

Tribhuvan University
Institute of Science and Technology
4 Years Bachelor in Computer Science and
Information Technology (BSc. CSIT)

Entrance Examination 2080

Full Marks: 100

Time: 2 hrs.

Attempt all questions:

Group A Mathematics (25 × 1 = 25)

1. A sentence which is a 'statement' is
 - a. What is your name?
 - b. 100 is a number
 - c. Pokhara is far away
 - d. Fewa Lake is in Kathmandu.
2. If $|x - 5| = 7$, then $x =$
 - a. $\{12, -2\}$
 - b. $[-2, 12]$
 - c. $(-2, 12)$
 - d. none
3. If $f(x) = 3x - 2$ for $x \in R$, then $f^{-1}(7) =$
 - a. 0
 - b. 1
 - c. 3
 - d. -2
4. The range of the function $f(x) = \sqrt{x - 3}$ is
 - a. $(-\infty, 0)$
 - b. $[0, \infty)$
 - c. $[3, \infty)$
 - d. $(3, \infty)$
5. The function $f(x) = x^4 + 5$ is symmetrical about
 - a. origin
 - b. x-axis
 - c. both x and y axes
 - d. y-axis
6. If a, b, c, d... are in G.S, then $1/a, 1/b, 1/c, 1/d$ are in
 - a. G. S.
 - b. H. S.
 - c. A.S.
 - d. none
7. If $A = \begin{bmatrix} 2 & 5 \\ 3 & 7 \end{bmatrix}$, then $A^{-1} =$
 - a. $\begin{bmatrix} -2 & -5 \\ -3 & -7 \end{bmatrix}$
 - b. $\begin{bmatrix} 7 & -5 \\ -3 & 2 \end{bmatrix}$
 - c. $\begin{bmatrix} -7 & 5 \\ 3 & -2 \end{bmatrix}$
 - d. $1/\begin{bmatrix} 2 & 5 \\ 3 & 7 \end{bmatrix}$
8. If A is a square matrix, then the matrix $A + A^T$ is
 - a. square
 - b. symmetric
 - c. diagonal
 - d. skew symmetric
9. If one root of a quadratic equation is $\frac{1}{3+\sqrt{5}}$, then the quadratic equation is
 - a. $x^2 - 6x + 1 = 0$
 - b. $x^2 - 6x - 1 = 0$
 - c. $4x^2 - 6x - 1 = 0$
 - d. $4x^2 - 6x + 1 = 0$
10. The least positive integer k which will reduce $\left(\frac{i-1}{i+1}\right)^k$ to a real number is
 - a. 2
 - b. 1
 - c. 3
 - d. 4
11. If $\tan^{-1}2x + \tan^{-1}3x = \pi/4$, then $x =$
 - a. $1/6, 2$
 - b. $1/6, -1$
 - c. 0, 1
 - d. $1/6, 0$
12. If $\sin^2 x = 1/2$, then for $n \in Z, x =$
 - a. $n\pi \pm \pi/4$
 - b. $n\pi \pm \pi/3$
 - c. $n\pi + \pi/4$
 - d. $n\pi + (-1)^n \pi/4$
13. The points on the y-axis at distance of $\sqrt{2}$ units from the line $x + y = 1$, are
 - a. (0, -1) and (0, -3)
 - b. (0, 1) and (0, -3)
 - c. (0, 1) and (0, 3)
 - d. (0, -1) and (0, 3)
14. The equation $kx^2 + xy - y^2 + 2x - y = 0$, represents a pair of lines if $k =$
 - a. 0
 - b. 2

