

Model Question [nET-2023]

Choose the one lettered choice that is best in each case and then fill in the corresponding circle in the answer sheet provided.

Each question carries equal mark.

Time: 2hrs

F.M. 1x100=100

MATHEMATICS

- 1) If $A \cap B = \phi$
A) $\bar{A} \subset B$
B) $\bar{B} \subset A$
C) $\bar{A} \cap \bar{B} = \phi$
D) $A \subset \bar{B}$
- 2) The inequality $2 \leq x \leq 4$ is same as
A) $|x - 2| \leq 1$
B) $|x - 3| \leq 1$
C) $|x - 3| \leq 2$
D) $|x - 3| \leq 4$
- 3) If $A = (-1, 3]$ and $B = [0, 4)$, then $A - B$ is
A) $[-1, 0)$
B) $(-1, 0]$
C) $[-1, 0]$
D) $(-1, 0)$
- 4) If $f^{-1}(x) = 2x - 1$, then $f(x)$ is
A) $2x + 1$
B) $\frac{1}{2x - 1}$
C) $\frac{x + 1}{2}$
D) $\frac{x - 1}{2}$
- 5) The value of $\log_{16} 64$ is
A) $\frac{3}{2}$
B) $\frac{2}{3}$
C) 2
D) 3
- 6) The parabola $y = ax^2$ is wider than $y = x^2$ if
A) $a < 1$
B) $|a| < 1$
C) $a > 1$
D) $|a| > 1$
- 7) If the three positive numbers a, b, c are in AP, then
A) $b^2 = ac$
B) $b^2 < ac$
C) $b = a + c$
D) $b^2 > ac$
- 8) If $|x| < 1$ and $y = x + x^2 + x^3 + \dots$ to ∞ , then x is equal to
A) $\frac{1}{y}$
B) $\frac{1}{1 + y}$
C) $\frac{y}{1 + y}$
D) $\frac{1 + y}{y}$
- 9) If A is a square matrix, then $A + A^T$ is a
A) diagonal matrix
B) scalar matrix
C) skew-symmetric matrix
D) symmetric matrix

- 10) The inverse of the matrix $\begin{pmatrix} 3 & -2 \\ 5 & 5 \end{pmatrix}$ is
- A) $\frac{1}{5} \begin{pmatrix} 5 & 2 \\ -5 & 3 \end{pmatrix}$ B) $\frac{1}{10} \begin{pmatrix} 5 & -2 \\ -5 & 3 \end{pmatrix}$
C) $\frac{1}{25} \begin{pmatrix} 5 & 2 \\ -5 & 3 \end{pmatrix}$ D) $\frac{1}{15} \begin{pmatrix} 3 & -2 \\ 5 & 5 \end{pmatrix}$
- 11) If $\begin{vmatrix} -4 & x-4 \\ -2 & x+1 \end{vmatrix} = 0$, then the value of x is
- A) 6 B) -6
C) 3 D) -3
- 12) If $z = \frac{-1 + \sqrt{3}i}{2}$, then z^3 is equal to
- A) i B) 1
C) $-i$ D) -1
- 13) The multiplicative inverse of $3 - 2i$ is
- A) $\frac{3}{13} + \frac{2}{13}i$ B) $\frac{2}{13} + \frac{3}{13}i$
C) $\frac{3}{13} - \frac{2}{13}i$ D) $\frac{2}{13} - \frac{3}{13}i$
- 14) The amplitude of the complex number $-\sqrt{3} - i$ is
- A) $\frac{\pi}{6}$ B) $\frac{2\pi}{3}$
C) $\frac{11\pi}{6}$ D) $\frac{7\pi}{6}$
- 15) The maximum value of $\sin x + \cos x$ is
- A) 1 B) 2
C) $\sqrt{2}$ D) $1/\sqrt{2}$
- 16) The general solution of the equation $4 \cos^2 x = 1$ is
- A) $n\pi \pm \frac{\pi}{6}$ B) $n\pi + \frac{\pi}{6}$
C) $n\pi + \frac{\pi}{3}$ D) $n\pi \pm \frac{\pi}{3}$
- 17) The smallest angle of the triangle having sides 7cm, $4\sqrt{3}$ cm and $\sqrt{13}$ cm is
- A) 30° B) 60°
C) 45° D) 15°
- 18) The distance between the lines $4x - 3y = 22$ and $4x - 3y = 12$ is
- A) 0 B) 2
C) 10 D) 5

