Tribhuvan University
Institute of Science and Technology
4 Years Bachelor in Computer Science and Information Technology
Entrance Examination
2071
Mathematics

1. If (X-3) = 4 then X is
   a) 7 and -1 b) 7 and 1 c) 7 d) 1
2. If { $X-X^2=9$ and $2X=6$}
   a) Null set b) {3} c) {3,-3} d) {4,3}
3. If: R →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}
4. 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) $\pi/6$
5. If $\cos^2\theta = 1/2$, then θ is
   a) $n\pi \pm \pi/4$ b) $n\pi + \pi/4$ c) $n\pi \pm \pi/3$ d) $2n\pi$
6. Cos $(\sin^{-1}3/5)$ =
   a) 3/5 b) 4/5 c) 9/25 d) 4/25
7. 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) $c^2a^2 = 2b^2(a^2 + c^2)$
8. 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
9. 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
10. 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
11. The value of $i^7 + 1/i^4$ is
    a) 1 b) -1 c) –i d) –i +1
12. The value of $\frac{x-wy+w^2z}{y+wz+w^2x}$, w is the cube root of unity, is
    a) w b) x + y + z c) w^2 d) 1
13. If the roots of $x^2 + 4x + k = 0$, are equal then k is
    a) 0 b) 4 c) -4 d) 16
14. The two lines $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ are identical if
15. 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 $x^2 + y^2 = 2S$ at (2,1) then k is
    a) 25 b) -25 c) ±25 d) ±11
18. The value of $lim_{x\to 2}\frac{x^5-2^5}{x-2}$ is
    a) 80 b) 40 c) 10 d) 0

19. The value of $lim_{x\to 0}\frac{3x+4tan\,2x}{x}$ 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. $\int \frac{dx}{1-cosx}$ =
    a) tan x/2 b) – cot x/2 c) cos x/2 d) – tan x/2
25. $\int_0^{1/2} \frac{cosx}{1+sinx} dx =$
    a) ∞ b) ln|2| c) 0 d) 1

English

26. The word “education” has the stress on the ……. Syllable.
    a) first b) third c) second d) fourth
27. Select the right synonym to the word “ardous”
    a) Simple b) difficult c) easy d) strange
28. Give the opposite meaning of “obscure”
    a) Pedantic b) implicit c) explicit d) obnoxious
29. The initial consonant sound of “chef” is the same as that of ……
    a) Chute b) chess c) child d) cheap
30. Which of the following pair has the same vowel sound?
    a) Hut/hot b) sit/seat c) salt/mark d) pair/tear
31. I completely differ …… you …… this point.
    a) From: at b) from: in c) from: on d) to: at
32. We feel sympathy …… the poor.
    a) To b) with c) about d) for
33. He insisted ……. Leaving immediately.
    a) At b) in c) on d) over
34. Tick the correct w0rd to the underlined expression. No one knows his <u>hole and corner</u> 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 c) 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) theistd) omnipotent
38. Fear of food is called as …….
    a) Sitophobia b) ergophobia
    c) Panthophobia d) hyctophobia
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) $\mu_s < \mu_k$
    b) $\mu_s = 0$ and $\mu_k > 0$ d) $\mu_s < 0$ and $\mu_k < 0$
54. When a torque () acts on a body, the change in angular momentum () of the body is
    a) Perpendicular to $\vec{L}$ b) parallel to $\vec{L}$
    c) always zero d) $180°\vec{L}$
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 $= 72 \times 10^{-3}$ N/m, g= 9.8 m/s^2) is given by
    a) 7.348 cm b) 0.918 cm 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 Carnot 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 tuning fork is vibrated its prongs have a phase difference of:
    a) 0 b) $\pi/4$ 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) whited) red
65. A double convex air bubble in a glass sheet would behave as a
    a) Convergent lens b) concave mirror
    c) Divergent lens 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 c) 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 µF
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 long solenoid is
    a) Zero b) 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 c) Gravitational forces
73. Which series of H atom lies in visible region?
    a) Lyman b) Bracket and Paschen
    c) Balmer c) 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?
    a) 3 b) 4 c) 6 d) 9
77. The number of moles of water present in 18g of water is
    a) 18 b) 1 c) 1.8 d) 180

78. The half-life of an radioisotope is 30 minutes. After how much time the amount of radioisotope left is 1/4th of the original amount.
    a) 4 minutes b) 30 minutes
    c) 60 minutes d) 120 minutes
79. What is oxidation of chlorine is HOCl.
    a) +1 b) 0 c) – 1 d) +3
80. Hemoglobin contains 0.33% of iron by weight. Molecular weight of hemoglobin is 67200. The number of iron atoms (At wt of Fe = 55.85) ion one molecule of hemoglobin is
    a) 2 b) 4 c) 6 d) 8
81. The gas law which deals with the effect of pressure in a given volume of gas constant temperature is known as
    a) Boyle's Law c) Charle's Law
    c) Graham's Law d) Dalton's law
82. Electronic configuration of four elements A, B, C, D are as follow, which will be most metallic?
    a) A=2,8, 4 b) B= 2, 8, 8 c) C= 2, 8, 1 d) D= 2, 8, 7
83. In which of the following compound the molecular geometry cannot be predicted by the use of VSEPR theory
    a) NaCl b) H_20 c) CH_4 d) NH_3
84. Consider the reaction 2A +B →C + D. If the concentration of the reactants are increase by three 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 d) 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) Solvoy'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) diethylether
    c) Acetone d) formic acid
95. Which of the following is a meta directing group
a) $–NH_2$ b) –OH c) –COOH d) –R

96. How many position isomers are possible for dichlorobenzene

a) 2 b) 3 c) 4 d) 6

97. Which one of the following is a condensation polymer
    a) Polyethene 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 b) uracil d) cytosine