Tribhuvan University
Institute of Science and Technology
Central Department of Computer Science and Information Technology
Model Question Paper
B.Sc. Computer Science and Information Technology

Subject: English   **Full Marks: 50**   **Time: 30 minutes**

Directions: Fill in the blanks with the word which best fits in the following sentences. Each question carries equal marks.

1) She is physically …………………………….. .
   a. attract   b. attraction
   c. attractive   d. attracting

2) Learn the correct ………………………………….. of the word 'pneumonia'.
   a. speller   b. spelling
   c. spelt   d. spell

3) She has an ……………………….. temperament.
   a. Exciting   b. Excitement
   c. Exciter   d. Excited

4) This information is not ……………………………………… available.
   a. public   b. publicly
   c. publicity   d. publication

5) The artist's …………………….. was greatly appreciated.
   a. creative   b. creating
   c. creativity   d. creatively

Directions: Complete the following analogies or comparisons.

6) *Herd* is to elephant as ………………….. is to shark.
   a. fleet   b. herd
   c. flock   d. school

7) Water is to *drought* as food is to …………………….. .
   a. hunger   b. feminine
   c. famine   d. draft

Directions: Select the appropriate preposition or article from the choices given below.

8) She plays ……………………………… flute well.
   a. no article   b. a
   c. an   d. the

9) Rani met him …………………………….. the way to work.
   a. to   b. in
   c. on   d. at

Directions: Choose the best answer

10) Never do the things blindly, ……………………… ?
   a. will you?   b. shall you?
   c. do you?   d. don't you?

11) We have to support you …………………………… .
   a. You have to be supported.   b. You have been supported.
   c. We have to be supported.   d. You have been supported by us.

12) I ……………. postal stamps since I left school.
   a. had collected   b. had been collecting
   c. collected   d. have been collecting

13) "Give me your book tomorrow", Ram said to Sita.
   a. Ram asked Sita to give him her book the following day.
   b. Ram told Sita that he gave her his book the following day.
   c. Ram wanted to know if he would give her his book the following day.
   d. Ram said to Sita whether he could give her his book the following day.

14) A saw, in addition to a hammer and nails, ...…………… essential for this task.
   a. is   b. are
   c. has   d. had

15) I am used ………………… .
   a. to cook   b. to cooking
   c. to be cooked   d. to being cooked

16) He made his sister write an essay.
   a. He had his sister write an essay.   b. He had his sister write an essay.
   c. He had his sister write an essay.   d. He asked his sister write an essay.

Directions: Select the word which is closest to the opposite in meaning of the following words.

17) Look for
- a. search
- b. see
- c. conceal
- d. survey

18) Attach
- a. join
- b. adhere
- c. detach
- d. combine

19) Gigantic
- a. big
- b. tiny
- c. large
- d. huge

20) Unique
- a. unprecedented
- b. unusual
- c. common
- d. singular

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Subject: Physics   **Full Marks: 25**   **Time: 15 minutes**

Put correct answer on the answer sheet given. Attempt all questions.

1) Which of the following has different dimensional formula
   a. Pressure
   b. Elasticity
   c. Stress
   d. Strain

2) The period of a simple pendulum is doubled when
   a. its length is doubled
   b. the mass of the bob is doubled
   c. the length is made four times
   d. the mass of the bob and length of the pendulum are doubled

3) In a molecule of NaCl, the sodium atom has a relative atomic mass of about 23.0 and the chlorine atom one of about 35.5. If the separation of the atom is a, the center of mass has a distance from Na atom,
   a. 0.6a
   b. 0.8a
   c. 0.5a
   d. 0.4a

4) A potential energy of a string stretched by 2mm is V. If the spring is stretched by 6mm, its potential energy will be
   a. V
   b. 3V
   c. V/3
   d. 9V

5) The speed needed to put a satellite in orbit does not depend on
   a. radius of orbit
   b. shape of orbit
   c. value of g in orbit
   d. mass of satellite

6) Two bodies will be in thermal equilibrium if they have same
   a. specific heat
   b. heat energy
   c. temperature
   d. thermal conductivity

7) The boiling water is changing into steam. Under this condition, the specific heat of water is,
   a. zero
   b. one
   c. less than one
   d. infinite