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- c. 1 d. none
15. If the direction cosines of line are 2, 3, -6, then its direction cosines are;
 a. $\frac{2}{7}, \frac{3}{7}, \frac{-6}{7}$ b. $\frac{-2}{7}, \frac{3}{7}, \frac{-6}{7}$
 c. $\frac{-2}{7}, \frac{-3}{7}, \frac{-6}{7}$ d. $\frac{2}{7}, \frac{3}{7}, \frac{-6}{7}$
16. If the three non zero vectors $\mathbf{p}, \mathbf{q}, \mathbf{r}$ are expressed as, $x\mathbf{p} + y\mathbf{q} + z\mathbf{r} = 0$ and x, y, z are scalars then the vectors are linearly independent if
 a. $x \neq 0, y \neq 0, z \neq 0$ b. $x = 0, y \neq 0, z \neq 0$
 c. $x = 0, y = 0, z = 0$ d. none
17. While two dice are thrown, the probability of getting the sum less than four is
 a. 1/18 b. 1/12
 c. 1/6 d. 1/9
18. $\lim_{x \rightarrow 0} \frac{\tan x + 4x}{x}$
 a. 5 b. 0/0
 c. 4 d. 1
19. If $y = \log e^{\sin(3x^2)}$, then $\frac{dy}{dx} =$
 a. $\log e^{\sin(3x^2)}$ b. $e^{\sin(3x^2)}$
 c. $6x \sin(3x^2)$ d. $6x \cos 3x^2$
20. The points of inflection of the curve $x^4 - 6x^2 + 8x$ are:
 a. 1, 2 b. 2, -1
 c. 1, -1 d. 0, 1
21. $\int_0^{\pi/2} \cos x e^{\sin x} dx =$
 a. $e - 1$ b. e
 c. $e + 1$ d. 1
22. The estimate of $\int_1^2 x^2 dx$ using the Rectangle Rule with one interval is
 a. 1.5 b. 3.2
 c. 3.3 d. 3.375
23. The function $f(x) = x^2 + x - 4$ defined in $[1, 4]$ has
 a. roots b. no roots
 c. one root d. none
24. If a force of 10N is inclined 45° to the horizon, then resolved part of the force in vertical direction is
 a. 5N b. $\sqrt{2}N$
 c. $5\sqrt{2}N$ d. 10N
25. A ball is projected up an inclined plane with a velocity of 20 m/sec. If the inclination of the plane to the horizontal is 30° and acceleration due to gravity is 10 m/sec^2 , then the length described before coming to rest is
 a. 20 m b. 30 m
 c. 200 m d. 40 m

Group B Physics (25 × 1 = 25)

26. Joule x second is the unit of
 a. Energy b. Momentum
 c. Angular momentum d. Power
27. In equation, $\vec{F} = q(\vec{v} \times \vec{B})$ the quantity $\vec{F}$ is
 a. Perpendicular to $\vec{v}$ only
 b. Perpendicular to $\vec{B}$ only
 c. Perpendicular to both $\vec{v}$ and $\vec{B}$
 d. Perpendicular to q and $\vec{B}$
28. Two balls of the same mass are shot upwards one after another at an interval of 2 seconds along the same

