Tribhuvan University
Institute of Science and Technology
Computer Science and Information Technology (B.Sc.CSIT)
Model Question for Entrance Examination

Full Marks: 100
Attempt all questions.   Time: 2 hrs.

Mathematics   (25 ×1 = 25)

1. Number of nonempty singleton subsets from the elements of the set {l, m, n, p} is
    (a) 4   (b) 3   (c) 2   (d) 1

2. Let f: A→B, then f is invertible if
    (a) f is one-one   (b) f is onto
    (c) f is both one-one and onto   (d) f is one-one into

3. Let f : R →R be defined by $f(x) = 3x - 4$, then $f^{-1}(x)$ is
    (a) $\frac{x+4}{3}$ (b) $\frac{x-4}{3}$
    (c) $x + 4$ (d) $x - 4$

4. $\lim_{x\to\infty} \left(1 + \frac{3}{x}\right)^x$ is equal to
    (a) e^3 (b) 3e   (c) $3e^3$ (d) $1/e^3$

5. $\lim_{x\to\infty} \frac{sinx}{x}$ is equal to
    (a) 3   (b) 2   (c) 1   (d) 0

6. If the function $f(x) = \begin{cases} 2x, & x < 2 \\ 2, & x = 2 \\ x^2, & x > 2 \end{cases}$, then the function has
    (a) Continuous at $x = 2$
    (b) discontinuous at $x = 2$
    (c) removable discontinuous at $x = 2$

    (d) does not exist

7. $\frac{d}{dx}(log|x|)$ is equal to
    (a) $\frac{1}{|x|}$ (b)$\pm\frac{1}{x}$ (c)$\frac{1}{x}$ (d)$\frac{1}{x^2}$

8. Derivative of sin^3x w.r.t. cos^3x is
    (a) $tanx$ (b)$-tanx$ (c)tan^3x (d)$cotx$

9. If f(x) = log (logx), then f^1(e) is equal to
    (a) e   (b) 1/e   (c) 1   (d) -1

10. The minimum value of f(x) = sinx.cosx is
    (a) - ½ (b) ½   (c) 0   (d) 1

11. $\int logx \, dx$ is equal to
    (a) (logx – 1) + C   (b) (xlogx – 1) + C
    (c) (xlogx + 1) + C   (d)x(logx – 1) + C

12. $\int_0^{\sqrt{3}/2} \frac{dx}{\sqrt{1-x^2}}$ is equal to
    (a) π/3   (b) π/6   (c) π/4   (d) π/2

13. The area bounded by the parabola $y^2 = x$, the line y = 4 and y-axis is
    (a) 16/3   (b) 32/3   (c) 64/3   (d) 128/3

14. The modulus of $\frac{(1-i)^3}{1-i^3}$ is equal to
    (a) -1   (b)i   (c) 0   (d) -2

15. The roots of the equation $2x^2 – 3x +1 = 0$ are
    (a) real, unequal, rational   (b) real, equal
    (b) perfect square, equal   (d) unequal, imaginary

16. If $A = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$ and $B = \begin{pmatrix} 5 & 6 \\ 7 & 8 \end{pmatrix}$, then (AB)′ is
    (a) $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ (b)$\begin{pmatrix} 19 & 43 \\ 22 & 50 \end{pmatrix}$
    (c)$\begin{pmatrix} 19 & 22 \\ 43 & 50 \end{pmatrix}$ (d)$\begin{pmatrix} 22 & 50 \\ 43 & 19 \end{pmatrix}$

17. The two lines of the system $6x - 4y = 10$, $3x - 2y = 5$ are
    (a) parallel   (b) intersecting
    (c) coincident   (d) independent

18. If the A.M. and G.M between two given numbers are 81 and 18, respectively, then H.M. is
    (a) 99   (b) 49.5   (c) 4.5   (d) 4

19. The most general value of θ satisfying the equation $3\tan^2\theta = 1$ is
    (a) $n\pi + \pi/6$ (b) $n\pi \pm \pi/6$
    (c) $2n\pi \pm \pi/6$ (d) $(-1)^3\alpha + \pi/6$

20. $\tan^{-1}x + \tan^{-1}(1/x)$ is equal to
    (a) 1   (b) $\pi/2$ (c) $\pi/4$ (d) 0

21. In a ΔABC, r is equal to
    (a) $(S-a)\tan\frac{B}{2}$ (b) $(S-b)\tan\frac{B}{2}$
    (c) $(S-b)\tan\frac{C}{2}$ (d) $(S-a)\tan\frac{C}{2}$