8) The ratio of kinetic energy of oxygen and hydrogen molecules at NTP is,
   a. 1:16
   b. 1:1
   c. 1:8
   d. 8:1

9) The efficiency of Carnot's engine operating between 300K and 500K is
   a. 2/5
   b. 3/5
   c. 6/5
   d. 2/3

10) When light passes from air to water
   a. wave length increases
   b. frequency increases
   c. wavelength decreases
   d. frequency decreases

11) Focal length of equiconvex lens ($\mu = 1.5$) is
   a. equal to radius
   b. half the radius
   c. twice the radius
   d. infinity

12) You are given four lenses of focal length 1cm, 2cm, 10cm and 100cm. Which combination would you use for microscope?
   a. 1cm and 2cm
   b. 2cm and 10cm
   c. 2cm and 100cm
   d. 1cm and 100cm

13) Wave theory of light cannot explain:
   a. interference
   b. diffraction
   c. polarization
   d. photoelectric effect

14) Ultrasonic waves have frequency
   a. <20 Hz
   b. between 20 and 20,000Hz
   c. >20KHz
   d. equal to 20Hz

15) A person can distinguish his friend without seeing him because of
   a. timbre
   b. pitch
   c. loudness
   d. none of above

16) If an electron enters electric field at a right angle to the direction of field, then what will be its path
   a. circular
   b. parabolic
   c. hyperbolic
   d. straight line

17) Capacity of parallel plate capacitor decreases when
   a. distance between plates is increased
   b. areas between plates is decreased
   c. distance between plates is decreased
   d. both (a) and (b)

18) Kirchoff's current law is based on
   a. energy
   b. mass
   c. charge
   d. current

19) The magnetic moment of a coil of 1000 turns and area $5 \times 10^{-4} m^2$ carrying current of 0.2A is,
   a. $0.1 Am^2$
   b. $0.2 Am^2$
   c. $0.5 Am^2$
   d. $1 Am^2$

20) AC meters measure
   a. peak value
   b. average value
   c. square root of average value
   d. RMS value

21) At the magnetic pole , angle of dip is
   a. 0°
   b. 45°
   c. 60°
   d. 90°

22) Electric and magnetic field cannot accelerate
   a. electrons
   b. α-particles
   c. photons
   d. none of the above

23) When a semiconductor is doped with gallium, it becomes
   a. diode
   b. n-type semiconductor
   c. p-type semiconductor
   d. transistor

24) Which of the following radiation is most penetrating
   a. α-particle
   b. β-particle
   c. γ radiation
   d. X-rays

25) The origin of hydrogen spectra is due to
   a. accelerations of orbital electrons
   b. the removal of electron from atom
   c. the collision of electron with atom
   d. the transition of electron from outer orbit to inner orbit

17) EBCDIC can code upto how many different characters?
    a. 16
    b. 32
    c. 64
    d. 26

18) What is required when more than one person uses a central computer at the same time?
    a. Light pen
    b. Mouse
    c. Digitizer
    d. Terminal

19) Hard disk and diskettes are
    a. Direct access storage devices
    b. Sequential access storage devices
    c. Rarely used with microcomputers
    d. Both (a) and (c)

20) Which command is used to delete the directory that is empty?
    a. DEL*.*
    b. RD
    c. ERASE
    d. MD

21) The computer code for the interchange of information between terminals is
    a. ASCII
    b. BCD
    c. EBCDIC
    d. None of the above

22) A hybrid computer resembles
    a. Digital computer
    b. Analog computer
    c. Both a digital and an analog computer
    d. None of the above

23) Binary numbers need more places for counting because
    a. 0's and 1's can be added in front of them
    b. 0's and 1's have to be properly placed
    c. They are always big numbers
    d. Binary base is small

24) While working with MS-DOS, which command will you use to transfer a specific file from one disk to another?
    a. COPY
    b. DISKCOPY
    c. TIME
    d. RENAME

25) An integrated Circuit (IC) is
    a. Fabricated on a tiny silicon chip
    b. A complicated circuit
    c. Much costlier than a single transistor
    d. An integrated device

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Subject: Mathematics   **Full Marks: 75**   **Time: 45 minutes**

Put correct answer on the answer sheet given. Attempt all questions.

