

**Max Time: 2Hrs****Total Questions: 100****Max Marks: 100**

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**Brief Instructions to Candidates**

1. **Anyone who will violates any of the following instructions will be immediately disqualified**
2. Please ensure that you do not have calculator, any item or information with you in the examination hall. **Your mobile phone must be switched off** and put under your chair/seat.
3. After the paper is distributed, you are not supposed to look around, whisper, borrow or lending anything from any one.
4. Nobody will leave before half time.
5. There are total of **100** questions and total time is **120** minutes.
6. You will get **one** mark for each correct answer and **zero** mark for incorrect answer. Selection of more than one choice will give you zero mark.
7. Once time is over, put down your pens and put the answer sheets inside the question papers

**Filling in The Answer Sheets**

8. **Your answer sheet will be checked by machine. If you do not comply with the instruction, your answers will not be graded correctly.**
9. On the back side of the answer sheet find the space for your name and roll number. Write down your name in block letters and sign the sheet.
10. On the front of the answer sheet, every entry by you will require selecting one circle out of many. Mark the correct one by COMPLETELY filling in the circle representing it. Ink should not spread outside the boundary line of the circle.
11. Write the color of your booklet next to your name **ON THE BACKSIDE** of your answer sheet.
12. If you fill in the wrong color or fill it in on the front side of the sheet, the machine reader may fail you.
13. You can do rough work inside the question booklet wherever you like. Spare sheets are also provided at the end of the booklet
14. After the paper is collected, keep sitting to fill in and sign your attendance sheet which will be circulated.
15. All students must fill and sign their attendance sheet else they will be eliminated from the Admission test.
16. **If you violate any instruction, your paper will be cancelled and admission refused.**

**Do not open the next page of the question booklet until you are told.**

## Mathematics

Q-1:  $\pi$  is a \_\_\_\_\_ number.

- A) Rational
- B) Irrational
- C) Integer
- D) Prime

Q-2:  $\sqrt{3} \in$  \_\_\_\_\_.

- A) N
- B) Q
- C) Q'
- D) None

Q-3:  $A \setminus B =$

- A)  $A \cap B$
- B)  $A \cap B'$
- C)  $A + B$
- D)  $A \cap \phi$

Q-4: If  $\begin{bmatrix} 6 & \lambda \\ 3 & 2 \end{bmatrix}$  is singular matrix then  $\lambda =$

- A) 4
- B) -4
- C) 12
- D) 18

Q-5: For Non Singular Matrices C & D, the expression  $(C^{-1} D^{-1})^{-1} =$  \_\_\_\_\_

- A)  $CD$
- B)  $DC$
- C)  $C^{-1} D^{-1}$
- D)  $D^{-1} C^{-1}$

Q-6: The Square of a number when added to the number results in 6 then the number is

- A) 2
- B) -2
- C) -3
- D) Both A & C

Q-7: The partial fraction of  $\frac{x^2 + 5}{x^2 - 1}$  is:

- A)  $\frac{x+1}{x-1} + \frac{x+4}{x+1}$
- B)  $\frac{x}{x-1} + \frac{x}{x+1}$
- C)  $\frac{x+2}{x-1} + \frac{3}{x+1}$
- D) None of the above.

Q-8: A man repays his loan of Rs. 1120. by paying Rs. 15 in the first installment and then increases the payment by Rs. 10 every month. How long (in months) will it take to clear his loan?

- A) 12
- B) 14
- C) 13
- D) 15

Q-9: If  ${}^n P_2 = 20$  then  $n =$

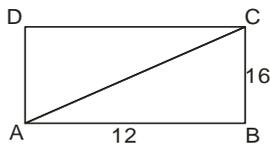
- A) 4
- B) 5
- C) 6
- D) 10

Q-10: The middle term of the expansion  $(1 + 2x)^6$  is \_\_\_\_\_

- A) 1st term
- B) 2nd term
- C) 3rd term
- D) 4th term

Q-11: In the figure the area of triangle ABC is

- A) 28
- B) 32
- C) 96
- D) 192



Q-12:  $\cos(\alpha + \beta) \cdot \cos(\alpha - \beta) =$

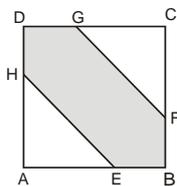
- A)  $\cot 2\alpha$
- B)  $\cos^2 \alpha - \cos^2 \beta$
- C)  $\sin 2\alpha$
- D)  $\tan 2\alpha$

Q-13: The period of  $3\tan \frac{x}{3}$  is

- A)  $\pi$
- B)  $2\pi$
- C)  $3\pi$
- D)  $4\pi$

Q-14: In figure ABCD is a square of side 8cm & E,F,G,H are the mid points of the sides then the shaded area is

- A) 48 cm
- B) 50 cm
- C) 58 cm
- D) 64 cm



Q-15:  $\tan(\sin^{-1} x) = ?$

- A)  $\sqrt{1+x^2}$
- B)  $\frac{1}{1+x^2}$
- C)  $\frac{x}{\sqrt{1-x^2}}$
- D) None of these

Q-16: What is the period of  $\cos(\pi x)$ ?

