 Marks]

a. 20%

b. 25%

c. 120%

d. 50%

22. Light of wavelength 600nm is incident normally on a slit of width 0.1mm. The angular position of the first minimum is

[2 Marks]

a. 0.10°

b. 0.19°

c. 0.34°

d. 0.71°

23. A convex mirror of focal length f produces an image $\frac{1}{n}th$ of size of object. The distance of object from the mirror is

[2 Marks]

a. fn - 1

b. $\frac{f}{n}$

c. $\frac{f}{n-1}$

d. nf

24. A parallel plate capacitor has a capacitance of $10\mu F$. The area of the capacitor is divided into two equal halves and filled with two media having dielectric constants $K_1 = 2$ & $K_2 = 4$. The capacitance of the system will be

[2 Marks]

a. 30 μF

b. 15 μF

c. 25 μF

d. 20 μF

25. The wire of a fuse in an electric circuit melts when the current density increases to $600 Am^{-2}$. The diameter of the wire so that it may limit the current to 0.4A is

[2 Marks]

a. 0.04A

b. 0.08A

c. 0.12A

d. 0.16A

26. An airplane with a wingspan of 30 m flies at a horizontal speed of 100m/s in a region where the vertical component of magnetic field due to earth is $5.0 \times 10^{-4} Wb\, m^{-2}$. The p.d. between the tips of wings is

[2 Marks]

a. 1.5V

b. 0.5V

c. 3V

d. 4.5V

27. If two ions of same charge and energy but different masses m_1 & m_2 are passing through a uniform magnetic field, the ratio of radii of their paths is

[2 Marks]

a) $\sqrt{\frac{m_1}{2m_2}}$

b) $\frac{m_1}{m_2}$

c) $\sqrt{\frac{m_1}{m_2}}$

d) $\sqrt{\frac{2m_1}{m_2}}$

28. A pure silicon at 300K has equal electron and hole concentrations of $1.5 \times 10^{16} m^{-3}$. Doping by indium increases the hole concentration to $4.5 \times 10^{22} m^{-3}$. The new electron concentration in the doped silicon is

[2 Marks]

a. $5 \times 10^{22} m^{-3}$

b. $5 \times 10^{16} m^{-3}$

c. $5 \times 10^{9} m^{-3}$

d. $1.5 \times 10^{9} m^{-3}$

29. Identify the correct parts of Speech for the underlined word in the given sentence: <u>After</u> lunch let's go out for a coffee.

[1 Marks]

a. Pronoun

b. Preposition

c. Verb

d. Adverb

30. We _____there three days ago.

[1 Marks]

a. Went

b. Will go

c. Gone

d. G

31. The town ..... its name from the famous temple and .....to be one of the oldest settlements in Nepal.

[1 Marks]

a. Has taken, said

b. Take, is

c. Takes, is said

d. Taking, said

32. You would _____gotten wet _____it had rained.
[1 Marks]

a. Has- when

b. Have- if

c. Be- when

d. Have- when

33. The direct speech for “The father warned his son that he should be aware of him” is:
[1 Marks]

a. The father warned his son, "Beware of him!"

b. The father warned his son, "Watch that chap!"

c. The father warned his son, "Be careful about him."

d. The father warned his son, "Don't fall into the trap."

34. Convert the affirmative sentence into a negative sentence:Mili is prettier than Neha.
[1 Marks]

a. Neha is not as pretty as Mili.

b. Mili is not as pretty as Neha.

c. Neha is not as prettier as Mili.

d. Mili is not prettier than Neha.

35. Coal and oil _____considered to be non-renewable resources.
[1 Marks]

a. has been

b. was

c. is

d. are

36. You can see the doctor _____8 am and 12 noon.

[1 Marks]

a. At

b. In

c. Between

d. On

37. Action _____louder than the word.

[1 Marks]

a. Speaks

b. Depicts

c. Speak

d. Has spoken

38. The antonym of the word Artificial is.

[1 Marks]

a. Natural

b. Genuine

c. Both a and b

d. None of the above

39. Identify the word in which the final sound is different from other words.

[1 Marks]

a. Sleep

b. Reap

c. Teach

d. Deep

40. _____are considered as Function words.

