Entrance Examination 2074

Mathematics

1. $p/q \quad q \in R$, **is undefined if**

   a. $p \neq 0, q = 0$ b. $p = 0, q = 0$

   c. $p \neq 0, q \neq 0$ d. $p = 0, q \neq 0$

2. $[a, b] =$

   a. $\{x: a \leq x \leq b\}$ b. $\{x: a < x < b\}$

   c. $\{x: a < x \leq b\}$ d. $x: a \leq x < b\}$

3. **If** $f: R \to R$ **defined by** $f(x) = \sqrt{(4 - x^2)}$ **then** $f(-3)$

   a. $Undefined$ b. $\sqrt{13}$

   c. $i\sqrt{5}$ d. $-\sqrt{13}$

4. **If** $|x| = 1$ **then** x **is**

   a. $\{1\}$ b. $\{-1\}$

   c. $\{-1,1\}$ d. $-1, -1$

5. **If** $log_2(x - 7) = 1$, **then** x **is**

   a. $Not\ Know$ b. 8

   c. 6 d. 9

6. **The value of** $\sin(cos^{-1} 4/5)$ **is**

   a. $4/5$ b. $3/5$

   c. $5/4$ d. $5/3$

7. **If** $tan^2 x = 3$ **then** x **is**

   a. $n^{\pi + \frac{\pi}{3}}$ b. $n^{\pi - \frac{\pi}{3}}$

   c. $n^{\pi \pm \frac{\pi}{3}}$ d. $n\pi$

8. **If** $k + 2, 4k - 6, 3k - 2$ **are in AP then** k **is**

a. -6 b. 0

c. 3 d. -3

9. The sum of infinity of $1 - 1/2 + 1/4 - 1/8$ … … is

a. 0 b. $2/3$

c. $1/3$ d. 1

10. If $A = \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix}$ and $B = (1 \quad 2 \quad 3)$ is

a. 14 b. $(1 \quad 2 \quad 3)$

c. 0 d. $\begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$

11. The value of $\begin{bmatrix} 0 & 2 & 3 \\ 1 & 2 & 3 \\ 4 & 8 & 12 \end{bmatrix}$ is

a. 10 b. 1

c. 0 d. -1

12. The matrix $\begin{bmatrix} 1 & 2 & 3 \\ -2 & 0 & 4 \\ -3 & -4 & 5 \end{bmatrix}$ is

a. $Diagonal$ b. $Symmetric$

c. $Skew\ Symmetric$ d. $Unit$

13. $[2(\cos 15 + isin15)]^6 =$

a. $64\ I$ b. 64

c. 0 d. $-64i$

14. $(1 + w - w^2)^3 + (1 + w - w^2)^3 =$

a. 16 b. $16w$

c. -16 d. w^2

15. The quadratic equation whose roots are -3 and -2 is

a. $x^2 + x - 6 = 0$ b. $x^2 + x + 6 = 0$

c. $x^2 - x - 6 = 0$ d. $x^2 - x + 6 = 0$

16. The line $kx + 3y + 5 = 0$ *and* $5x - 2y - 6 = 0$ *are perpendicular to each other for* $k =$

a. $6/5$ b. $-6/5$
c. $3/5$ d. $-3/5$

17. The lines represented by $5x^2 + 3xy + ky^2$

a. 5 b. 3
c. 0 d. -5

18. The equation tangent to the circle $x^2 + y^2 = 9$ at (1,1) is

a. $x + y = 9$ b. $x - y = 9$
c. $2x + 2y = 9$ d. $-x - y = 9$

19. $\lim_{n\to\infty} \frac{3x^2+2x-5}{6x^2+4x-7} =$

a. 2 b. 3
c. $5/7$ d. $1/2$

20. $\lim_{n\to\infty} 1 - \frac{\cos ax}{x^2} =$

a. $a^2/2$ b. a^2
c. $2a^2$ d. $4a^2$

21. If $x + t\sin t,\ y = 1 - \cos t$ *then* $\frac{dy}{dx}$ *is*

a. $\tan t$ b. $\tan t/2$
c. $-\tan t$ d. $-\tan t/2$

22. The derivative of $\cos x$ *w.r.t.* $\sin x$ *is*

a. $-\tan x$ b. $\tan x$
c. $\cot x$ d. $-\cot x$

23. The point of inflection of $y = x^3 - 12x^2 = 0$ *is*

a. 12 b. -12
c. 4 d. 0

24. $\int \frac{dx}{\sin^2 x} =$

a. $\cot x + C$ b. $-\cot x + C$

c. $\tan x + C$ d. $-\tan x + C$

25. $\int_0^1 \frac{dx}{1+x^2} =$

a. $\frac{\pi}{4}$ b. $\frac{\pi}{2}$

c. 0 d. 1

English

26. The word “commemorate “has the streeson.....syllable.
    (a) First (b) second (c) fourth
27. The word “go” has the same vowel sound as the word..... ..
    (a) Nor (b) four (c) sew
28. I hope that a school..... For collage children.
    (a) Opens V (b) is opened
    (c) U has to be opened 3 (d) be opened
29. One who is found of fight is
    (a) Bellicose (b) bigot (c) pacifist (d) fatalist
30. Select the right synonym to the word “ambiguous”.
    (a) Obvious (b) clear (c) clear (d) expressed
31. Give the opposite meaning od “ominious”.
    (a) rash (b) auspicious (c) folly e (d) fictitions