- A) 2
- B) 4
- C)  $\pi$
- D)  $2\pi$

Q-17: If  $x = at^2$  and  $y = 2at$  then  $\frac{dy}{dx}$  is equal to

- A)  $y/2a$ .
- B)  $2a/y$ .
- C)  $2a/y$ .
- D)  $-y/2a$ .

Q-18: If  $y = \tanh(x^2)$  then  $\frac{dy}{dx}$  is

- A)  $2x \sec^2(x^2)$ .
- B)  $2x \cdot \sinh(x^2)$ .
- C)  $2x \cdot \cot(x^2)$ .
- D)  $2x^2 \sec^2(x^2)$ .

Q-19: If  $\int_0^1 (4x + k) dx = 4$ , then  $k = ?$

- A) -1
- B) 0
- C) 1
- D) 2

Q-20: Find the distance from the point  $(3, -4)$  to the line  $4x + 3y = 10$

- A) 0
- B) 1
- C) 2
- D) 3

Q-21: A point  $P(x, y)$  on a circle having a radius  $r = \sqrt{x^2 + y^2}$ , making an angle of inclination  $\theta$  with the centre of the circle is also represented by

- A)  $x = r \cos \theta, y = r \sin \theta$
- B)  $x = r \sin \theta, y = r \cos \theta$
- C)  $x = \cos \theta, y = \sin \theta$
- D) None of the above

Q-22: A hyperbola having an equation  $\frac{y^2}{16} - \frac{x^2}{49} = 1$  has its foci at

- A)  $(0, \pm \sqrt{65})$
- B)  $(\pm \sqrt{65}, 0)$
- C)  $(0, \pm 65)$
- D)  $(\pm 65, 0)$

Q-23: If  $f(-x) = -f(x)$  then  $f$  is called

- A) odd
- B) implicit
- C) explicit
- D) Even

Q-24: The derivative of  $f(x) = |x|$  does not exist at

- A)  $x = 1$
- B)  $x = 0$
- C)  $\mathbb{R}$
- D) None of these

Q-25: The regions of inequalities are also called:

- A) Planes
- B) Lines
- C) Half planes
- D) None of these

Q-26: The point  $P(-5, 6)$  lies \_\_\_\_\_ the circle  $x^2 + y^2 + 4x - 6y = 12$

- A) Inside
- B) Out side
- C) On
- D) None of these

Q-27: If  $F = 3\hat{i} - \hat{j} + \hat{k}$  and  $d = 2\hat{i} + \hat{j} + 4\hat{k}$  then work done is

- A) -9
- B) 9
- C) 12
- D) -1

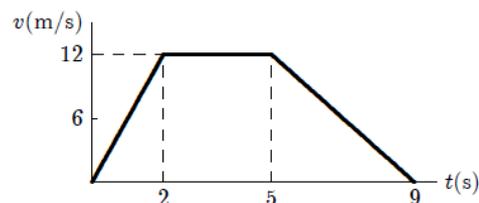
- Q-28: The domain of binary relation  $y^2 = -4x$  is,
- A) R
  - B) Z
  - C)  $R^+$
  - D) Negative real numbers including zero.
- Q-29: The slope of the tangent to the curve  $y = x^3 + 5$  at the point (1, 2) is:
- A) 6
  - B) 3
  - C) 5
  - D) 7
- Q-30:  $Q - \{0\}$  is a group w.r.t the binary operation
- A) +
  - B)  $\times$
  - C)  $\div$
  - D) -