- 19) The equation $3x^2 + xy - y^2 - 3x + 6y + k = 0$ represents a pair of straight line, then k is
 A) 9
 B) -9
 C) 0
 D) 1
- 20) The line $y = mx + c$ is normal to the circle $x^2 + y^2 = a^2$ if
 A) $c = \pm a\sqrt{1+m^2}$
 B) $c = 0$
 C) $m = 0$
 D) $c = m = 0$
- 21) The equation of the tangent to the circle $x^2 + y^2 = 13$ at the point (2, 3) is
 A) $2x + 3y = \sqrt{13}$
 B) $2x - 3y = 13$
 C) $2x - 3y = \sqrt{13}$
 D) $2x + 3y = 13$
- 22) The equations $ax + by + c = 0$ and $\alpha x + \beta y + \gamma = 0$ represents the same line if and only if
 A) $\frac{a}{\alpha} = \frac{b}{\beta}$
 B) $a = \alpha, b = \beta, c = \gamma$
 C) $\frac{a}{\alpha} = \frac{b}{\beta} = \frac{c}{\gamma}$
 D) $c = \gamma$
- 23) The value of b for which the equations $9x + 4y = 9$ and $7x + by = 5$ have no solution is
 A) 4
 B) 7
 C) $\frac{9}{28}$
 D) $\frac{28}{9}$
- 24) $\lim_{x \rightarrow 0} f(x)$ for the function $f(x) = \begin{cases} 2x-1 & \text{for } x < 0 \\ 2x+1 & \text{for } x \geq 0 \end{cases}$ is
 A) 0
 B) 1
 C) -1
 D) not exist
- 25) The value of k for which the function $f(x) = \begin{cases} x-k, & x < 1 \\ 5-x, & x \geq 1 \end{cases}$ is continuous at $x = 1$ is
 A) 4
 B) 5
 C) -3
 D) 3
- 26) The derivative of $\frac{1}{x} + x$ with respect to x is
 A) $1 - \frac{1}{x^2}$
 B) $\ln x + \frac{x^2}{2}$
 C) $\ln x + 1$
 D) 0
- 27) If $y = \ln(\sin x)$, then $\frac{d^2y}{dx^2}$ is equal to
 A) $\cot x$
 B) $-\operatorname{cosec}^2 x$
 C) $\sec^2 x$
 D) $-\operatorname{cosec} x \cot x$
- 28) The derivative of $\tan x$ with respect to $\sec x$ is
 A) $\sec^2 x$
 B) $\cos x$
 C) $\sin x$
 D) $\operatorname{cosec} x$

- 57) The γ – ray emitted by a radioactive nucleus, actually is:
 A) Photon
 B) Electron
 C) Proton
 D) Neutron
- 58) The atomic mass unit is used for unit of:
 A) Mass only
 B) Energy only
 C) Both mass and energy
 D) Neither mass nor energy
- 59) Mass of a proton (in Kg) is equal to:
 A) 9.11×10^{-31}
 B) 1.67×10^{-27}
 C) 1.68×10^{-27}
 D) 1.60×10^{-19}
- 60) In a simple harmonic motion, the K.E. of the body is maximum at which position?
 A) Extreme
 B) Between extreme and mean
 C) Mean
 D) K.E. is constant
- 61) The energy stored in a capacitor is given by:
 A) $\frac{1}{2} \frac{q^2}{C}$
 B) $\frac{1}{2} q^2 C$
 C) $\frac{1}{2} q C^2$
 D) $\frac{1}{2} \frac{1}{q^2 C}$
- 62) The prefix ‘ Pico’ used in a unit represents:
 A) 10^{15}
 B) 10^{-12}
 C) 10^{-15}
 D) 10^{12}
- 63) Which of the parameters below does not change on refraction of wave?
 A) Wavelength
 B) Phase
 C) Speed
 D) Frequency
- 64) Which of the following is correct for X – ray:
 A) Deflected by electric field
 B) Does not possess charge
 C) Deflected by magnetic field
 D) Possess charge
- 65) In parallel combination of resistors with unequal resistances, the equivalent resistance:
 A) Is less than minimum of that in combination
 B) Is more than maximum of that in combination
 C) Remains as that of minimum one of in combination
 D) Remains as that of maximum one in combination
- 66) A lens of power -4D is placed in contact with a lens of power +2D. The power of lens combination will
 A) +6D
 B) +2D
 C) -2D
 D) -1D
- 67) If the normal reaction is doubled, keeping limiting friction same, the coefficient of friction is
 A) not changed
 B) halved
 C) doubled
 D) tripled

