Tribhuvan University

Institute of Science and Technology

4 Years Bachelor in Computer Science and Information Technology

Entrance Examination

2070

Mathematics ($1 \times 25 = 25$

1. If A and B are any two sets, then A-(A-B) is equal to
   a) B-A b) A∩B c) A∪B d) ∅
2. The range of the function y=$\sqrt{a^2 - x^2}$, a>0 is equals to
   a) [-a,a] b) (-a,a) c) [0,a] d) (0,a)
3. What is the value of $log_a\sqrt{a^3\sqrt{a^2}}$?
   a) 4 b) 3 c) 2 d) 1
4. If A=$\begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix}$, then A^{100} is equal to
   a) 1 b) 0 c) -1 d) None
5. If a^x=b^y=c^z and a, b, c, are in G.P. ,then x, y, z, are in
   a) G.P. b) A.P. c) H.P. d) None
6. $lim_{\overrightarrow{x0}} \frac{a^x - b^x}{x}$ is equal to
   a) 0 b) log(ab) c)log$\left(\frac{a}{b}\right)$ d) log$\left(\frac{b}{a}\right)$
7. The derivative of y =$5^x$with respect to x is equal to
   a) $5^x log_e 5$ b) 5^x c) $log_e{}^5$ d) $5log_e 5$
8. The function f(x)=x-$\frac{1}{x^2}$, x∈R, x≠0 is increasing in
   a) (-∞, 0 ∪ (0, ∞) b) (-∞, 0 ∪
   c) [-1,1] d) (-∞, ∞
9. The integral $\int \frac{dx}{(e^x - e^{-x})^2}$ is equal to
   a) $\frac{-1}{2(e^2+1)} + C$ b)$\frac{-1}{e^{2x}+1} + C$
   c) $\frac{-1}{2(e^x+e^{-x})} + C$ d) $\frac{1}{2(e^{2x}+1)} - C$
10. For what value of k will the equation 5x^2-kx+45 = 0 have equal roots?
    a) 0 b) ± 3 c)± 30 d)± 33
11. The quadratic equation whose one root 2+$\sqrt{3}$ is
    a) $x^2 + 4x + 1 = 0$ b) $x^2 - 4x + 1 = 0$
    c) $x^2 - 4x - 1 = 0$ d) $-x^2 - 4x - 1 = 0$
12. The distance between the parallel lines $y - 2x = 4$ and $6x - 3y = 5$ is
    a) $\frac{1}{\sqrt{45}}$ b) $\frac{7}{\sqrt{45}}$ c) $\frac{17}{\sqrt{45}}$ d) $\frac{17}{2\sqrt{45}}$
13. Radius of the circle $x^2 + y^2 - 3x + 2y - \frac{3}{4} = 0$ is
    a) 2 b) 1 c) 4 d) 3
14. The absolute value of the complex number $(1 + i)^{-1}$ is
    a) 1 b) $\sqrt{2}$ c) $\frac{1}{\sqrt{2}}$ d) 2
15. If $z = cos\theta + isin\theta$, then $z^n + \frac{1}{z^n}$ is equal to
    a) -2$cosn\theta$ b) 2$cosn\theta$ c) 2$sinn\theta$ d) -2$sinn\theta$
16. The n[th] term of the series: $2 + 4 + 6 + 12 + 20 +$…… is
    a) n(n+1) b)(n+1)(n+2)
    c) n(n-1) d) n
17. If $|x| < 1$ and $y = x + x^2 + x^3 + x^4 +$……..+∞, then x is equal to

a) $\frac{y}{1-y}$ b) $\frac{y}{y-1}$ c) $\frac{y+1}{y}$ d) $\frac{y}{1+y}$

18. If $a = 2, b = \sqrt{6} \wedge A = 65°$, then c is equal to
    a) $\sqrt{2} \pm 1$ b) $1 \pm \sqrt{2}$ c) $\sqrt{3} \pm 1$ d) $1 \pm \sqrt{3}$
19. $3cos^{-1}x$ is equal to
    a) $3x - 4x^2$ b) $4x^3 - 3x$
    c) $4x - 3x^3$ d) $3x^3 - 4x$
20. Solution of the $tanax = cotbx$ is
    a) $\frac{2n+1}{a+b}\frac{\pi}{4}$ b) $\frac{2n-1}{a-b}\frac{\pi}{2}$
    c) $\frac{2n+1}{a+b}\frac{\pi}{2}$ d) $\frac{\pi}{2}$
21. What is the value of $\begin{vmatrix} 1 & \omega & \omega^2 \\ \omega & \omega^2 & 1 \\ \omega^2 & 1 & \omega \end{vmatrix}$, where ω is an imaginary cube root of unity.
    a) 1 b) 2 c) 3 d) 4
22. The single equation representing the pairs of lines $y = x$ and $y = -x$ is
    a) $y^2 - x^2 = 0$ b) $y - x = 0$
    c) $x - y = 0$ d) $x^2 - y^2 = 0$
23. Let $A = [-3,2]$ and $B = [-2,3]$ then $A - B$ is equal to
    a) [-3,3) b) [-3,2] c) (-2,2) d) (-2,1)
24. If $x \to a \quad x \to a^- f(x) \neq \lim_{x \to a^+} f(x)$ then $f(x)$ is said to be an
    a) Infinite discontinuity b) removable discontinuity
    c) Jump discontinuity d) none
25. Which one of the following is the area enclosed by the curve $y = 3x$, the x-axis and the ordinate $x = 0, x = 4$?
    a) 12 b) 16 c) 20 d) 24