- vertical line with the same initial velocity of 40 m/s. They were collide at a height of
 a. 75 m b. 80 m
 c. 30 m d. 45 m
29. Cricketer *Sompal Kami* hits a cricket ball at 45° to horizontal with a kinetic energy K . The kinetic energy of ball at highest point of path is
 a. 0 b. $K/2$
 c. $\frac{K}{\sqrt{2}}$ d. K
30. The maximum value of static friction is called
 a. Rolling friction b. Limiting friction
 c. Maximum friction d. Dynamic friction
31. India has become the first country to successfully land a spacecraft Chandrayaan-3 near the south pole of the Moon. Its rover has confirmed the presence of
 a. Oxygen and Sulphur
 b. Hydrogen and Oxygen
 c. Sulphur and Nitrogen
 d. Nitrogen and Water
32. A girl is sitting in a boat which is floating in *Fewa Lake*. If she drinks water from the lake, the level of water in the lake will be
 a. Increased
 b. Decreased
 c. Remain unchanged
 d. May increase or decrease depending upon the weight of the girl
33. Fire alarm work on the principle of
 a. Volume expansion of solid
 b. Volume expansion of water
 c. Volume expansion of gas
 d. Bimetallic bar which become curve on heating
34. During 5 – 12 September 2023, temperature at noon is recorded the same at the base camp of Mount Everest. A climber feels hottest when the relative humidity is
 a. 99% b. 50%
 c. 30% d. 10%
35. A microscope is focused on an 'ink mark'. A glass plate is placed over the spot. In order to focus the spot, microscope is to be raised 1 m. In order to focus scratch on upper surface it must be raised 2 m further. The refractive index of glass is
 a. 1.33 b. 1.50
 c. 1.62 d. 1.80
36. Decrease in aperture of a lens changes
 a. Position of the image
 b. Size of the image
 c. Intensity of the image
 d. Both position and size of the image
37. Sound travels in rocks in the form of
 a. Longitudinal elastic wave
 b. Transverse elastic wave
 c. Both longitudinal and transverse elastic waves
 d. Stationary wave
38. If radii of a solid and hollow sphere are same. Which can hold greater number of charges?
 a. Solid sphere
 b. Hollow sphere
 c. Both will hold equal charges

- d. Charge storing capacity depends upon surface temperature
9. To draw maximum current from a combination of cells, the cells be grouped as
 - a. series
 - b. parallel
 - c. mixed
 - d. both (a) and (b).
0. Two parallel wires carrying currents in the same direction attract each other because of
 - a. Potential difference between them
 - b. Mutual inductance between them
 - c. Electric forces between them
 - d. Magnetic forces between them
1. An emf of 2 volt is produced in a coil when current changes at steady rate from 3 to 2 amperes in 1 milli-second. The value of self-inductance is
 - a. 0
 - b. 2 mH
 - c. 20 mH
 - d. 2 H
2. In L-C-R circuit, potential difference between terminals of inductance is 60 volts, between terminals of condenser (or capacitor) is 30 volts, and between terminals of resistance is 40 volts. The supply voltage will be equal to
 - a. 130 volts
 - b. 70 volts
 - c. 50 volts
 - d. 10 volts
3. The magnetic field of Earth is due to
 - a. Motion and distribution of materials in and around the Earth
 - b. Interaction between cosmic rays and surface of the Earth
 - c. A strong magnetic dipole is believed to be buried at the center of the Earth
 - d. Strong induction effect of the Sun
4. A free charged particle moves through a magnetic field. The particle may undergo a change in
 - a. speed
 - b. energy
 - c. pressure
 - d. direction of motion
5. The speed of electron in first Bohr orbit of Hydrogen atom is v . The speed of electron in the first excited state of doubly ionized Lithium atom is
 - a. $v/2$
 - b. v
 - c. $1.5v$
 - d. $2v$
6. What is nuclear 'holocaust'?
 - a. Formation of a nuclear bomb
 - b. Formation of nuclear reactor
 - c. Making hole in the nuclear shielding layer
 - d. After math of a nuclear explosion
7. Oppenheimer is a 2023 biographical drama film written and directed by Christopher Nolan and starring Cillian Murphy as J. Robert Oppenheimer a physicist. His scientific contribution is
 - a. Nuclear Reactor Physics
 - b. AK-47 Rifle
 - c. Bullet Dynamics
 - d. Design of Atom Bomb
8. A GM counter gives 82 counts/sec. After 210 seconds the count rate decreased to 19 counts/sec. The background count is 10 counts/sec, then the half life of the source is
 - a. 40 s
 - b. 70 s

