

Entrance Examination 2071

Mathematics

- If $(X-3) = 4$ then X is
a. 7 and -1 b. 7 and 1 c. 7 d. 1
- If $\{X-X^2 = 9 \text{ and } 2X = 6\}$
a. Null set b. $\{-1, 1\}$ c. $\{1, 0\}$ d. $\{4, 3\}$
- If: $R \rightarrow R$ defined by $f(X) = X^2 + 3$ then $f^{-1}(4)$ is
a. Null set b. $\{-1, 1\}$ c. $\{1, 0\}$ d. $\{4, 3\}$
- The value of $\log_2 \sqrt{2} + \log_3 \sqrt{3} + \log_4 \sqrt{4}$ is
a. 0 b. $13/12$ c. $-13/2$ d. $\pi/6$
- If $\cos^2 \theta = \frac{1}{2}$, then θ is
a. $n\pi \pm \pi/4$ b. $n\pi + \pi/4$ c. $n\pi \pm \pi/3$ d. $2n\pi$
- $\cos(\sin^{-1} 3/5) =$
a. $3/5$ b. $4/5$ c. $9/25$ d. $4/25$
- If a^2, b^2, c^2 are in H.P. then
a. $2a^2c^2 = b^2(a^2 + c^2)$ b. $a^2c^2 = b^2(a^2 + c^2)$ c. $2b^2c^2 = a^2(b^2 + c^2)$ d. $c^2a^2 = 2b^2(a^2 + c^2)$
- If $A = \begin{bmatrix} 1 & 2 \\ 2 & 3 \end{bmatrix}$ and $A^2 - nA - I = 0$, then the value of n is
a. 0 b. 4 c. 1 d. -4
- If $A = \begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 1 \\ 1 & 0 & 0 \end{bmatrix}$, then A is
a. Symmetric b. skew-symmetric c. Singular d. Non singular
- The system of equations $2x + y = 5$; $4x + 2y = 8$ is
a. Consistent and dependent
b. Inconsistent and independent
c. Inconsistent and dependent
d. Consistent and independent
- The value of $i^7 + 1/i^4$ is
a. 1 b. -1 c. $-i$ d. $-i + 1$
- The value of $\frac{x-xy+w^2z}{y+wz+w^2x}$ w is the cube root of unity, is
a. W b. $x+y+z$ c. w^2 d. 1
- If the roots of $x^2 + 4x + k = 0$, are equal then k is
a. 0
b. 4
c. -4
d. 16
- The length of the perpendicular from $(0, 0)$ to the line $x+y+1 = 0$ is
a. $\frac{1}{\sqrt{2}}$ b. $\sqrt{2}$ c. $\frac{-1}{\sqrt{2}}$ d. $-\sqrt{2}$
- The two lines $2x^2 - 2xy + ky^2 = 0$ are perpendicular to each other if k is
a. 2
b. -2

- c. 0
d. 1
16. The equation of the circle touching the positive x-axis and y-axis with radius 2 units is
 a. $X^2 + y^2 - 4x - 4y + 4 = 0$
 b. $X^2 + y^2 + 4x + 4y + 4 = 0$
 c. $X^2 + y^2 - 4x + 4y + 4 = 0$
 d. $X^2 + y^2 - 4x - 4y - 4 = 0$
17. If the line $4x + 3y = k$ is tangent to the circle $x^2 + y^2 = 25$ at $(2, 1)$ then k is
 a. 25
 b. -25
 c. ± 25
 d. ± 11
18. The value of $\lim_{x \rightarrow 2} \frac{x^5 - 2^5}{x - 2}$ is
 a. 80
 b. 40
 c. 10
 d. 0
19. The value of $\lim_{x \rightarrow 0} \frac{3x + 4 \tan 2x}{x}$ is
 a. 7
 b. 3
 c. 11
 d. 4
20. The derivative of $y = b^x$ is
 a. Xb^{x-1}
 b. b
 c. $x^b \ln |b|$
 d. $b^x \ln |b|$
21. The derivative of $y = \cos(\cos \sqrt{x})$ is
 a. $\frac{\sin(\cos \sqrt{x}) \sin \sqrt{x}}{2\sqrt{x}}$
 b. $\sin(\cos \sqrt{x})$
 c. $\sin(\sin \sqrt{x})$
 d. $\frac{\sin(\cos \sqrt{x})}{2\sqrt{x}}$
22. The value of x for which the derivative of $x^2 + 2x + 2$ is zero is
 a. 1
 b. 2
 c. 0
 d. -1
23. The point of inflection of the curve $x^2 + 3x^2 - 9x + 2$ is
 a. -1
 b. 1
 c. 6
 d. 0