English($1 \times 25 = 25$

26. Inscription on a tomb is called……..
    a) Epitaph b) cemetery
    c) Morgue d) demagogue
27. After he finished the exam, he…….. to the teacher.
    a) Handed over it b) handed it over
    c) Handed it out d) handed out it
28. Every week she …… her sister in her village to talk to her.
    a) Calls over b)calls on c) calls out d) calls up
29. He has a coat……..five pockets.
    a) Of b) about c) with d) in
30. To hit below the belt means:
    a) To use force b) to use unfair means
    c) To use energy d) to use leather

31. I disapprove ……..his cheating on the exam.
a) Of b) at c) in d) off
32.The lights were…….because the room was bright.
a) Put off b) take off c) left off d) switched off
33.Which of the following is a noun?
a) Thicken b) impoverish
c) Mercantile d) mercy
34. Which of the underlined word is an adjective?
a) Swimming is good for health.
b) Students are walking on the lawn.
c) Many people like smoking.
d) She is taking knitting classes.
35. Which of the following is an active voice?
a) This work will be finished.
b) The suspect was seen.
c) I know him.
d) The letter was posted.
36. The memoranda……..approved.
a) Have been b) has been c) was d) is
37. Which of the following takes a singular verb?
a) Police b) furniture c) families d) committees
38. Neither her nor they…….going to the college.
a) Is b) are c) has d) was
39. Which expression is incorrect?
a) A pile of books b) a herd of cattle
c) A herd of sheep d) a pack of wolves
40. They daren't go……?
a) Did they b) do they
c) hasn't they d) dare they
41. I am hungry and ……..
a) She is too b) they are so
c) c) so aren't they d) they are too
42.Which word has the stress on the first syllable?
a) Likelihood b) religious c) fantastic d) orthography
43.How many syllables does the word 'economical' have?
a) five b) four c) three d) six
44. The pair…….has the some pronunciation.
a) Pot, port b) so, sow c) pull, pool d) did, dead
45.The word 'they' has the same initial constant bound as the word……..
a) Day b) date c) thief d) that
46.A professional horse rider is called
a) Jockey b) rider c) coach d) horse courser
47.Give the opposite meaning of "appropriate".
a) Inevitable b) likely c) unsuitable d) suitable
48.Select the right synonym to the word 'sporadic'.

a) Occasional b) frequently
c) continuously d) never ending

49. Which of the following is incorrect punctuated?
a) The teacher said, "Honesty is the best policy".
b) He said to me," When did she come to the party"?
c) The man received a gift, the women, a book.
d) The man, whom he met, had excellent speech skills

50. The word "father" takes the suffix?
a) ….is b) …..some c) ….ly d) ……y

Physics

51. The dimensional formula for potential difference is
a) $[ML^2T^{-3}I^{-1}]$ b)$[ML^2T^{-3}I]$ c) $[ML^2T^3I^{-1}]$ d) $[ML^2T^{-2}I^{-2}]$

52. A stone is thrown vertically upward with a speed u from the top of a tower reaches the ground with a speed of $3u$. The height of the tower is……
a) $\frac{3u^2}{g}$ b) $\frac{4u^2}{g}$ c) $\frac{6u^2}{g}$ d) $\frac{9u^2}{g}$

53. The acceleration of a particle in S.H.M is……
a) Always zero
b) always constant
c) Maximum at extreme position
d) Maximum at the equilibrium position

54. An iron ball is heated. The percentage increase will be largest in…….
a) Volume b) density c) diameter d) surface area

55. Two wires A and B are of the same material. Their lengths are in the ratio of 1:2 and diameters are in the ratio of 2:1. If they are pulled by the same force, their increase in length will be in the ratio.
a) 2:1 b) 1:4 c)1:8 d) 8:1

56. Water is flowing through a tube of non-uniform cross section. If the radius of the tube at the entrance and the exit is 3:2, then the ratio of velocity of liquid entering and leaving the tube is:
a) 8:27 b) 4:9 c) 9:4 d) 1:1