- 68) The amount of heat required to change the state of 1kg of substance at constant temperature is called
A) Kilocal B) Calorie
C) Specific heat D) Latent heat
- 69) Mechanical waves can be
A) longitudinal only B) transverse only
C) both longitudinal and transverse D) neither longitudinal nor transverse
- 70) The bending of light waves through the corners of the obstacle is called
A) refraction B) diffraction
C) interference D) beats

ENGLISH

- 71) Dikendra got his servant _____ his house.
A) paint B) to paint
C) painted D) painting
- 72) Among the following words, _____ has /æ/ sound.
A) mouth B) moon
C) sound D) add
- 73) The word 'Tabulate' has primary stress on _____ syllables.
A) 1st B) 2nd
C) 3rd D) 4th
- 74) The word _____ has three syllables from the following.
A) absent B) academy
C) department D) beauty
- 75) The man has been working here _____ last Monday.
A) for B) to
C) from D) since
- 76) If you boil the water, it _____ into vapour.
A) changes B) will change
C) would change D) will be changed
- 77) The passive form of the sentence, 'Everybody speaks English all over the world' is _____.
A) English was spoken all over the world B) English is spoken all over the world
C) English is being spoken all over the world D) English has been spoken all over the world
- 78) Question tag of the sentence, 'Let's prepare the minute', _____?
A) shall we B) will you
C) do you D) don't we
- 79) I explained that I was _____ artist, but that I was sometimes _____ plumber as well.
A) an, the B) a, a
C) an, a D) an, an

- 80) The indirect speech of He says "I will meet you at the station" is _____.
- A) he says that he would meet him at the station B) he said that he would meet him at the station
C) he said that he will meet him at the station D) he says that he will meet him at the station

CHEMISTRY

- 81) Minimum energy required for the molecules to enter into the reaction is called
- A) Potential energy B) Kinetic energy
C) Activation energy D) Nuclear energy
- 82) Le -Chatelier's principle is not applicable to
- A) Homogenous reaction B) Not homogenous reaction
C) System that is in equilibrium D) System that is not in equilibrium
- 83) Why liquid ammonia is used in refrigerator? Because of its
- A) High basicity B) High heat of vaporization
C) High dipole moment D) All the above
- 84) Tick the necessary conditions for Geometrical isomerism
- A) There should be carbon - carbon double bond compound B) First carbon must contain two different groups attached
C) Second carbon must contain same group as the first carbon D) All the above
- 85) Which test is useful to distinguish formaldehyde with acetaldehyde?
- A) Schiff's test B) Fehling's test
C) Test with Iodine in basic condition D) Tollen's test
- 86) Bromomethane can be converted into methanol in suitable chemical environment, the reaction involved is
- A) Nucleophilic substitution B) Electrophilic substitution
C) Elimination D) Addition
- 87) Markovnikoff's rule is applicable to
- A) Free radical addition reaction B) Electrophilic addition reaction
C) Substitution reaction D) Elimination reaction
- 88) In which type of reaction, the number of pi bonds in the product increases?
- A) Elimination reaction B) Addition reaction
C) Substitution reaction D) Electrophilic addition reaction
- 89) A sample of drinking water was found to be severely contaminated with chloroform (CHCl_3) supposed to be a carcinogen. The level of contamination was 20 ppm (by mass), express this in % by mass.
- A) $20 \times 10^5 \times 100$ B) $20/10^6 \times 100$
C) $20/10^5 \times 100$ D) $20 \times 10^6 \times 100$
- 90) Which of the following is optically active compound?
- A) Formic acid B) Acetic acid
C) Phenol D) Lactic acid