24. $\int \frac{dx}{1-\cos x} =$
- Tan $x/2$
 - $-\cot x/2$
 - Cos $x/2$
 - $-\tan x/2$
25. $\int_0^{1/2} \frac{\cos x}{1+\sin x} dx =$
- ∞
 - $\ln |2|$
 - 0
 - 1

English

26. The word "education" has the stress on the.....Syllable.
- First
 - Third
 - Second
 - Fourth
27. Select the right synonym to the word "ardous"
- Simple
 - Difficult
 - Easy
 - Strange
28. Give the opposite meaning of "obscure"
- Pedantic
 - Implicit
 - Explicit
 - Obnoxious
29. The initial consonant sound of "chef" is the same as that of.....
- Chute
 - Chess
 - Child
 - Cheap
30. Which of the following pair has the same vowel sound?
- Hut/ hot
 - Sit/ seat
 - Salt/ mark
 - Pair/tear
31. I completely differ You..... This point.
- From: at
 - from: in
 - from: on
 - to: at
32. We feel sympathythe poor.
- To
 - With
 - About

- d. For
33. He insistedleaving immediately
- a. At
 - b. In
 - c. On
 - d. Over
34. Tick the correct word to the underlined expression. No one knows his hole and corner method of dealing with people.
- a. Strict
 - b. Secret
 - c. Servile
 - d. Suspicious
35. Food that agree to one's taste is
- a. Pungent
 - b. Edible
 - c. Palatable
 - d. Sensuous
36. The word " pleased" takes the prefix.....
- a. Un-
 - b. Mis-
 - c. Dis-
 - d. None-
37. One who is resent everywhere is.....
- a. Omnipresent
 - b. Omniscient
 - c. Theist
 - d. Omnipotent
38. Fear of food is called as
- a. Sitophobia
 - b. Ergophobia
 - c. Panthophobia
 - d. Hictophobia
39. A funeral bell is called
- a. Call
 - b. Knell
 - c. Replica
 - d. Invitation
40. People..... A large number of computers now, because prices are getting low
- a. Must buy
 - b. Must have bought
 - c. Must be buying
 - d. Must buying
41. Although they are similar, chipmunks are..... most other ground squirrels.
- a. Alike'

- b. Like as
 - c. Like to
 - d. Like
42. She..... The whole day long.
- a. Has been working
 - b. Works
 - c. Had worked
 - d. Worked
43. Now a days Shyam is Busy to take care of his health.
- a. Very
 - b. To
 - c. So
 - d. Extremely
44. She demanded..... her status
- a. Know
 - b. Knowing
 - c. To Know
 - d. To be known
45. The mail comes at ten O' clock everyday.....Saturday.
- a. But also
 - b. And
 - c. Also
 - d. But
46. In my office, salary is paid by Month.
- a. The
 - b. A
 - c. An
 - d. Some
47. Every boy and every girl Very responsible
- a. Are
 - b. Is
 - c. Has
 - d. Have
48. Which of the following is accepted?
- a. Some of rice is still left
 - b. Time and tide wait for none
 - c. She absents herself from the college today
 - d. None of the squares was properly drawn
49. Which of the following is a complex sentence?
- a. However, hard she worked, she failed in the exams
 - b. It rained heavily, however he came to school
 - c. In spite of heavy rain, he come to school
 - d. Neither she nor he will come.
50. Which of the following is an adjective?