22. The distance between the two lines $3x + 4y = 6$ and $6x + 8y = 15$ is
    (a) 2/3 units   (b) 2/5 units

    (c) 10/3 units   (d) 3/10 units

23. For what value of λ does the equation $12x^2 - 10xy + 2y^2 + 11x - 5y + \lambda = 0$ represents a line pair?
    (a) 1   (b) 2   (c) 3   (d) 4

24. Equation of the circle having ends of its diameter at (1, -1) and (0, 2) is
    (a) $x^2 + y^2 - x - y - 2 = 0$ (b) $x^2 + y^2 + x + y - 2 = 0$
    (c) $x^2 + y^2 - x - 2y + 2 = 0$ (d) $x^2 + y^2 - x + 2y - 2 = 0$

25. The direction cosines of a line equally inclined to the axes are
    (a) ½ , ½ , ½   (b) 1/3, 1/3, 1/3
    (c) $\pm 1/\sqrt{2}, \pm 1/\sqrt{2}, \pm 1/\sqrt{2}$ (d) $\pm 1/\sqrt{3}, \pm 1/\sqrt{3}, \pm 1/\sqrt{3}$

Physics   (25×1=25)

26. Which of the following pair have same dimension?
    (a) L/R and CR   (b) LR and CR
    (c) R/L and $[LC]^{1/2}$ (d) CR and 1/LC

27. A bullet fired into a fixed target loses half of its velocity after penetrating 3 cm, the further distance travelled before coming to the rest is
    (a) 4 cm.   (b) 2 cm.   (c) 3 cm.   (d) 1 cm.

28. The horizontal range is $4\sqrt{3}$ times the maximum height in a projectile motion. The angle of projection is
    (a) 15°.   (b) 45°.   (c) 30°.   (d) 60°.

29. The 'net force acting on a body is zero' then the wrong statement is
    (a) body is at rest.   (b) acceleration is not zero.
    (c) body is in motion.   (d) Acceleration should be zero.

30. If length of wire is doubled keeping the diameter constant, it's Young's modulus will
    (a) increases.   (b) decreases.
    (c) remain same.   (d) depend upon nature of matter.

31. The work done to blow a soap bubble of radius 'R' is W, then work done to increase the radius from R to 3R is
    (a) 2 W.   (b) 8 W.   (c) 4 W.   (d) 9 W.

32. A metallic ball is immersed in alcohol. The coefficient of cubical expansion of metal is less than that of alcohol. When the system is heated weight of ball is
    (a) increases.   (b) remains unchanged
    (c) decreases.   (d) First increases and then decreases.

33. Latent heat of a substance is zero at
    (a) boiling point.   (b) critical temperature.
    (c) melting point.   (d) freezing point.

34. The average Kinetic Energy per degree of freedom per molecule of an ideal gas is
    (a) KT.   (b) $2KT$.   (c) ½ KT.   (d) ¾ KT.

35. Two spheres of same material have radii in the ration 3:2. The heat radiated by them at the same temperature will be
(a) 1:1.　　　　(b) 4:9.　　　　(c) 9:4.　　　　(d) 3:2.

36. Light of wavelength 550 nm falls normally on a slit of width 22×10^{-7} m, the angular position of second minima from central maxima will be
(a) 14.5^0.　　　(b) 30^0.　　　(c) 42^0.　　　(d) 62^0.

37. A person is in a room whose ceiling and two adjacent walls are mirrors. Number of images formed of an object is
(a) 5.　　　　(b) 7.　　　　(c) 6.　　　　(d) 8.

38. The refractive index is 1.414 and refracting angle is 60°, then minimum deviation of light will be
(a) 30°.　　　(b) 60°.　　　(c) 45°.　　　(d) 72°.

39. A sound wave has frequency 500 Hz and velocity 360 m/s. What is the distance between 2 particles having phase difference 60^0?
(a) 0.7 cm　　　(b) 70 cm　　　(c) 1.2 cm　　　(d) 12 cm

40. Two fixed charges q and $4q$ are at r distance apart. What will be position of third charge to be placed so that the system will be in equilibrium?
(a) $2r/3$ from $4q$　　(b) $2r$ from q　　(c) $r/2$ from q　　(d) $r/2$ from $4q$

41. n-equal capacitors are first connected in series and then in parallel. The ratio of maximum to minimum capacitance is
(a) n^2.　　　(b) $1/n^2$.　　　(c) n.　　　(d) $1/n$.