57. The thermodynamic process in which the pressure of the system remains constant is called……
a) Isothermal b) adiabatic c) isochoric d) isobaric

58. 50 g of ice at -6°C is dropped into water at 0°C. how many grams of water freeze? Sp. Heat capacity of ice=2000$JKg^{-1}C^{-1}$.
a) 1.785 g b) 4.25 g c) 3.16 g d) 9.33 g

59. The image of an object placed at the focus of a concave mirror is at
a) F b) ∞ c) 2f d) $\frac{f}{2}$

60. The temperature of source and sink of cannot engine are 400K and 300K respectively. What is its efficiency?
    a) 100% b) 75% c) 33.3% d) 25%
61. The refractive index of air with respect to glass is $2/3$. The refractive index of diamond with respect to air is $12/5$. Then the refractive index of glass with respect to diamond will be……
    a) $\frac{5}{8}$ b) $\frac{8}{9}$ c) $\frac{5}{18}$ d) $\frac{18}{5}$
62. The focal length of a double convex lens for which radius of curvature of each surface is R will be…….$(\mu = 1.5)$
    a) $\frac{R}{2}$ b) R c) $2R$ d) $4R$
63. Light of wave length 7200$\acute{A}$ in air has a wave length in glass equal to…….(Given refractive index of glass with respect to air = 1.5).
    a) 7200$\acute{A}$ b) 4800$\acute{A}$ c) 1080$\acute{A}$ d) 10800$\acute{A}$
64. Three capacitors of capacitance $3\mu F, 9\mu F$ and $18\mu F$ are connected first in series and then I parallel. The ratio of equivalent capacitance in two cases $\left(\frac{C_I}{C_P}\right)$ will be
    a) 1:15 b) 15:1 c) 1:1 d) 1:3
65. Thee equal resistors each of resistance r are connected to form a triangle. The equivalent resistance across any two comes of the triangle is….
    a) 2r b) $\frac{r}{3}$ c) $\frac{2r}{3}$ d) 3r
66. The resistances of two lamps are in the ratio of 1:2. Their wattage will be in the ratio of
    a) 1:2 b) 2:1 c) 4:1 d) 1:4

67. The energy stored in a 50mH inductor carrying a current of 4A is……
    a) 0.1 J b) 0.4 J c) 0.3 J d) 0.01 J
68. The alternating current in an LCR circuit is maximum when..
    a) $X_L=0$ b) $X_C=0$ c) $X_L=X_C$ d) $\sqrt{X_L^2 + X_C^2} = 0$
69. A particle of mass 10^{-31} Kg is moving with a speed of 10^5m/s. The de Broglie wavelength of the particle is…..
    a) $6.63 \times 10^{-8}m$ b) $6.63\acute{A}$
    c) $66.3\acute{A}$ d) $6.63 \times 10^{-7}m$
70. Two waves of the same wavelength and amplitude interfere to give a minimum when their phase difference is
    a) π b) $\frac{\pi}{2}$ c) $\frac{3\pi}{2}$ d) 0
71. Hard X-rays as compared to soft X-rays have
    a) Higher intensity b) lower frequency
    c) Higher frequency d) higher speed

72. The mass of α-particle is
    a) Equal to the mass of four protons
    b) Equal to the mass of four neutrons
    c) Equal to the masses of 2 protons and 2 neutrons

d) Less than the sum of masses of 2 protons and 2 neutrons

73. A common emitter transistor amplifier has a current gain of 50. If the load resistance is 4 KΩ and the input resistance is 500 Ω. The voltage gain of the amplifier is…….
    a) 400 b) 6.2 c) 500 d) 300

74. A tube closed at one end has a resonating length 1 meter. The air column in the pipe can resonate for sound of frequency…..($V = 320ms^{-1}$).
    a) 166 Hz b) 249 Hz c) 575 Hz d) 80 Hz

75. A displacement wave is represented by $y = .025sin(500t - 0.0025x)$, where y, t and x are in cm, second and meter respectively. The wave length of wave is…….
    a) 20π m b) 40π m c) 60π m d) 80π m

Chemistry ($1 \times 25 = 25$

76. The gas obtained by adding water on aluminum carbide is
    a) Ethyne b) ethane c) methane d) ethane

77. The mixture of HCl and $ZnCl_2$ is known as
    a) Tollen's reagent b) Baeyer's reagent
    c) Lucas reagent d) Nessler's reagent

78. The IUPAC name of n-valeric acid is
    a) Pentanoic acid b) butanoic acid
    c) Propanoic acid d) ethanoic acid

79. A blood red colouration of ferric sulphocyanide obtained by addition of ferric chloride in sodium extract confirms the presence of
    a) Sulphur b) nitrogen c) both a and b d) halogens