32. He die..... Cancer but she died ..... the losss of blood.
    (a) Of, from (b) from ,of (c) of ,at
33. Whom did you give it.....?
    (a) At (b) for (c) from (d) to
34. The dog sprang .....a cat.
    (a) Upon (b) on (c) at (d) from
35. Insert the missing vowels in these Inn
    (a) e-i-0 (b) i-o-e (c) 1
36. Choose the correct word from given option: Rice and curry…….mmmyfavorite dish.
    (a) Are (b) has (c) is (d) am
37. There is snag in it somewhere.
    (a) Flow (b) insect (c) 1
38. Customer of having many wives is called
    a) Bigamy (b) polygamu (¢) monogamy (d) matrimony
39. Choose the right word Monkeys.....
    (a) Growl (b) gibber (c) yelp (d) howl
40. Choose the right grammatical category of the underlined phase.
    Ram handed a book (to his sister.)
    (a) Complement (b) direct object
    (c) adjuct (d) indirect object
41. The car needs hood repaired.
    (a) Its (b) it’s (c) itself (d) there
42. These two photographers are ..... same.

(a) A (b) an (c) the (d) same

43. The girl is versatile ,means
    (a) Bad (b) gifted (c) clumsy (d)unlucky
44. The word “aggression ” takes the prefix ’
    (a) Non (b) un (c) in (d)il
45. Fear of fire is called .....
    (a) Sitophobia (b) pyrophobia
    (c) trichophobia (d) monomania
46. Which of the following is a noun?
    (a) Real (b) readable (c) readable
47. We waited of the bus stop.....the bus came
    (a) Fill (b) until (c) while (d) unless
48. One who travels from place to palace.
    (a) Itinerant (b) mendicant (c) tramp (d) tourist
49. You.re coming to the party .....?
    (a) Are’nt you (b) cant’you (c) won’t (d) isn’t
50. Are you my friend or enemy? Has a tone.
    (a) risingand rising (b) rising and falling
    (C) rising (d) falling and falling

Physics

51. The order of magnitude of radius an atom is
    (a) 10^{-7} m (b) 10^{-10} m (c) 10^{-12} m (d) 10^{-15} m
52. A projectile goes farthest away from the earth, When the angle of projection is
    (a) 0° (b) 45° (c) 90° (d) 120°
53. A simple pendulum when set into vibration comes to rest after sometime become of
    (a) Friction of air (b) tension of air
    (c) Gravity (d) its mass
54. Power /clings to the skin because of
    (a) Compression (b) cohesion
    (c) Adhesion (d) capillarity
55. Viscosity is the inherent property of liquids and gases and ismore closely related to
    (a) Inertia (b) shearing strain
    (c) transfer of momentum (d) surface tension
56. A bridge of steel has length 700m, the temperature varies from243k to 131k. The change in length of the bridge for aboveseasonal variation in temperature is ~((lsteel=11 10‘/k)
    (a) 15.4cm (b) 15.4cm (c) 15.8cm (d) 10cm
57. The internal energy of a perfect gas does not change during

(a) adialatic (b) isothermal process

(c) isobaric process (d) isochoric process

58. The efficiency of stream engine is of the order of

a. 10% b.20% c. 60% d. 100%

59. A gas maximum work when it expands

(a) isothermally (b) isobarically

(c) adiabatically (d) isochorically

60. When two wave overlap the result is large disturbance means

(a) The interface is constructive

(b) The interface is destructive

(c) The interference depends -on the type of wave

(d) all of the above

61. While standing still, an observer measure the frequency of atuning fork to he 524)Hz. What frequency does he measure as he approaches the from at 5m/s? (Speed of sound in air = 340m/s)