- | A | B | Y |
|---|---|---|
| 0 | 0 | 0 |
| 0 | 1 | 0 |
| 1 | 0 | 0 |
| 1 | 1 | 1 |

- Group C Chemistry (25 × 1 = 25)**

51. The law of conservation of mass was developed by
 - a. Antoine Laurent de Lavoisier
 - b. Joseph Louis Proust
 - c. John Dalton
 - d. Niels Bohr
52. The actual electronic configuration of copper is
 - a. $[Ar]3d^9 4s^2$
 - b. $[Ar]3d^{10} 4s^1$
 - c. $[Ar]3d^8 4s^2$
 - d. $[Ar]3d^7 4s^2$
53. The most electronegative element in the periodic table is
 - a. chlorine
 - b. oxygen
 - c. fluorine
 - d. nitrogen
54. The shape of NH_3 molecule is
 - a. square planar
 - b. linear
 - c. tetrahedral
 - d. pyramidal
55. The number of water molecules associated with copper sulphate is
 - a. 5
 - b. 7
 - c. 2
 - d. 10
56. Brass is a/an
 - a. metalloid
 - b. alloy
 - c. non-metal
 - d. alkali metal
57. The compound formed during the ring test for nitrate is
 - a. $FeSO_4 \cdot NO_2$
 - b. $Fe(NO_3)_3$
 - c. $FeSO_4 \cdot NO$
 - d. $Fe(NO_3)_2$
58. Kipp's apparatus is used for the preparation of
 - a. Cl_2
 - b. SO_2
 - c. CO_2
 - d. H_2S
59. The metal ion present in chlorophyll is
 - a. Mg^{2+}
 - b. Ca^{2+}
 - c. Ba^{2+}
 - d. Cu^{2+}
60. Tetrahedral structure of carbon was proposed by
 - a. Linus Pauling
 - b. van't Hoff and Le Bell
 - c. Robert Corey
 - d. James Weston
61. Haber's process is used for the manufacture of
 - a. sulphuric acid
 - b. nitric acid
 - c. ammonia
 - d. sodium hydroxide
62. Benzene was isolated first by

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- a. Berzelius
c. Wohler
63. Prussian blue is
a. $\text{Fe}_4[\text{Fe}(\text{CN})_6]_3$
c. $\text{Fe}(\text{CNS})_3$
64. Which of the followings is related to Uranium series?
a. $4n$
c. $(4n + 1)$
65. An example of condensation polymer is
a. polystyrene
c. bakelite
66. Which is correct for transition elements?
a. exhibit inert pair effect
b. have low melting points
c. do not show catalytic activity
d. exhibit variable oxidation states
67. Corrosive sublimate is
a. HgCl_2
c. HgI_2
68. The major product of reaction between ethanol and potassium dichromate in presence of sulphuric acid is
a. CH_3COCH_3
c. HCHO
69. IUPAC name of formic acid is
a. ethanoic acid
c. methanoic acid
70. Ammonical silver nitrate solution is known as
a. Baeyer's reagent
c. Fehling's solution
71. The reduction of nitrobenzene in neutral medium gives
a. phenyl hydroxylamine
c. hydrazobenzene
72. The reaction of ketone with Grignard's reagent gives
a. primary alcohol
c. secondary alcohol
73. Which of the followings is not a primary standard substance?
a. $(\text{COOH})_2$
c. KMnO_4
74. The factor which does not influence the rate of reaction is
a. concentration
c. nature of reactants
75. An intensive property is
a. density
c. volume

- b. Cavandish
d. Faraday
- b. $\text{Na}_4[\text{Fe}(\text{CN})_6]$
d. $\text{Na}_2[\text{Fe}(\text{CN})_5\text{NO}]$
- b. $(4n + 2)$
d. $(4n + 3)$
- b. teflon
c. polyvinyl chloride
- b. Hg_2Cl_2
d. HgO
- b. CH_3COOH
d. $\text{CH}_3\text{COOCH}_2\text{CH}_3$
- b. propanoic acid
d. butanoic acid
- b. Schiff's reagent
d. Tollen's reagent
- b. aniline
d. all of the above
- b. tertiary alcohol
d. carboxylic acid
- b. $\text{K}_2\text{Cr}_2\text{O}_7$
d. NaCl
- b. temperature
d. molecularity
- b. mass
d. enthalpy

