MEET CBT 2079 – Sample Questions

Mathematics (40x1=40)

1. If n(A)=3, n(B)=6 , then minimum number of elements in (A∪ B) is
(a) 6 (b) 3 (c) 1 (d) 0

2. The range of the function $f(x) = sinx$ is
(a) $-1 < x < 1$ (b) $-1 \leq x \leq 1$ (c) $-1 \leq x < 1$ (d) $-1 \leq x < 1$

3. If $log_a\left(\frac{1}{8}\right) = 3$, then the value of a is
(a) $\frac{1}{8}$ (b) $\frac{1}{3}$ (c) $\frac{1}{2}$ (d) 1

4. For any two square matrices A and B, which one of the following is a symmetric matrix?
(a) A - A^T (b) A+A^T (c) $(A^T)^T$ (d) none

5. For a given cube roots of unity ω, what is the value of $\frac{a+b\omega+c\omega^2}{b+c\omega+a\omega^2}$?
(a) 1 (b) ω (c) ω^2 (d) $none$

6. The infinite series $x - \frac{x^2}{2} + \frac{x^3}{3} - \frac{x^4}{4} + \cdots \ldots \ldots\ldots\ldots$ equals
(a) e^{-x} (b) e^x (c) $ln(1-x)$ (d) $ln(1+x)$

7.. The sum $S_\infty = \frac{1}{1-r}$ of an infinite geometric series $1 + r + r^2 + r^3 + \cdots \ldots \ldots \ldots$ is a fixed finite number if
(a) $|r| < 1$ (b) $|r| \leq 1$ (c) $|r| > 1$ (d) $|r| \geq 1$

8. ${}^nC_0 + {}^nC_1$ equals
(a) $n!$ (b) 0! (c) 1! (d) 2!

9. In how many ways can 5 different beads be strung on a necklace?
(a) 12 (b) 16 (c) 20 (d) 24

10. Which of the following statements is correct?
(a) $\ln 0 = 1$ (b) $ln1 = \infty$
(c) $ln(1+2+3) = ln1 + ln2 + ln3$ (d) $ln(2+3+4) = ln2 + ln3 + ln4$

11. If $\sec^{-1} x = \text{cosec}^{-1} y = \theta$, then
(a) $\frac{1}{x^2} + \frac{1}{y^2} = 0$ (b) $\frac{1}{x^2} + \frac{1}{y^2} = 1$ (c) $\frac{1}{x} + \frac{1}{y} = 0$ (d)) $\frac{1}{x} + \frac{1}{y} = 1$

12. The general solution of the equation $\frac{tan3\theta - tan2\theta}{1+tan3\theta.tan2\theta} = 1$ is
(a) $n\pi + \frac{\pi}{4}$, n=1,2,3, …. (b) $n\pi \pm \frac{\pi}{4}$, n=1,2,3, ….
(c) $2n\pi + \frac{\pi}{4}$, n=1,2,3, …. (d) $2n\pi \pm \frac{\pi}{4}$, n=1,2,3, ….

13. $b\ cosC + c\ cosB + a =$
(a) 0 (b) a (c) $2a$ (d) $3a$

14. If $sinA = sinB = sinC$ and $a = R = 4\ cm$ then area of triangleABC is
(a) 4 sq cm (b) 6 sq cm (c) 8 sq cm (d) 10 sq cm

15. Point of intersection of altitudes of a triangle is called
(a) centroid (b) orthocentre (c) circumcentre (d) incentre

16. For what value of a the points $(0,3), (a,1)\ and\ (2,-1)$ will be collinear?
(a) 3 (b) 2 (c) 1 (d) 0

17. The perpendicular distance between the parallel lines $3x - 4y + 5 = 0$ and $3x - 4y - 5 = 0$ is
(a) 1 (b) 2 (c) 3 (d) 4

18. Two lines represented by $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ are parallel if
(a) $h^2 = ab$ (b) $h^2 < ab$ (c) $h^2 > ab$ (d) $h^2 \geq ab$

19. The equations $x = a\ cos\theta, y = a\ sin\theta$ together represent
(a) an hyperbola (b) an ellipse (c) a parabola (d) a circle

20. The line $y = mx + c$ will be a tangent to a parabola $y^2 = 4ax$ if
(a) $c < \frac{a}{m}$ (b) $c = \frac{a}{m}$ (c) $c > \frac{a}{m}$ (d) $c \geq \frac{a}{m}$

21. The distance of a point $(2,3,4)$ from the x-axis is
(a) 2 (b) 3 (c) 4 (d) 5

22. $\lim_{x\to\infty} \frac{ax^3+bx+c}{px^2+qx+r} =$

(a) ∞ (b) 0 (c) $\frac{a}{p}$ (d) $\frac{c}{r}$

23. Let $f(x) = \begin{cases} kx+5 \ , & x \le 2 \\ x-1 \ , & x > 2 \end{cases}$

If $f(x)$ is continuous at $x = 2$, what is the value of k?