- a. Sympathize
- b. Lighten
- c. Perception
- d. Moral

Physics

51. The dimensions of (h/e) are same as that of
- a. Magnetic field
 - b. Electric field
 - c. Magnetic flux
 - d. Electric flux
52. The number of significant figures in 0.0030×10^{11} m are
- a. 5
 - b. 4
 - c. 11
 - d. 2
53. μ_s and μ_k are coefficient of static and kinetic frictions between two bodies. Then
- a. $\mu_s \geq \mu_k$
 - b. $\mu_s < \mu_k$
 - c. $\mu_s = 0$ and $\mu_k > 0$
 - d. $\mu_s < 0$ and $\mu_k < 0$
54. When a torque (τ) acts on a body, the change in angular momentum (L) of the body is
- a. Perpendicular to \vec{L}
 - b. Parallel to \vec{L}
 - c. Always zero
 - d. $180^\circ \vec{L}$
55. The Poisson's ratio of material can't be
- a. 0.10
 - b. 0.20
 - c. 0.40
 - d. 0.65
56. The depth of water at which air-bubble of radius 0.4 mm may remain in equilibrium (surface tension of water = 72×10^{-3} N/m, $g = 9.8$ m/ s²) is given by
- a. 7.348 cm
 - b. 0.918cm
 - c. 3.674 cm
 - d. 1.837 cm
57. When a cylinder is heated, its length increases by 2%, the area of its base will increase by:
- a. 0.5%
 - b. 1%
 - c. 2%
 - d. 4%
58. In a pressure cooker food is cooked usually at a pressure
- a. One atmosphere

- b. Half atmosphere
 - c. Two atmosphere
 - d. 50 atmosphere
59. The mean free path of a gas varies with absolute temperature (T) as
- a. T^4
 - b. $1/T^4$
 - c. $1/T$
 - d. T
60. The efficiency of Carrot engine working between steam point and ice point is:
- a. 16.8%
 - b. 26.81%
 - c. 36.8%
 - d. 46.8%
61. The bending of sound waves through the corners of the obstacle is called
- a. Refraction
 - b. Interference
 - c. Beats
 - d. Diffraction
62. When a turning fork is vibrated its prongs have a phase difference of:
- a. 0
 - b. $\frac{\pi}{4}$
 - c. π
 - d. 2π
63. The image of an object placed at the focus of convex mirror is at a distance
- a. ∞
 - b. F
 - c. 2f
 - d. f/2
64. If sky is seen from moon's surface, it will appear
- a. Black
 - b. Blue
 - c. White
 - d. Red
65. A double convex air bubble in a glass sheet would behave as a
- a. Convergent lens
 - b. Concave mirror
 - c. Divergent mirror
 - d. Plane mirror
66. When two prisms are combined it gives
- a. Reflection only
 - b. Lateral shift
 - c. Dispersion and deviation both
 - d. Dispersion or deviation
67. Which property of electrons is used in an electron microscope

- a. Negative charge
 - b. Wave nature
 - c. Spin
 - d. Small size
68. A system of three charges may be in equilibrium. If they are placed
- a. On a straight line
 - b. On corners of equilateral triangle
 - c. On three corners of a rectangle
 - d. On the corners of a cube
69. The radius of Earth is 6400 km. The capacitance is
- a. 6400 MF
 - b. 6400 F
 - c. 1 F
 - d. $711 \mu\text{F}$
70. Two wires of same material have lengths L and $2L$ and cross reaction areas $4A$ and A respectively. The ratio of their specific resistances would be
- a. 1:1
 - b. 1:8
 - c. 8:1
 - d. 1:2
71. The magnetic field inside a ling solenoid is
- a. Zero
 - b. 1
 - c. $\mu_0 ni$
 - d. μni
72. Electrons in the atoms are held due to
- a. Nuclear forces
 - b. Coulomb forces
 - c. Van der Waals force
 - d. Gravitational forces
73. Which series of H atom lies in visible region?
- a. Lyman
 - b. Bracket and Paschen
 - c. Balmer
 - d. Paschen
74. The half- life of a substance is 1600 years. The mean life is
- a. 1600 years
 - b. 3200 years
 - c. 800 years
 - d. 2309 years
75. Rydberg constant is
- a. Same for all elements
 - b. Different for different elements
 - c. A universal constant