80. Which of the following compounds has highest boiling point?
    a) CH_4 b) CH_3Cl c) CH_3Br d) CH_3OH

81. The compound that undergoes Cannizzaro reaction is
    a) CH_3COOH b) C_2H_5CHO c) HCHO d) CH_3OCH_3

82. Benzene is converted to toluene by
    a) Friedel Craft reaction b) Grignard reaction
    c) Wurtz reaction d) Perkin reaction

83. The compound that gives positive carbylamines reaction is
    a) $(CH_3)_2NH$ b) $(CH_3)_3N$ c) $(CH_3)_4N^+$ d) CH_3NH_2

84. Hematite is an ore of
    a) Silver b) iron c) mercury d) copper

85. Na_2O is a
    a) Neutral oxide b) acidic oxide
    c) Basic oxide d) amphoteric oxide

86. Which of the following elements has highest electro-negativity?
    a) Bromine b) iodine c) chlorine d) fluorine

87. Zinc sulphate($ZnSO_4.7H_2O$) is also called

a) White vitriol b) green vitriol
c) Blue vitriol d) corrosive sublimate

88. Brass is an alloy of
a) Copper and zinc b) copper and nickel
c) Copper and tin d) copper and lead

89. The formula of dolomite is
a) $CaCO_3$ b) $CaCO_3,MgCO_3$
c) $CaSO_4.2H_2O$ d) CaF_2

90. The general electronic configuration of zinc is
a) $[Ar]4s^2 3d^{10}$ b) $[Ar]4s^1 3d^{10}$
c) $[Ar]4s^2 3d^8$ d) $[Ar]4s^2 3d^7$

91. Equivalent weight of $KMnO_4$ in neutral medium is
a) 52.6 b) 158.0 c) 31.6 d) 63.0

92. Bohr's model was modified by
a) Rutherford b) Sommerfeld
c) Dalton c) Pauli

93. How many oxygen atoms are there in 8.0g of oxygen atoms?
a) 3.011×10^{23} atoms b) 3.011×10^{22} atoms
c) 3.011×10^{20} atoms d) 3.011×10^{19} atoms

94. What is the pH of 0.001 M HCl?
a) 2.0 b) 3.0 c) 4.0 d) 5.0

95. The rate of reaction is independent of
a) Temperature b) concentration
c) Particle size of reactant d) molecularity

96. The CGS unit of specific conductance is
a) Siemen cm^{-1} b) $ohm^{-1} cm^2 equiv^{-1}$
c) Siemen d) ohm^{-1}

97. Hess's law deals with
a) Total change in heat of reaction
b) Rate of reaction
c) Equilibrium constant of reaction
d) Influence on pressure of volume of gas

98. The degree of dissociation of an electrolyte
a) Decreases with dilution
b) Increases with dilution
c) May increase or decrease with dilution
d) Is not affected by dilution

99. The weight of 100 ml of NH_3 gas at NTP is

a) 0.0759 g b) 0.0579 g c) 0.0459 g d) 0.0359 g

100. The law of multiple proportions was given by

a) Richter b) John Dalton

c) Albert Einstein d) Gay Lussac

Answers

01. b	**02. d**	**03. c**	**04. a**	**05. b**	**06. c**	**07. a**	**08. a**	**09. d**	**10. c**	**11. b**	**12. b**	**13. a**	**14. c**	**15. b**
	16. c	**17. c**	**18. c**	**19. b**	**20. c**	**21. b**	**22. a**	**23. b**	**24. c**	**25. d**	**26. a**	**27. b**	**28. c**	**29. c**
	30. b	**31. a**	**32. d**	**33. d**	**34. d**	**35. c**	**36. a**	**37. b**	**38. b**	**39. c**	**40. a**	**41. a**	**42. a**	**43. a**
	44. c	**45. d**	**46. a**	**47. c**	**48. a**	**49. c**	**50. c**	**51. c**	**52. b**	**53. c**	**54. a**	**55. b**	**56. b**	**57. d**
	58. a	**59. b**	**60. d**	**61. c**	**62. a**	**63. b**	**64. a**	**65. c**	**66. b**	**67. b**	**68. d**	**69. a**	**70. a**	**71. c**
	72. d	**73. a**	**74. d**	**75. d**	**76. c**	**77. c**	**78. a**	**79. c**	**80. d**	**81. c**	**82. a**	**83. d**	**84. b**	**85. c**
	86. d	**87. a**	**88. a**	**89. b**	**90. a**	**91. a**	**92. b**	**93. a**	**94. b**	**95. d**	**96. a**	**97. a**	**98. b**	**99. a**

100. b