(a) -1 (b) 1 (c) -2 (d) 2

24. If $y = \cos^2\frac{x}{2} - \sin^2\frac{x}{2}$, then $\frac{d^2y}{dx^2} =$

(a) $2y$ (b) $-2y$ (c) y (d) $-y$

25. The maximum value $f(x) = x - \frac{x^2}{2}$ is

(a) 0 (b) $\frac{1}{2}$ (c) 1 (d) 2

26. If $f(x) = \int_0^x x\,dx$, then $f(4) =$

(a) 2^1 (b) 2^2 (c) 2^3 (d) 2^4

27. Area of the region bounded by the curve $x = logy$, $y - axis$ and the line $x = 1$ is

(a) 1 (b) e (c) $e-1$ (d) $e+1$

28. If $\vec{a} = 2\vec{\imath} - \vec{\jmath} + \lambda\vec{k}$ and $\vec{b} = -2\vec{\imath} + \vec{\jmath} + \vec{k}$ be any two vectors such that $\vec{a} \parallel \vec{b}$. Then λ is equal to

(a)-1 (b) 0 (c) 1 (d) 2

29. If $\vec{a}$ and $\vec{b}$ are any two unit vectors such that $|\vec{a} + \vec{b}| = 2$. Then $\vec{a}.\vec{b} =$

(a) -1 (b) 0 (c) 1 (d) 2

30. For any two non-zero vectors $\vec{a}$ and $\vec{b}$, which one of the following does not hold?

(a) $\vec{a} \perp (\vec{a} \times \vec{b})$ (b) $\vec{b} \perp (\vec{a} \times \vec{b})$

(c) $\vec{a} \times \vec{b} = -\vec{b} \times \vec{a}$ (d) $\vec{a} \times \vec{b} \neq -\vec{b} \times \vec{a}$

31. The ratio in which the line segment joining the points (2, 6) and (5, −4) is divided by x-axis is
   a. $1:1$
   b. $2:-5$
   c. $3:2$
   d. $4:5$

32. If the points $(a,0),(0,b)$ and (x,y) are collinear then
   a. $ax + by = ab$
   b. $ax + by = 1$
   c. $\frac{x}{a} + \frac{y}{b} = 1$
   d. $x + y = ab$

33. The equation of the circle with the end points of diameter $(3,4)$ and $(-3,-4)$ is
   a. $x^2 + y^2 - x + 3 = 0$
   b. $x^2 + y^2 - 4x + 2y + 1 = 0$
   c. $x^2 + y^2 = 49$
   d. $x^2 + y^2 = 25$

34. The direction cosines of a line equally inclined to the axes are
   a. $\pm\frac{1}{3}, \pm\frac{1}{3}, \pm\frac{1}{3}$
   b. $\pm\frac{1}{\sqrt{3}}, \pm\frac{1}{\sqrt{3}}, \pm\frac{1}{\sqrt{3}}$
   c. $\pm\frac{1}{2}, \pm\frac{1}{2}, \pm\frac{1}{2}$
   d. $\pm\frac{1}{\sqrt{2}}, \pm\frac{1}{\sqrt{2}}, \pm\frac{1}{\sqrt{2}}$

35. If the equation $2x^2 - 2hxy + 2y^2 = 0$ represents two coincident straight lines passing through the origin, then h equals
   a. ± 1
   b. $\pm\sqrt{2}$
   c. ± 2
   d. ± 4

36. If two lines in space whose direction ratios are $1, 2, 3$ and $-m, 2, 1$ are perpendicular to each other then
   a. $m = 3$
   b. $m = 4$

c. $m = 6$
d. $m = 7$

37. Evaluate: $\lim_{x \to 3} \frac{|x-3|}{x-3}$.
a. 1
b. -1
c. 3
d. does not exist

38. A function $f(x)$ defined by $f(x) = \begin{cases} \alpha x^2 & \text{for } x \leq 2 \\ 3 & \text{for } x > 2 \end{cases}$ is continuous at $x = 2$, then the value of α equals
a. $\frac{1}{4}$
b. $\frac{1}{2}$
c. $\frac{3}{4}$
d. $\sqrt{3}$