## Physics

- Q-31: Which one of the following is not a unit of length
- A) Angstrom
  - B) Micron
  - C) Radian
  - D) Light year
- Q-32: In which quadrant the two rectangular components of a vector have same sign?
- A) 1<sup>st</sup>
  - B) 2<sup>nd</sup>
  - C) both 1<sup>st</sup> and 3<sup>rd</sup>
  - D) 4<sup>th</sup>
- Q-33: Angle between two vectors A and B can be determined by.
- A) their dot product
  - B) their cross product
  - C) head to tail rule
  - D) right hand rule
- Q-34: Three coplanar forces acting on a body keep it in equilibrium. They should therefore be.
- A) Concurrent
  - B) non concurrent
  - C) parallel
  - D) non parallel
- Q-35: Area under velocity time graph represent.
- A) Force
  - B) Momentum
  - C) Distance
  - D) acceleration
- Q-36: When car takes turn around a curve road, the passengers feel a force acting on them in a direction away from the center of the curve. It is due to.
- A) centripetal force
  - B) gravitational force
  - C) inertia
  - D) centrifugal force
- Q-37: Two automobiles are 150 kilometers apart and traveling toward each other. One automobile is moving at 60km/h and the other is moving at 40km/h mph. In how many hours will they meet?
- A) 2.5
  - B) 2.0
  - C) 1.75
  - D) 1.5
- Q-38: If a body of mass 10 kg is allowed to fall freely, its weight becomes.
- A) Zero
  - B) 98N
  - C) 9.8N
  - D) 10N

Q-39: The diagram represents the straight line motion of a car. Which of the following statements is true?

- A) The car accelerates, stops, and reverses
- B) The car accelerates at  $6 \text{ m/s}^2$  for the first 2 s
- C) The car is moving for a total time of 12 s
- D) The car decelerates at  $12 \text{ m/s}^2$  for the last 4 s



Q-40: Instrument used to measure blood pressure is called.

- A) Venturimeter
- B) Blood pressure meter
- C) Sphygmomanometer
- D) Sonometer

Q-41: If length of second pendulum becomes four times, then its time period will become.

- A) four times
- B) six times
- C) eight times
- D) two times

Q-42: Which one does not work according to resonance?

- A) T.V
- B) Radio
- C) microwave oven
- D) bulb

Q-43: The velocity of sound is greatest in

- A) Water
- B) Air
- C) Copper
- D) Ammonia

Q-44: Which phenomena can be applied to estimate the velocity of star with respect to earth

- A) Dopplers effect
- B) Interference of waves
- C) Beats phenomena
- D) All of these

Q-45: Which one of the following properties of light does not change with the nature of the medium?

- A) velocity
- B) frequency
- C) wavelength
- D) amplitude

Q-46: Which one of the following cannot be polarized?

- A) radio waves
- B) Ultraviolet rays
- C) X-rays
- D) sound waves

Q-47: The velocity of light was determined accurately by

- A) Michelson
- B) Newton
- C) Huygen
- D) Young

Q-48: Which one type of fiber is more suitable for transmission of signals in which white light is used?

- A) mono mode step index fiber
- B) multi-mode step index fiber
- C) multi-mode graded index fiber
- D) single mode step index fiber

Q-49: Which one is not an example of adiabatic process?

- A) rapid escape of air from a burst tyre
- B) conversion of water into ice in refrigerator
- C) rapid expansion of air
- D) cloud formation in the atmosphere

Q-50: Selenium becomes a conductor in light so it behaves like

- A) Photodiode
- B) Semiconductor
- C) Light emitting diode
- D) Capacitor

- Q-51: Photocopier and inject printer are dealt in
- A) Charges in motion
  - B) Capacitors
  - C) Electrostatics
  - D) Electric fields
- Q-52: An electric iron is marked 20 volts 500W. The units consumed by it in using if for 24 hours will be
- A) 24
  - B) 12
  - C) 5
  - D) 1100
- Q-53: The relationship between Tesla and smaller unit Gauss of magnetic induction is given by
- A)  $1\text{T} = 10^3\text{G}$
  - B)  $1\text{T} = 10^4\text{G}$
  - C)  $1\text{T} = 10^2\text{G}$
  - D)  $1\text{T} = 10^4\text{G}$
- Q-54: When the wheat stone bridge is balanced then:
- A) Maximum current flows through the galvanometer
  - B) Potential difference across galvanometer is maximum
  - C) Potential difference across galvanometer is zero
  - D) None of the above
- Q-55: In p-n-p transistor the collector current is
- A) equal to emitter current
  - B) slightly less than emitter current
  - C) greater than emitter current
  - D) any of above
- Q-56: The reverse process of pair production is called:
- A) Pair Annihilation
  - B) Compton effect
  - C) Photoelectric effect
  - D) None of the above
- Q-57: Ammeter connected in an AC circuit measures
- A) Exact value of current
  - B) rms value of current
  - C) Net value of current
  - D) Peak value of current
- Q-58: Radiation with wavelength longer than red lights
- A) X-rays
  - B) visible radiation
  - C) infrared radiation
  - D) ultraviolet rays
- Q-59:  $\alpha$ ,  $\beta$  and  $\gamma$  rays are emitted from a radio-active substance:
- A) Spontaneously
  - B) When it interacts with the other particle
  - C) When it is heated
  - D) When it is exposed to light
- Q-60: Energy liberated when one atom of U-235 undergoes fission reaction is
- A) 40MeV
  - B) 30MeV
  - C) 20MeV
  - D) 200MeV