Group A: (15 x 2 =30)

1) If $A = [3, 3]$ and $B = [-2, 4)$, then $A - B$ is
   a. [-3, -2)   b. [-3, -2]
   c. (-3, -2)   d. (-3, -2]

2) If $f(x) = x$ and $g(x) = \frac{1}{x}$, then $g \circ f(x)$ is
   a. x
                                          b. $\frac{1}{x}$
   c. 1   d. None

3) The line pair $\frac{x}{a} + \frac{y}{b} = 1$ and $\frac{x}{b} + \frac{y}{a} = 1$ intersect at
   a. $\left(\frac{ab}{a+b}, \frac{ab}{a+b}\right)$ b. $\left(\frac{a+b}{ab}, \frac{a+b}{ab}\right)$
   c. Both   d. None

4) The line pair represented by $ax^2 + 2hxy + by^2 = 0$ will be at right angles if
   a. $h^2 = ab$ b. $h^2 + ab = 0$
   c. $a + b = 0$ d. $h^2 = a + b$

5) The value of the determinant $\begin{vmatrix} 2 & 1 & 0 \\ 4 & 2 & 0 \\ 6 & 3 & -8 \end{vmatrix}$ is
   a. -32   b. 0
   c. 8   d. -8

6) The transpose of the transpose of the matrix $\begin{pmatrix} 2 & 4 \\ 3 & 5 \end{pmatrix}$ is
   a. $\begin{pmatrix} 2 & 4 \\ 3 & 5 \end{pmatrix}$ b. $\begin{pmatrix} 2 & 3 \\ 4 & 5 \end{pmatrix}$
   c. $\begin{pmatrix} 5 & 4 \\ 3 & 2 \end{pmatrix}$

d. $\begin{pmatrix} 2 & 3 \\ 4 & 5 \end{pmatrix}$

7) Direction cosines of a line having its direction rations -1, 2, 2 are

a. $\left(\frac{2}{3}, \frac{2}{3}, \frac{-1}{3}\right)$

b. $\left(\frac{2}{3}, \frac{-1}{3}, \frac{2}{3}\right)$

c. $\left(\frac{1}{3}, \frac{2}{3}, \frac{2}{3}\right)$

d. $\left(\frac{-1}{3}, \frac{2}{3}, \frac{2}{3}\right)$

8) The system of equations $3x - y = 5$ and $x + y = 7$ intersects at points

a. Unique

b. Finitely many

c. Infinitely many

d. Does not intersect

9) Linear programming deals with

a. Linear objective function and nonlinear constraints

b. Linear objective function and linear constraints

c. Nonlinear objective function and nonlinear constraints

d. Linear objective function and linear constraints

10) If $1, \frac{-1+\sqrt{3}i}{2}$ and w are cube root of unity, the value of w is

a. 1

b. $\frac{-1+\sqrt{3}i}{2}$

c. $\frac{1-\sqrt{3}i}{2}$

d. $\frac{-1-\sqrt{3}i}{2}$

11) If $b^2 - 4ac < 0$ in $ax^2 - bx + c = 0$ with real coefficient then its root are

a. Real and unequal

b. Real and equal

c. Imaginary and unequal

d. Imaginary and equal

12) The derivative of $\sin^{-1}(x)$ is

a. $\frac{-1}{\sqrt{1-x^2}}$

b. $\frac{1}{\sqrt{1-x^2}}$

c. $\frac{1}{\sqrt{1+x^2}}$

d. $\frac{-1}{\sqrt{1+x^2}}$

13) The value of $\int_0^a \frac{dx}{x^2 - a^2}$ is

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

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

c. 1

d. 0

14) The domain of $y = \sin^{-1}(x)$ is

a. $-1 \leq x \leq 1$

b. $-\frac{\pi}{2} \leq y \leq \frac{\pi}{2}$

c. $-\infty < x < \infty$

d. None

15) If a, b, c in a triangle are in A.P. then $\frac{1}{r1}, \frac{1}{r2}, \frac{1}{r3}$ are in
   a. G.P.
   b. H.P.
   c. A.P.
   d. None

Group B: (15 x 3 = 45)

16) In a college in BSc.CSIT, all students study Physics or Biology or both. If 60 percent study Physics and 51 percent study biology, the percentage of the student studying both is
   a. 50
   b. 60
   c. 100
   d. 10