79. Pick out the word or group of words which has nearly the opposite meaning as the word "morbid".
a. healthy
c. sick
80. Pick out the word or group of words which has nearly the opposite meaning as the word "esteem".
a. honour
c. happy
81. Choose a correct single word for the expression "belief that God is unknowable".
a. atheism
c. agnosticism
82. Choose a correct single word for the expression "false reasoning intended to deceive".
a. Pluralism
c. pacifism
83. Pick up the correct phrasal verb for the expression "I because I wasn't sure of the way he would react".
a. hold back
c. hold off
84. Pick up the correct phrasal verb for the expression "I told the children to take their football and...".
a. clear up
c. clear in
85. Pick out most appropriate preposition/s to fill up the blanks. "The defeated warrior surrendered...the enemy and waited...the verdict".
a. with, for
c. in, on
86. Pick out most appropriate preposition/s to fill up the blanks. "Engineers proceed... one site to another ...quick supervision and attend business".
a. for, for
c. from, for
87. Pick out most appropriate preposition/s to fill up the blanks. "everybody winks ...one's fault and laughs... others errors.
a. on, at
c. at, for
88. Give appropriate meaning of the idiomatic expression "to carry the day"
a. to be victorious
c. to speak truth
89. The word "prosecution" gets its prime stress on :
a. 3rd syllable
c. 4th syllable
90. Find appropriate conditional expression to fill up the blank space in "we will follow him ...he would drive more slowly".
a. in case
c. if only
- b. happy
d. passive
- b. insult
d. pardon
- b. monism
d. nihilism
- b. hedonism
d. sophism
- b. hold on
d. hold out
- b. clear off
d. clear out
- b. to, for
d. from, for
- b. to, on
d. on, on
- b. on, on
d. at, at
- b. to feel shame
d. to stop work
- b. 2nd syllable
d. 1st syllable
- b. even if
d. but for

Group D English (25 × 1 = 25)

76. Pick out the word or group of words which has nearly the same meaning as the word "predicament".
a. modest
c. future
77. Pick out the word or group of words which has nearly the same meaning as the word "preferment".
a. demotion
c. promotion
78. Pick out the word or group of words which has nearly the same meaning as the word "gainsay".
a. save
c. comment

- b. ignorance
d. quandary
- b. preference
d. rectify
- b. deny
d. punish

Group E Computer Related GK (25 × 1 = 25)

91. What does the acronym 'GPT' stand for in ChatGPT?
a. Generative Pre-trained Transformer
b. Global Policy Tracker
c. Graphical Information Technology
d. General Purpose Tool
92. What type of operating system MS-DOS is?
a. Command Line Interface

- b. Graphical User Interface
 - c. Multitasking
 - d. Menu Driven Interface
93. What is the full form of VGA?
- a. Video Graphics Array
 - b. Visual Graphics Array
 - c. Volatile Graphics Array
 - d. Video Graphics Adapter
94. Which of the following is the common language for Artificial Intelligence?
- a. Python
 - b. Java
 - c. Julia
 - d. Scala
95. For what purpose AI is used in Chandrayaan-3?
- a. Data analysis during the launch
 - b. Landing safely on the moon's surface
 - c. Maintaining the power
 - d. Programming
96. Which of the following devices is used in the network layer?
- a. Application Gateway
 - b. Switch
 - c. Router
 - d. Reapers
97. How many bytes does 4 kilobytes represent?
- a. 512
 - b. 1024
 - c. 4096
 - d. 8192
98. Which of the following values is the correct value of this binary code 1011 and 1111?
- a. 11 and 14
 - b. 12 and 15
 - c. 11 and 15
 - d. 12 and 14
99. What is the ".BAT" extension?
- a. System file
 - b. Backup file
 - c. Storage file
 - d. None of these
100. Identify the first computer virus among the following.
- a. Blaster
 - b. Crippler
 - c. Sasser
 - d. Mydoom