[1 Marks]

a. Stressed

b. Accented

c. Non-stressed

d. Content

41. 4.5 g of a metal on reaction with acid gives 5.6 liters of hydrogen gas at STP. The equivalent weight of metal is

[1 Marks]

a. 7

b. 9

c. 12

d. 20

42. Which of the following is non-polar molecule with polar covalent bond?

[1 Marks]

a. SO_2

b. NH_3

c. CO

d. $BeCl_2$

43. Which of these is conjugate acid base pair?

[1 Marks]

a. $H_2|H^+$

b. $NH_4^+|NH_2^-$

c. $CH_4|CH_3^-$

d. $H_3PO_4|PO_4^{--}$

44. Element A belongs to group VII in p-block and element B belongs to group I in s-block of the periodic table. Out of the following assumptions, the correct one is:

[1 Marks]

a. A and B are metals

b. A and B are non-metals

c. A is a metal and B is a non-metal

d. A is a non-metal and B is a metal

45. Isoelectronic species pair of carbomonoxide is

[1 Marks]

a. N_2

b. O_2^{++}

c. Si

d. All

46. Which of these can reduce both conc. H_2SO_4 and $FeCl_3$ solution?

[1 Marks]

a. HF

b. HCl

c. HBr

d. HI

47. A deep brown gas is formed by mixing two colourless gases which are

[1 Marks]

a. NO_2 and O_2

b. N_2O and NO

c. NO and O_2

d. NH_3 and HCl

48. Which of these is used as flux in the extraction of Zn by vertical retort process?
[1 Marks]

a. P_2O_5

b. CaO

c. SiO_2

d. None

49. The secondary suffix for the compound $CH_3COCH_2CH_2OH$ is:
[1 Marks]

a. – ol

b. – al

c. – one

d. – omol

50. Homolytic fission of C-C bond in ethane gives an intermediate in which carbon atom is
[1 Marks]

a. sp^3 hybridized

b. sp^2 hybridized

c. sp hybridized

d. sp^2d hybridized

51. Which of the following is not a mixture of hydrocarbons?
[1 Marks]

a. Candle wax

b. Kerosene

c. Vegetable oil

d. Paraffin oil

52. The volume of CO_2 at STP formed by reacting 4 g of methane with 20 g of oxygen is

[2 Marks]

a. 5.6 liters

b. 6 liters

c. 7.5 liters

d. 7 liters

53. 0.975 grams of metal were deposited by passing 193C charge through Mn^+ ion. The value of n is (Atomic weight of M = 195) :

[2 Marks]

a. 1

b. 2

c. 3

d. 4

54. 20ml of HCl solution required 21.8 ml of 0.1N NaOH for neutralization, vol. of water that should be added to 1 litre of HCl to get exactly decinormal is

[2 Marks]

a. 1090

b. 90

c. 1000

d. 190

55. 1 litre of saturated solution of $BaSO_4$ contains 2.33×10^{-3} g of $BaSO_4$. The K_{SP} of $BaSO_4$ is (mol. wt. of $BaSO_4$ = 233)

[2 Marks]

a. 1×10^{-9}

b. 1×10^{-10}

c. 5×10^{-8}

d. 5×10^{-9}

56. Gas formed by hydrolysis of calcium carbide on passing through dil. H_2SO_4 + dil. $HgSO_4$ gets converted into
[2 Marks]

a. CH_3COCH_3

b. CH_3CHO

c. $CH_3COOC_2H_5$

d. CH_3CH_2OH

57. The tough cake copper is the copper obtained after purification of blister copper by
[2 Marks]

a. electrorefining

b. poling

c. liquation

d. distillation

58. A compound formed by distillation of phenol with Zinc dust on heating with CH_3Cl in presence of $AlCl_3$ gives
[2 Marks]

a. Toluene

b. Xylene

c. Benzene

d. bi-phenyl

59. The number of terms in the expression $(a + b)^{12}$ is
[1 Marks]

a. 13

b. 12

c. 11

d. 10

60. If S and P are the sum and the product of the roots of a quadratic equation, then quadratic equation is
[1 Marks]

a. $x^2 + Sx - P = 0$

b. $x^2 - Sx + P = 0$

c. $x^2 - Sx - P = 0$

d. $x^2 + Sx + P = 0$

61. A matrix in which the number of rows is not equal to the number of columns is called a
[1 Marks]

a. diagonal matrix

b. rectangular matrix

c. square matrix

d. scalar matrix

62. ${}^nP_r =$
[1 Marks]

a. n!