17) Let $f : Q \rightarrow Q$ be defined by $f(x) = 3x + 5$ for $x \in Q$ and Q being the set of all rational numbers. Then the function f is
   a. One-to-one but not onto
   b. Onto but not one-to-one
   c. one-to-one and onto
   d. Neither one-to-one nor onto

18) If $2cos^2x - 5 \cos x - 2 = 0 \ (0 \le x \le 360)$, then the value of x can have in degrees
   a. 60
   b. 300
   c. Both
   d. None

19) The area of a triangle whose sides are 3ft, 5ft and 4ft is
   a. 6 sqft
   b. 3 sqft
   c. 5 sqft
   d. 4 sqft

20) The equation of the straight line passing through the intersection of the lines $3x - 4y - 10 = 0$ and $5x + 3y - 7 = 0$ and making angle $135°$ with the positive x-axis is
   a. $x + y = 1$
   b. $x - y = 1$
   c. $x + y + 1 = 0$
   d. $x - y + 1 = 0$

21) The inverse of matrix $\begin{pmatrix} 3 & 2 \\ -1 & 6 \end{pmatrix}$ is
   a. $\begin{pmatrix} 6 & 1 \\ -2 & 3 \end{pmatrix}$
   b. $\begin{pmatrix} 6 & -2 \\ 1 & 3 \end{pmatrix}$
   c. $\frac{1}{20}\begin{pmatrix} 6 & -2 \\ 1 & 3 \end{pmatrix}$
   d. $\frac{1}{20}\begin{pmatrix} 6 & 1 \\ -2 & 3 \end{pmatrix}$

22) The system of equation $x - y = 2$ and $5x - 5y = 10$ is
   a. Inconsistent and independent
   b. Consistent and dependent
   c. Consistent and independent
   d. Neither

23) The quadratic equation whose roots are $2 + \sqrt{3}$ and $2 - \sqrt{3}$ is
    a. $x^2 + 4x + 1 = 0$
    b. $x^2 - 4x - 1 = 0$
    c. $x^2 - 4x + 1 = 0$
    d. $x^2 + 4x - 1 = 0$

24) The function $f(x) = \frac{3x-1}{x^3 - 5x^2 + 6x}$ is discontinuous at
    a. $x = 0$
    b. $x = 2$
    c. $x = 3$
    d. Above all

25) The derivative of $y = a^x$ with respect to x is
    a. $\log a$
    b. $a^x \log a$
    c. a^x
    d. xa^{x-1}

26) The function $f(x) = x^3 - 3x^2 + 6x + 4$ has local
    a. Maxima
    b. Minima
    c. Neither
    d. Both

27) The value of $\int \frac{\log(ax+b)}{ax+b} dx$ is
    a. $\frac{1}{2a}[\log(ax+b)]^2$
    b. $\frac{1}{2a}[\log(ax+b)]^2 + c$
    c. $[\log(ax+b)]^2$
    d. $[\log(ax+b)]^2 + c$

28) The area bounded by the curve $y^2 = 4ax$, the x-axis and the ordinate which cuts the curve at $(a, 2a)$ is
    a. $4a^2$
    b. $\frac{1}{3}a^2$
    c. $\frac{4}{3}a^2$
    d. a^2

29) If α, β, γ are the angles which a line makes with the coordinate axes, then $sin^2\alpha + sin^2\beta + sin^2\gamma$ equals to
    a. 1
    b. 0
    c. 3
    d. 2

30) The value of the determinant $\begin{vmatrix} 1 & \omega & \omega^2 \\ \omega & \omega^2 & 1 \\ \omega^2 & 1 & \omega \end{vmatrix}$, ω is an imaginary cube root of unity, is
    a. 1
    b. 0
    c. ω
    d. ω^2

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Subject: Chemistry **Full Marks: 25** **Time: 15 minutes**

Put correct answer on the answer sheet given. Attempt all questions.