(a) SOOHZ (b) 42OHz (c) 520Hz (d) 532Hz

62. In longitudinal wave the displacement of the particles of themedium is

(a) parallel to the wave velocity

(b) ant- parallel to the wave velocity

(c) perpendicular to the wavevelocity

(d) parallel or anti parallel to wave velocity

63. The illuminance at a distance of 2m from a 100 candela lamps is

(a) l0 lux (b) 15 lux (c) 25lux (d) 100 lux

64. When light beam is incident on a prism , is causes

(a) Lateral shift (b) dispersion only

(c) deviation only (d) dispersion and deviation both

65. If critical angle for a material placed in air 30^0 the refraction index -will be

(a) 2 (b) 0.5 (c) 1.5 (d) 2.5

66. A body has c of negative charge how many excess electrons it has as compared to its netural state?

(a) 6.25×10^{18} (b) 6.25×10^{-19} (c) 1.6×10^{-19} (d) 1.6×10^{18}

67. On health a liquid , the refraction index generally

(a) does not change (b) decrease (c) increase

(d) may increase or decrease depending on the rate of health

68. The torque on electric 'dipole off moment vector (p) when placedin an electrical filed vector (E) is proportional to

(a) P/E (b) E/P (c) P.E (d) PE tan0

69. Wheatstone bridge is used tomeasure

(a) emf (b) potential (c) current (d) resistance

70. Magnetism of magnet

(a) Is Zero at absolution zero temperature

(b) increase with temperature

(c) is maximum at curle temperature

(d) because practically zero curie temperature

71. The self inductance of coil is 10mH .if a current of 2A -is flower.What is the magnetic flux through the coil?

(a) 0.02 Wb (b) 0.01Wb (c) 0.05Wb (d) 10Wb

72. The position rays are

(a) electromagnetic waves (b) positrons

(c) irons (d) protons

73. Wavelength of a photon is 4000 A. its energy well be

(a) 3keV (b) 4000 eV (c) 3.1 J (d) 3.1 eV

74. According to Brohr's model of thee H atom ,the radius of thestationary orbit characterized by the principle quantum numbern is proportional to '

(a) 1/n (b) n2 (c) n (d) 1/n2

75. In some substance ,charge can flow at ordinary temperature butnot at very flow at ordinary temperature but not at very lowtemperature . These are

(a) semiconductors (b) conductors

(c) insulators (d) dielectrics

Chemistry

76. The number of atom of carbon present in25.0g pf $caco_3$. is

(a) $1.505 * 10^{23}$ (b) $1.005*10^{23}$

(c) $1.205 *10^{23}$ (d) $1.303 * 10^{23}$

77. The electronic configuration of chromium is

(a) $[Ar]3d^5 4s^1$ (b) $[Ar]3d^6 4s^2$ (c) $[Ar]3d^7 4s^2$ (d) $[Ar]3d^4 4s^2$

78. The structure of $C0_2$ molecule is

(a) linear (b) tetrahedral (c) angular (d) pyramidal

79. Which of the following elements has highest electron affinity?

(a) chlorine (b) bromine (c) iodine (d) fluorine

80. The oxidation number of Fe in the compound Fe304 is

(a) 1.3333333 (b) +4/3 (c) +2/3 (d) +5/3

81. MgO is an example of

(a) basic oxide (b) amphoteric oxide

(c) neutral oxide (d) acidic oxide

82. 'Down' process is used for the extraction of

(a) sodium (b) sodium hydroxide

(c) sodium carbonate (d) ammonia

83. The IUPAC name of C-(CH3)4 is 4

(a) 2.2 dimethyl propane (b) 2- imethylrbutane

(c) 2-methyle propane (d) Pentane

84. Al4C3 reacts with water to gave

(a) CH4 (b) C2H2 (c) H2 (d) C2H4

85. Protein is a polymer of

(a) glycol (b) glucose

(c) a=amino acid (d) pthalic acid

86. Which of the following carbohydrate gives Tollen'stest ?

(a) glucose (b) fructose (c) galactose (d) maltose

87. DDT is an example of

(a) insecticide (b) herbicide

(c) fungicide (d) rodenticide

88. Tarnquilizers are substance used for the treatment of

(a) cancer (b) mental anxiety

(c) physical disorder (d) malaria

89. Each carbon atom in "benzene is y

(a) sp^2 hybridized (b) Sp hybridized

(c) sp^3 hybridized (d) sp^3 d hybridized

90. Primary , secondary and tertiary alcohals are distinguished by

(a) Hoffman's test (b) Fehling's solution

(c) Victor Meyer'_s test (d) Brillstein's test

91. The reduction of aldehydes or ketones by amalgamated' zinc and concentrated HCl- to corresponding alkane is called as

(a) Clemeiitson reduction (b) Wolff-Kusimer reduction

(c) Cannizaro's reduction (d) Perkin's reaction

92. Which of the following compound is most basic? _

(a) NH_3 (b) CH_3NH_2 (C) $(CH_3)_2NH$ (d) $(CH_3)_3N$

93. The molecular formula of the white vitriol is

(a) $ZnSO_4.7H_20$ (b) $Zn(OH)_2$

(c) $ZnCO_3$ (d) ZnO

94. Cinnabar is an ore of

(a) zinc (b) copper (c) mercury (d) iron

95. The pH of 0.04M HN03 is

(a) 1.4 (b) 2 (c)3 (d) 4

96. The unit of cell constant is '

(a) Sm^{-1} (b) ohm (c) cm^{-1} (d) ohm^{-1} cm^{-1}

97. The unit of rate constant for first order reaction is

(a) mol s^{-1} (b) L $mol^{-2}s^{-1}$ (c) s^{-1} (d) mol $L^{-1}s^1$

98. Which of the following is an intensive property?

(a) Volume (b) mass

(c) area (d) concentration

99. The unit of radioactivity is

(a) curie (b) nik/L (c) gauss (d) g/L

100. The compound Naz[Fe(CN)5NO] is know as

(a) sodiumnitroprusside (b) Prussian blue

(c) Tollens's reagent (d) Bayer's reagent