b. r !

c. $\frac{n!}{(n-r)!}$

d. none of these

63. The nth term of a G.P. is
[1 Marks]

a. $a_1 r^n$

b. $a_1 r^{n+1}$

c. $a_1 r^{n-1}$

d. ar^{-n}

64. $\int_1^2 x^2 + 1dx =$

[1 Marks]

a. $\frac{10}{3}$

b. $\frac{3}{10}$

c. π

d. $\frac{\pi}{2}$

65. The area enclosed between the graph of $y = x^3$ and the lines $x = 0, y = 1, y = 8$ is

[1 Marks]

a. 7

b. 14

c. 45/4

d. None of these

66. If $f'(c)$ does not change before and after $x = c$, then this point is called

[1 Marks]

a. Stationary point

b. turning point

c. critical point

d. point of inflexion

67. $\frac{d}{dx}(ax + b)^n =$

[1 Marks]

a. $na^{n-1}x + b$

b. $n(ax + b)^{n-1}$

c. $na^{n-1}x$

d. $na(ax + b)^{n-1}$

68. $\lim_{x \to 0} \frac{\tan x}{x}$ is

[1 Marks]

a. 0

b. 1

c. π

d. The limit does not exist.

69. The circle $x^2 + y^2 + 4x - 4y + 4 = 0$ touches

[1 Marks]

a. X-axis and y –axis

b. X-axis

c. Y- axis

d. None of these

70. The vertex of the parabola $y^2=4a(x-a)$ is:

[1 Marks]

a. (0,

b. (-a,0)

c. (a,0)

d. (0,-a)

71. The product of the length of the perpendicular from the point (1,2) to the lines $2x^2+5xy-4y^2 = 0$ is

[1 Marks]

a. $\frac{4}{\sqrt{61}}$

b. $\frac{2}{\sqrt{31}}$

c. $\frac{5}{\sqrt{49}}$

d. $\frac{3}{17}$

72. If (3,3) lies on the line joining the points (h,0) and (0,k) then
[1 Marks]

a. h+k = 9

b. $\frac{1}{h}+\frac{1}{k}=\frac{1}{3}$

c. hk = 3

d. 3h-3k = 1

73. If the planes x+2y+kz = 0 and 2x+y-2z=0 are at right angle then k=
[1 Marks]

a.-1/2

b. ½

c.-2

d. 2

74. The graph of the binary relation $y = x^2 - 6x + 5$ represents
[1 Marks]

a. line

b. circle

c. parabola

d. ellipse

75. If $\cos^{-1}\frac{12}{13} =$
[1 Marks]

a. $\sin^{-1}\frac{5}{13}$

b. $\sin^{-1}\frac{13}{12}$

c. $\sin^{-1}\frac{13}{5}$

d. none of these

76. The probability that A speaks truth is $4 / 5$ while this probability for B is $3 / 4$. The probability that they contradict each other when asked to speak on a fact is

[1 Marks]

a. $\frac{3}{20}$

b. $\frac{1}{5}$

c. $\frac{7}{20}$

d. $\frac{4}{5}$

77. When tested the lives (in hours) of 5 bulbs were noted as follows: 1357, 1090, 1666, 1494, 1623. The mean of the lives of 5 bulbs is

[1 Marks]

a. 1445

b. 1446

c. 1447

d. None of these

78. Which of these is a relative measure of dispersion

[1 Marks]

a. Standard Deviation

b. Variance

c. Coefficient of Variation

d. None of these

79. If $\alpha \text{ and } \beta$ are roots of $2x^2 - 4x + 5 = 0$ then $\alpha + 1\,(\beta + 1)$ is

[2 Marks]

a. $\frac{11}{2}$

b. $-\frac{11}{2}$

c. $\frac{2}{11}$

d. $-\frac{2}{11}$

80. How many signals can be given by 5 flags of different colors, using 3 at a time
[2 Marks]

a. 120

b. 60

c. 24

d. 15

81. The harmonic mean between 3 and 7 is
[2 Marks]

a. 5

b. $\pm\sqrt{21}$

c. $\frac{21}{5}$

d. none of these

82. $\int x^x\,(1+\log x)\,dx$ is equals to
[2 Marks]