1) The alkane that cannot be formed by Wurtz reaction is
   a. Methane
   b. Ethane
   c. Butane
   d. Hexane

2) The product of the reaction $CH_3 - CH = CH_2 + HBr \rightarrow$ is
   a. $CH_3\text{-}CH_2\text{-}CH_2Br$
   b. $BrCH_2\text{-}CH_2Br$
   c. $CH_3CHBr\text{-}CH_3$
   d. $CH_2\text{=}C\text{=}CH_2$

3) Which of the following solution is Tollen's reagent?
   a. Ammonical cuprous chloride
   b. Ammonical cuprous nitrate
   c. Ammonical sodium chloride
   d. Ammonical silver nitrate

4) Aniline reacts with diazonium salt to form
   a. Diazonium benzene
   b. Hydrazonium benzene
   c. Azobenzene
   d. Azoxybenzene

5) Which of the following compound is known as tear gas?
   a. CCL_3NO_3
   b. CH_3COCL
   c. $COCL_3$
   d. CH_3CL

6) Which of the following compounds are used as refrigerant?
   a. CH_3COCH_3
   b. CCL_4
   c. CF_4
   d. CCL_2F_2

7) The compound B formed in the following sequence of reaction

$$CH_3CH_2CH_2OH \xrightarrow{PCL_5} A \xrightarrow{Alc.KOH} B$$
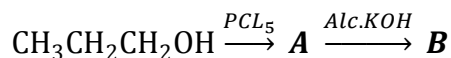
   a. Propyne
   b. Propane
   c. Propene
   d. Propanol

8) Phenol (C_6H_5OH) is
    a. Acidic
    b. Basic
    c. Neither acidic nor basic
    d. Both acidic and basic

9) Hardness of water may be caused by
    a. Calcium carbonate
    b. Calcium phosphate
    c. Calcium hydride
    d. None of above

10) *Chile Salt-Petre's* formula is
    a. $NaNO_3$
    b. Na_2SO_4
    c. $CuSO_4.5H_2O$
    d. KNO_3

11) An ingredient of baking powder is
    a. Sodium bicarbonate
    b. Sodium carbonate
    c. Sodium sulphate
    d. Borax

12) Cinnabar is an ore of the metal
    a. Mercury
    b. Gold
    c. Zinc
    d. Silver

13) Which is the most basic of the following oxides?
    a. Na_2O
    b. BaO
    c. As_2O_3
    d. Al_2O_3

14) Which mixture stands for *aqua regia*?
    a. $3HCL + HNO_3$
    b. $HCL + 3HNO_3$
    c. $H_3PO_4 + H_2SO_4$
    d. $HCL + CH_3COOH$

15) Sea weed are important source of
    a. Iron
    b. Chlorine
    c. Iodine
    d. Bromine

16) Copper pyrites are concentrated by
    a. Gravity separation
    b. Electromagnetic method
    c. Chemical means
    d. Froth floatation process

17) What will be the mass of 6.03×10^{23} molecules of carbon monoxide?
    a. 17.01g
    b. 16.00g
    c. 28.01g
    d. 56.20g

18) Energy of an electron of an atom is specified by
    a. Principal quantum number
    b. Spin quantum number
    c. Magnetic quantum number
    d. Azimuthal quantum number

19) How many moles of water are present in 180g of water?
    a. 1
    b. 10
    c. 18
    d. 100

20) Which of the following transition in a hydrogen atom absorbs the photon of highest frequency?
    a. $n = 1\ to\ n = 2$
    b. $n = 2\ to\ n = 5$
    c. $n = 2\ to\ n = 21$
    d. $n = 5\ to\ n = 2$

21) The number of unpaired electrons in d orbitals of a atom having atomic number 29 at ground state is
    a. 0.
    b. 1
    c. 5
    d. 10

22) Which of the ions have the greatest radius?
    a. H⁻
    b. F⁻
    c. Br⁻
    d. I⁻

23) Which sequence follows the order of decreasing tendency to form anions?
    a. F, N, O
    b. N, O, F
    c. F, O, N
    d. N, F, O

24) The reversible reaction: $N_2 + 3H_2 \leftrightarrows 2NH_3 + Heat$; in the forward direction is favored by
    a. Low temperature and high pressure
    b. High temperature and low pressure
    c. Low temperature and low pressure
    d. High temperature and high pressure

25) In the reaction: $Cr_2O_7^{--} + 14H^+ + 6I^- \rightarrow 2Cr^{3+} + 3H_2O + 3I_2$, which element is reduced?
    a. Chromium
    b. Hydrogen
    c. Oxygen
    d. Iodine