39. If $y = \frac{1}{\sec x - \tan x}$ then $\frac{dy}{dx} =$
a. $\sec x + \sec x \tan x$
b. $\sec^2 x \tan x$
c. $\sec x (\tan x + \sec x)$
d. $\sec x (\tan x - \sec x)$

40. Find the local extreme value of the function $f(x) = e^x$.
a. 0
b. 1
c. 2.81
d. Does not exist

Physics (30x1=30)

1. The dimensional formula for gravitational constant G is
[a] $\mathrm{M L^3 T^{-2}}$ [b] $\mathrm{M L^2 T^{-3}}$ [c] $\mathrm{M^{-1} L^2 T^{-3}}$ [d] $\mathrm{M^{-1} L^3 T^{-2}}$

2. An object is thrown along a direction inclined at an angle of 45º with the horizontal. The horizontal range of the object is equal to
[a] the maximum vertical height.
[b] twice the maximum vertical height.
[c] thrice the maximum vertical height.
[d] four times the maximum vertical height.

3. In an inelastic collision,
[a] momentum is less after the collision
[b] momentum is more after the collision
[c] kinetic energy is less after the collision
[d] kinetic energy is more after the collision

4. A satellite is moving in a circular orbit around the earth. If gravitational pull suddenly disappears, then it
[a] falls down with increasing speed
[b] moves with the same speed tangential to the original orbit
[c] continues to move with the same speed along the same path
[d] comes to rest after moving a certain distance along the original path

5. In order to double the period of a simple pendulum
[a] its length should be doubled
[b] its length should be quadrupled
[c] the mass of its bob should be doubled
[d] the mass of its bob should be quadrupled

6. A copper wire and a steel wire of the same diameter and length are connected end to end and a force is applied which stretches their combined length by 1 cm. Then the two wires have
[a] same stress and strain
[b] different stresses and strains
[c] same stress but different strains

[d] same strain but different stresses

7. Water rises to a height of 4 cm in a capillary tube. If the area of cross-section of the tube is reduced to 1/16 of the former value, water will rise to a height of

[a] 8 cm [b] 16 cm [c] 24 cm [d] 32 cm

8. On a thermometer, the freezing point of water is marked as 20° and the boiling point of water is marked as 150°. A temperature of 60°C will be read on this thermometer as

[a] 58° [b] 80° [c] 98° [d] 110°

9. A sphere, a cube and a thin circular plate, all having the same mass and made of the same material are heated to the same temperature and then allowed to cool. Which of them cools fastest?

[a] cube [b] sphere
[c] circular plate [d] all at the same rate

10. According to the kinetic theory of gases
[a] the pressure of a gas is proportional to the rms speed of the molecules
[b] the rms speed of the molecules of a gas is proportional to the absolute temperature
[c] the pressure of a gas is proportional to the square of the rms speed of the molecules
[d] the rms speed of the molecules of a gas is inversely proportional to the square root of the absolute temperature

11. When a gas expands adiabatically
[a] no energy is required for expansion
[b] law of conservation of energy does not hold
[c] internal energy of the gas is used in doing work
[d] energy is required and it comes from the wall of the container of the gas

12. When the temperature difference between the inside and outside of a room is 20°C, the rate of heat flow through a window is 200 J/s. If the temperature difference becomes 30°C, the rate of heat flow through the same window will be

[a] 300 J/s [b] 450 J/s [c] 600 J/s [d] 900 J/s

13. A liquid with coefficient of volume expansion γ is filled completely in a container of a material having coefficient of linear expansion α. If the liquid overflows on heating, then

[a] $\gamma = 3\alpha$ [b] $\gamma > 3\alpha$ [c] $\gamma < 3\alpha$ [d] $\gamma = \alpha^3$

14. An air bubble inside a glass slab ($\mu_g = 1.5$) appears to be 6 cm deep when viewed from one side and 4 cm deep when viewed from the opposite side. The thickness of the slab is

[a] 5.4 cm [b] 6.67 cm [c] 10 cm [d] 15 cm

15. The distance between a real object and its real image formed by a lens is D. If the magnification is m, the focal length of the lens is

[a] D [b] $\frac{1}{D}$ [c] $\frac{(m+1)^2}{mD}$ [d] $\frac{mD}{(m+1)^2}$

16. All of the following statements are correct except
[a] The image formed by a concave mirror is real, inverted and magnified when the object is placed beyond the centre of curvature.
[b] The image formed by a concave mirror is real, inverted and equal in size when the object is placed at the centre of curvature.
[c] The image formed by a concave mirror is virtual, erect and magnified when the object is placed between the focus and the mirror.
[d] The image formed by a concave mirror is real, inverted and magnified when the object is placed between the centre of curvature and the focus.