- d. Is different for lighter elements but same for heavier elements

Chemistry

76. How many orbitals are possible for principle quantum number 3?
- 3
 - 4
 - 6
 - 9
77. The number of moles of water present in 18 g of water is
- 18
 - 1
 - 1.8
 - 180
78. The half- life of an radioisotope is 30 minutes. After how much time the amount of radioisotope left is $1/4^{\text{th}}$ o the original amount.
- 4 minutes
 - 30 minutes
 - 60 minutes
 - 120 minutes
79. What is oxidation of chlorine is HOCL.
- +1
 - 0
 - 1
 - +3
80. Hemoglobin contains 0.33% of iron by weight. Molecular weight of hemoglobin is 97200. The number of iron atoms (At wt of Fe = 55.85) ion one molecule of hemoglobin is
- 2
 - 4
 - 6
 - 9
81. The gas law which deals with the effect of pressure in a given volume of gas constant temperature is known as
- Boyle's Law
 - Charle's Law
 - Graham's Law
 - Dalton's Law
82. Electronic configuration of four elements A, B, C, D are as follow, which will be most metallic?
- A = 2,8,4
 - B= 2,8,8
 - C=2,8,1
 - D=2,8,7
83. In which of the following compound the molecular geometry cannot be predicted by the use of VSEPR theory
- NaCl

- b. H_2O
 - c. CH_4
 - d. NH_3
84. Consider the reaction $2\text{A} + \text{B} \rightarrow \text{C} + \text{D}$. If the concentration of the reactants are increased by 3 times, the rate of reaction will increase by
- a. 3 times
 - b. 6 times
 - c. 9 times
 - d. 27 times
85. An aqueous solution of NaCl would be
- a. Acidic
 - b. Basic
 - c. Neutral
 - d. Could be acidic or basic depending upon temperature
86. The Ph of pure water at 50°C would be
- a. 7.0
 - b. More than 7.0
 - c. Less than 7.0 cannot be predicted
87. Which of the following metals generate H_2 on treatment with dil. HNO_3 .
- a. Zn
 - b. Mn
 - c. Cu
 - d. Pb
88. 1 M H_2SO_4 is equal to
- a. 1 N H_2SO_4
 - b. 2 N H_2SO_4
 - c. 0.5 N H_2SO_4
 - d. 4 N H_2SO_4
89. Hydrogen molecule which has parallel spin of two nuclei is called
- a. Ortho hydrogen
 - b. Para hydrogen
 - c. Heavy hydrogen
 - d. Nascent hydrogen
90. Ammonia is manufactured by the use of
- a. Solvay's process
 - b. Haber's process
 - c. Ostwald's process
 - d. Down's process
91. Hematite is an ore of
- a. Fe
 - b. Cu
 - c. Zn
 - d. Hg
92. Which of the following is not a nucleophile

- a. BF_3
 - b. NH_3
 - c. H_2O
 - d. OH
93. Anti- Markownikoff addition of HBr is not observed in
- a. Propene
 - b. 1- butane
 - c. 2- butane
 - d. Pent-2-one
94. When oxalic acid crystals and glycerol are mixed and heated to about 110°C , the compound obtained is
- a. Chloroform
 - b. Diethyl ether
 - c. Acetone
 - d. Formic acid
95. Which of the following is a meta directing group?
- a. $-\text{NH}_2$
 - b. $-\text{OH}$
 - c. $-\text{COOH}$
 - d. $-\text{R}$
96. How many position isomers are possible for dichlorobenzene?
- a. 2
 - b. 3
 - c. 4
 - d. 6
97. Which of the following is a condensation polymer?
- a. Polythene
 - b. Terylene
 - c. PVC
 - d. Teflon
98. Penicillin is an example of
- a. Antiseptic drug
 - b. Antipyretic drug
 - c. Antibiotic drug
 - d. Analgesic drug
99. Enzymes are
- a. Carbohydrates
 - b. Proteins
 - c. Lipids
 - d. Nucleic acids
100. Which base is found only in the nucleotides of RNA?
- a. Adenine
 - b. Guanine
 - c. Uracil

d. cytosine