42. A heater coil is cut into two equal parts and only one part is used in the heater. How will the heat generated vary?
(a) One fourth　　(b) Doubled　　(c) Halved　　(d) Four times

43. A 50 V battery is connected across 10 Ohm resistor. The current in the circuit is 4.5 Ampere. The internal resistance of the battery should be
(a) zero　　　(b) 5.0 Ohm　　(c) 0.5 Ohm　　(d) 1.1 Ohm

44. A magnetic needle kept in a non-uniform magnetic field. It experiences
(a) a torque but not a force　　　(b) a force and a torque
(c) neither a force nor a torque　　(d) a force but not a torque

45. In LCR circuit, the inductive reactance at resonance frequency is 100 Hz and resistance is 5 Ohm, the quality factor of the circuit is

(a) 5000.　　　(b) 500.　　　(c) 20.　　　(d) 95.

46. A circuit contains a capacitor of 420 Pf and an inductance L. The value of 'L' to broadcast on Radio at 1020 kHz is
(a) 2.8×10^{-5} H.　　(b) 7.6×10^{-5} H.　(c) 5.8×10^{-5} H.　(d) 9.6×10^{-6} H.

47. Electron accelerated from rest to a potential difference of 100 volt, its final velocity will be
(a) 5×10^5 m/s.　　(b) 3×10^6 m/s.　　(c) 4×10^5 m/s.　(d) 6×10^6 m/s.

48. When a proton collides with an electron, which of the following characteristics of proton increases?
(a) Energy　　　(b) Wavelength　　(c) Frequency　　(d) Impulse

49. The half life of a radioactive sample is 10 years. Its mean life is
(a) 12.43 years.　　　　(b) 16.43 years.
(c) 14.43 years.　　　　(d) Same as half life.

50. *NPN* transistors are most preferred than that of *PNP* transistor. It is because of
(a) low cost.　　　　　(b) capable of handling low power.
(c) Low dissipation of energy.　　(d) high mobility of electrons than holes.

Chemistry　　　　　　　　　　　　　　(25×1=25)

51. Azimuthal quantum number describes
(a) orbital size　　　　(b) orbital orientation
(c) orbital shape　　　(d) nuclear stability

52. The radioactive rays having highest penetrating power is
(a) αrays　　　(b) β rays　　(c) ϒ rays
(d) all have equal penetrating power

53. Which of the following has an electrovalent linkage?
(a) $MgCl_2$　　　(b) CH_4　　　(c) $SiCl_4$　　　(d) CCl_4

54. The element having highest value of electronegativity is
(a) chlorine　　(b) fluorine　　(c) bromine　　(d) iodine

55. Oxidation number of chromium in $Cr_2O_7^{2-}$ is
(a) + 6　　　(b) + 5　　　(c) + 4　　　(d) + 3

56. Which of the following is an amphoteric oxide?
    (a) CaO　　　(b) MgO　　　　(c)CuO　　　　(d) ZnO

57. The structure of Buckminister fullerene contains
    (a) 20 six member rings and 12 five member rings
    (b) 12 six member rings and 20 five member rings
    (c) 12 six member rings and 10 five member rings
    (d) 12 six member rings and 8 five member rings

58. Down's process is used for the extraction of
    (a) ammonia　　(b) nitric acid　　(c) sodium　　(d) sulphuric acid

59. The IUPAC name of iso-butane is
    (a) 2-methylpropane　　(b) 2,2-dimethylpropane
    (c) 2-methylpropene　　(d)2-methylbutane

60. An alkaline $KMnO_4$ solution is known as
    (a) Tollen's reagent　　(b) Baeyer's reagent
    (c) Fehling's reagent　　(d) Grignard reagent

61. When haloalkane solution is treated with metallic sodium in presence of dry ether, respective alkane is obtained. This reaction is known as
    (a) Wurtz reaction　　　　(b) Wolf-Kishner reduction
    (c) Cannizzaro's reaction　　(d) Reimer-Tiemann reaction

62. The general formula of alkanes is
    (a) C_nH_{2n}　　(b)C_nH_{2n+2}　　(c)C_nH_{2n-2}　　(d)None of the above

63. Detection of nitrogen, sulphur and halogens in organic compounds is done by
    (a) Lassaigne's test　　　(b) Lucas test
    (c) Victor meyer test　　　(d) carbylamine test

64. The structure of methane is
    (a) trigonal planar　(b) linear　(c) tetrahedral　(d) square planar

65. Equivalent weight of potassium dichromate in an acidic medium is equal to its
    (a) mol. wt./6　(b) mol. wt./3　(c)mol. wt./4　(d) mol. wt./2

66. An example of Lewis base is
    (a) BF_3　　　(b) $AlCl_3$　　　(c) $FeCl_3$　　　(d)NH_3

67. A device which can generate electricity by means of a redox reaction is called
    (a) electrochemical cell　　(b) galvanic cell
    (c) voltaic cell　　　　　　(d)all of the above