17. To obtain larger angular magnification (magnifying power) by an astronomical telescope
[a] both the objective and the eyepiece should be of large focal lengths
[b] both the objective and the eyepiece should be of small focal lengths

[c] the objective should be of large focal length and the eyepiece should be of small focal length
[d] the objective should be of small focal length and the eyepiece should be of large focal length

18. The transverse nature of light is shown by
[a] refraction of light [b] interference of light
[c] dispersion of light [d] polarization of light

19. When a source of sound is in motion towards a stationary observer, the effect observed is
[a] increase in the velocity of sound only
[b] decrease in the velocity of sound only
[c] increase in the frequency of sound only
[d] increase in both the velocity and the frequency of sound

20. When beats are produced by two waves of nearly the same frequency,
[a] the beat frequency decreases as time passes
[b] the beat frequency depends on the position where the beats are heard
[c] the particles vibrate simple harmonically with a frequency equal to the difference of the two frequencies
[d] the amplitude of vibration at any point changes simple harmonically with a frequency equal to the difference of the two frequencies

21. A parallel plate capacitor is charged and the charging battery is then disconnected. If the plates of the capacitor are moved farther apart by means of insulating handles
[a] the charge on the capacitor increases
[b] the voltage across the plates increases
[c] the capacitance of the capacitor increases
[d] the energy stored in the capacitor decreases

22. A galvanometer can be converted into a voltmeter or an ammeter by using either of the two resistances R_1 and R_2 ($R_1 >> R_2$). We have to connect
[a] R_1 in series with the galvanometer for voltmeter and R_2 in parallel for ammeter
[b] R_1 in parallel with the galvanometer for voltmeter and R_2 in series for ammeter
[c] R_2 in series with the galvanometer for voltmeter and R_1 in parallel for ammeter
[d] R_2 in parallel with the galvanometer for voltmeter and R_1 in series for ammeter

23. Which of the following does not affect the motion of a moving electron?
[a] Electric field applied in the direction of motion
[b] Magnetic field applied in the direction of motion
[c] Electric field applied perpendicular to the direction of motion
[d] Magnetic field applied perpendicular to the direction of motion

24. According to Faraday's law of electromagnetic induction
[a] magnetic field is produced by time-varying electric flux
[b] the direction of induced emf is such that it opposes the cause producing it
[c] the direction of induced current is such that it opposes the cause producing it
[d] the magnitude of induced emf is directly proportional to the rate of change of magnetic flux

25. The root-mean-square value of the alternating current is equal to
[a] half the peak value [b] (1/2) times the peak value
[c] twice the peak value [d] $(1/\sqrt{2})$ times the peak value

26. Photoelectric effect is the phenomenon in which
[a] photons come out of a metal when it is hit by a beam of electrons
[b] photons come out of the nucleus of an atom under the action of an electric field
[c] electrons come out of a metal with a constant velocity which depends on the frequency and intensity of incident radiation
[d] electrons come out of a metal with different velocities not greater than a certain value which depends only on the frequency of the incident light and not on its intensity

27. X-ray region lies between
[a] visible and ultraviolet regions
[b] gamma rays and ultraviolet regions
[c] short radio waves and visible regions
[d] short radio waves and long radio waves

28. A nucleus containing Z protons and N neutrons has a mass M. If the mass of a proton is m_p and that of a neutron is m_n, then the mass defect of the nucleus is

[a] $m_p + m_n + M$ [b] $m_p + m_n - M$

[c] $Zm_p + Nm_n + M$ [d] $Zm_p + Nm_n - M$

29. Fusion reaction takes place at high temperature because
[a] nuclei break up at high temperature
[b] atoms are ionized at high temperature
[c] molecules break up at high temperature
[d] kinetic energy is high enough to overcome repulsion at high temperature

30. In the use of transistor as an amplifier
[a] both the junctions are forward biased
[b] any of the two junctions may be forward biased
[c] the emitter-base junction is forward biased and collector-base junction is reverse biased
[d] the emitter-base junction is reverse biased and collector-base junction is forward biased