a. $x^x + c$

b. $x^{-x} + c$

c. $x\log x + x$

d. $\log x + x$

83. If $f'(x) = 0, f''(x) \leq 0$ at a point P, then P is called
[2 Marks]

a. Relative maxima

b. relative minima

c. point of inflexion

d. None of these

84. If $f(x) = \frac{1}{x}$, then $f''(a) =$

[2 Marks]

a. $-\frac{2}{(a)^3}$

b. $-\frac{1}{a^2}$

c. $\frac{1}{a^2}$

d. $\frac{2}{a^3}$

85. $\lim_{x \to 0} \frac{\sin x}{x^2 + 3x}$ is

[2 Marks]

a. 1

b. $\frac{1}{3}$

c. 3

d. ∞

86. The equation of the circle is $x^2+y^2-4x-2y+3=0$. Then the equation of the tangent at (1,2) is

[2 Marks]

a. x+y-3=0

b. x+2y-5=0

c. x-y+1=0

d. 3x-2y-7=0

87. Maximum number of normal, which can be drawn from a point to a parabola is

[2 Marks]

a. 1

b. 2

c. 3

d. 4

88. If the pair of straight lines $ax^2+2hxy+ay^2=0$ and $bx^2+2gxy-by^2 = 0$ are such that each pair bisects the angle between the other, then

[2 Marks]

a. ag+bh = 0

b. bg +ah = 0

c. gh+ab = 0

d. h^2-ab

89. If a line lie in a octant OXYZ and it makes equal angles with the axes, then

[2 Marks]

a. l=m=n $=\frac{1}{\sqrt{3}}$

b. l=m=n$=\pm\frac{1}{\sqrt{3}}$

c. l=m=n $=\frac{1}{3}$

d. l=m=n $=\frac{1}{\sqrt{2}}$

90. If A = {1, 3, 5, 7, 9, 11, 13, 15, 17}, B = {2, 4... 18} and N is the universal set, then $A' \cup ((A \cup B) \cap B')$ is

[2 Marks]

a. A

b. N

c. B

d. None of these

91. Period of $\tan 4x$ is

[2 Marks]

a. π

b. $\frac{\pi}{2}$

c. $\frac{\pi}{4}$

d. 2π

92. If $\vec{a}$ and $\vec{b}$ are two vectors then $|\vec{a} \times \vec{b}|^2 + |\vec{a} \cdot \vec{b}|^2 =$

[2 Marks]

a. $|a|^2$

b. $|b|^2$

c. $|a|^2 \ |b|^2$

d. None of these

93. Which of the following is not a cyclic ether?

[2 Marks]

a. THF

b. Oxetane

c. Oxirane

d. Anisole

94. Tarnishing of silver is due to the formation of

[2 Marks]

a. AgCl

b. Ag_2S

c. Ag_2O

d. Ag_2SO_4

95. In haloarene, halogen atom is attached to…….Hy-bridised carbon

[1 Marks]

a. sp

b. sp^2

c. sp^3

d. may be sp, sp^2 or sp^3

96.

Read the following passage and answer the four question that follow:

The Suez Canal is a man-made canal located in Egypt that connects the Red Sea to the Mediterranean Sea. It was built in the mid-19th century to provide a shorter and more direct route for ships travelling between Europe and Asia. The Suez Canal is an important waterway for international trade, with over 50,000 ships passing through each year. It is also a major source of revenue for Egypt, as ships must pay a fee to use the canal. The Suez Canal is an engineering marvel and is considered one of the greatest achievements of the 19th century.

97. Where is the Suez Canal located?

[2 Marks]

a. Egypt

b. Mediterranean Sea

c. Red Sea

d. Europe

98. What does the Suez Canal connect?

[2 Marks]

a. The Red Sea to the Mediterranean Sea

b. The Mediterranean Sea to the Atlantic Ocean

c. The Red Sea to the Indian Ocean

d. The Mediterranean Sea to the Pacific Ocean

99. Why was the Suez Canal built?

[2 Marks]

a. To provide a shorter and more direct route for ships

b. To connect the two seas for recreational purposes

c. To create a new source of revenue

d. To boost tourism in the area

100. What is the Suez Canal considered to be?

[2 Marks]

a. An engineering marvel

b. A tourist attraction

c. A minor waterway

d. A failure of the 19th century