68. 1calorie is equal to
    (a) 4.184 joules　　　　(b) 5.184 joules
    (c) 3.184 joules　　　　(d) 2.184 joules

69. The rate of a reaction depends on
    (a) concentration of reacting species　　(b) temperature
    (c) surface area of the reactants　　　　(d) all of the above

70. Each carbon atom of benzene is
    (a) sp^3 hybridized　　　　(b) sp^2 hybridized
    (c) sp hybridized　　　　　　(d) sp^3d hybridized

71. Which is correct for the reaction of Lucas reagent with tertiary alcohol?
    (a) no turbidity occurs at room temperature
    (b) turbidity appears within five minutes
    (c) turbidity appears immediately
    (d) turbidity appears within ten minutes

72. Fat is a
    (a) lipid　　(b) carbohydrate　　(c) protein　　(d) amino acid

73. Bakelite is made by the action of
    (a) phenol on formaldehyde　　(b) urea on formaldehyde
    (c) melamine on formaldehyde
    (d) ethylene glycol on phthalic acid

74. Which of the following compound is called corrosive sublimate?
    (a) Hg_2Cl_2 (b) $HgCl_2$　　　　(c) $K_2[HgI_4]$　　(d)HgI_2

75. Haematite is an ore of
    (a) iron(b) copper　　　(c) mercury　　(d) silver

English   (15×1=15)

76. The word "permissible" is accented on its .....syllable.
    (a) 1st   (b) 2nd   (c) 3rd   (d) none of the above

77. Which of the following word gets stress on the first syllable ?
    (a) perish   (b) incredible   (c) incur   (d) temerity

78. I shall be glad......your help in my business.
    (a) in   (b) by   (c) of   (d) with

79. An addicted person is the slave..... to his drug habit.
    (a) to   (b) for   (c) on   (d) by

80. Give an appropriate synonym to the word "vendetta".
    (a) pleasant   (b) secret   (c) promise   (d) feud

81. Give an appropriate synonym to the word " acerbity".
    (a) mildness   (b) acrimony
    (c) unsuitable   (d) extravagant

82. Give opposite meaning word to " replete".
    (a) empty   (b) alarm   (c) full   (d) stuff

83. Give opposite meaning word to " quell".
    (a) encourage   (b) stop   (c) crush   (d) promote

84. A disease that can be spread by touch is.......
    (a) pandemic   (b) infectious   (c) endemic   (d) contagious

85. Pick the odd word out
    (a) lamb   (b) pork   (c) mutton   (d) venison

86. What is the right meaning of the Latin words "ad nauseam"?
    (a) to a disgusting degree (b) regularly (c) on duty (d) rarely

87. I think she will succeed,.....?
    (a) shan't she? (b) won't she?   (c) would she?   (d) doesn't she?

88. Which of the following is the adjective?
    (a) width   (b) autumnal   (c) advantage
89. Don't stand on ceremony with him just because he
has a title.

(a) avoid someone
(b) maintain formality
(c) pay too much attention to correct rules of behavior or be too formal;
(d) do every thing necessary

90. This legal document is double Dutch to me.
    (a) emotional object   (b) entertainment
    (c) a fair chance;   (d) difficult to understand

Computer   (10×1=10)

91. Analog computer works on the supply of
    (a) physical strength.   (b) natural strength.
    (c) magnetic strength.   (d) continuous electrical pulses.

92. We can make use of the wild card entries such as ……….. in Windows Explorer.
    (a) #,@   (b) ^,*   (c) ?,*
                      (d) ?,#

93. Which of the following is the second largest measurement of RAM?
    (a) Megabyte   (b) Gigabyte   (c) Byte   (d) Terabyte

94. Cache memory acts between
    (a) CPU and Hard disk.   (b) RAM and ROM.
    (c) CPU and RAM .   (d) All of these .

95. Which of the following is billionth of a second?
    (a) Microsecond   (b) Nanosecond
    (c) Terabyte   (d) Gigabyte

96. The Binary Coded Decimal (BCD) uses
    (a) 6 bits   (b) 8 bits   (c) 16 bits   (d) 32 bits

97. RAM is also called as
    (a) Virtual memory .   (b) Volatile memory.
    (c) Non volatile memory.   (d) Cache memory.

98. CPU stands for

(a) Central Planning Unit.   (b) Computer Planning Union.
(c) Computer Processing Unit.   (d) Central Processing Unit.

99. If you want to copy a portion of the text then you need to use
    (a) Control & C   (b) Command & C
    (c) Control & V   (d) Command and V

100. Which one is not an operating system?
    (a) Windows   (b) Linux
    (c) Unix   (d) LaTex