Chemistry (20x1=20)

1. The molecular formula for Ammonium carbonate is
a.$(NH_4)_2CO_3$ b. $(NH_4)CO_3$
c. $(NH_4)_2 CO$ d. $NH_3 CO$

2 . The electronic configuration Cu is
a.$1s^2,2s^2,2p^6,3s^2,3p^6,4s^2,3d^{10}$ b.$1s^2,2s^2,2p^6,3s^2,3p^6,4s^1,3d^{10}$
c. $1s^2,2s^2,2p^6,3s^2,3p^6,4s^2,3d^9$ d.$1s^2,2s^2,2p^6,3s^2,3p^6,4s^2,3d^8$

3. The elements in modern periodic table are arranged on the basis
a. increasing atomic number b.increasing atomic weight.
c. non of the above d. both a and b

4. How many gm moles oxygen are there in 88 gms carbon di oxide?
a. 1 b. 2
c. 3 d. 4

5. During electrolysis of NaCl, the gas discharged at the anode is
a.Chlorine b.Hydrogen
c.Oxygen d. None of these.

6. You should never taste or touch to identify a base because they can be
a. Corrosive b. slippery
d. Sour d. Antacids

7. ..... is suitable indicator for the titration of strong alkali and weak acid.
a. methyl orange b. phenolpthalein
c. litmus solution d. universal indicator

8. Avogadro Number is represented by
a. A_o b. M_a
c. N_A d. A_N

9. Hardness of water is due to the presence of salts of _____
a. Potassium b. Chlorine
c. Magnesium d. Boron

10. What is the oxidation number of Cl in ClO_3^- ?
a. + 5 b.-2
c.-6 d.+4

11. Nitrogen is classified into this group of elements.
a. halogens b.non-metals
c. nobel gases d.transition metals

12. Sulphuric acid is produced by
a. Haber's process b.Ostwald's process
c.Contact process d. Dow's process

13. Which of the following is a correct formula for washing soda?

a. $Na_2CO_3.10H_2O$ b. Na_2CO_3

c. $NaCO_3$ d. Na_2CO

14.The chemical formula of copper pyrite is .....

a. CuS_2Fe b. $CuFeS_2$.

c.Cu_2FeS d.$(CuFe)_2S$

15. The purest form of iron is.....

a. cast iron b. pig iron

c. wrought iron d. steel

16. Which of the following is atomic mass of an atom with 12 neutrons, 10 electrons and 10 protons?

a. 12 U b.22 U

c.20 U d.32 U

17. If different functional groups are present it is termed as

a. position isomerism b. chain isomerism

c. functional group isomerism d. none of above

18. The common name of ethyne is

a. acetylene b. ethyl alcohol

b. methane d. ethanol

19. The function group of alcohol is.....

a. -CHO b. -C00H

c. $-NH_2$ d. -OH

20.Which of the following suffix is used to name hydrocarbons with double bond by IUPAC system

a. ene b. ane

c.yne d. ol

English (10x1=10)

1. How …….. You …… (get) on with your studies?
   a) is, get
   b) do, get
   c) is, getting
   d) have, got
2. Suganya _____ yesterday.
   a) came not
   b) didn't come
   c) hadn't come
   d) hasn't come
3. If I_____to Kathmandu, i'll visit the zoo.
   a) go
   b) went
   c) had gone
   d) goes
4. "How do you like your new apartment?"
   "The apartment itself is great, but I wish I ---- used to the constant noise from the street below."
   a) got
   b) can get
   c) had gotten
   d) will get
5. The extent …… the stock market is affected by the day-to-day pronouncements of the president of China is astonishing
   a) of which
   b) to which
   c) whose

d) when

6. In many parts of the world, the grass…… is called vetiver is known for its fragrant oil as well as its ability to prevent soil erosion
   a) whose
   b) where
   c) which
   d) when

7. Open the window.

   a) let the window be opened.
   b) le the window should be opened.
   c) let the window open.
   d) the window is opened.

8. The invigilator was reading out the instructions.
   a) the instructions were read by the invigilator.
   b) the instructions were being read out by the invigilator.
   c) the instructions had been read out by the invigilator.
   d) the instructions had been read by the invigilator.

9. Choose the correct synonym of the given word: Paramount
   a) very important
   b) wide and extensive
   c) above others in rank of authority
   d) famous

10. Choose the correct synonym of the given word: Perspicacious
    a) bad
    b) clear
    c) hazy
    d) shrewd