## Chemistry

- Q-61: The number of peaks obtained in mass spectrometry shows
- A) Relative abundance
  - B) Average mass of element
  - C) Number of isotopes
  - D) Relative isotopic mass
- Q-62: Which of the following is not a macromolecule?
- A) sand
  - B) maltose
  - C) haemoglobin
  - D) diamond

- Q-63:** Which of the following statements is true about plasma
- A) It may be the first state of matter
  - B) It is not a phase transition
  - C) It is a conductor of electricity
  - D) All of the above
- Q-64:** Under what conditions the gases deviate from the ideal behavior?
- A) High temperature
  - B) Low temperature
  - C) High pressure
  - D) Both B and C
- Q-65:** Which has strongest bonding in the solid state?
- A) Sodium Chloride (NaCl)
  - B) Hydrogen Chloride (HCl)
  - C) Chlorine (Cl<sub>2</sub>)
  - D) Xenon (Xe)
- Q-66:** Vapour pressure is not affected by
- A) Surface area
  - B) Temperature
  - C) Intermolecular forces
  - D) Atmospheric pressure
- Q-67:** When electrons collide with heavy metals than \_\_\_\_\_ are produced.
- A) Beta-rays
  - B) Alpha-rays
  - C) X-rays
  - D) Gamma-rays
- Q-68:** On sp<sup>3</sup> hybridization
- A) All p-orbitals are involved
  - B) One s and 3 p-orbitals are involved
  - C) one p-orbital is involved
  - D) four p-orbitals are involved
- Q-69:** Which has maximum oxidation number?
- A) N
  - B) Cr
  - C) S
  - D) Mn
- Q-70:** Which one of the following aqueous solutions will be basic?
- A) NaCl
  - B) Na<sub>2</sub>SO<sub>4</sub>
  - C) Na<sub>2</sub>CO<sub>3</sub>
  - D) FeCl<sub>3</sub>
- Q-71:** Mixtures which distill over without change in composition called
- A) zeotropic mixture
  - B) azeotropic mixture
  - C) amphoteric mixture
  - D) ideal solution
- Q-72:** Beckmanns apparatus is used to measure
- A) depression in freezing point
  - B) boiling point elevation
  - C) lowering of vapour pressure
  - D) lowering of osmotic pressure
- Q-73:** A substance which increases the efficiency of a catalyst is termed as
- A) Promoter
  - B) Activator
  - C) Retarder
  - D) Super catalyst
- Q-74:** Radiations are absorbed in
- A) Dilatometric method
  - B) Optical relation method
  - C) Spectrophotometer method
  - D) Refractometric method

- Q-75:** Benzene is a good solvent for
- A) fats
  - B) resins
  - C) iodine
  - D) all the above
- Q-76:** The scientist who did not contribute in the construction of periodic table?
- A) Democritus
  - B) Al-Razi
  - C) Moseley
  - D) Dobereiner
- Q-77:** Which of the following ion is stable in aqueous solution?
- A)  $H^+$
  - B)  $Cl^-$
  - C)  $H^-$
  - D) All are stable
- Q-78:** The oxides of beryllium  $BeO$  is
- A) Acidic
  - B) Basic
  - C) Amphoteric
  - D) Neutral
- Q-79:** Identify the correct statement regarding  $CO$
- A) it combines with  $H_2O$  to form carbonic acid
  - B) it reacts with red blood cells of hemoglobin
  - C) it is powerful oxidizing agent
  - D) it is used to prepare aerated drinks
- Q-80:** Which element can form tripositive ion?
- A) Beryllium
  - B) Carbon
  - C) Silicon
  - D) Aluminium
- Q-81:** Which one of the following is the weakest acid in water
- A)  $HF$
  - B)  $HCl$
  - C)  $HBr$
  - D)  $HI$
- Q-82:** Which of the halogen has highest electronegativity?
- A) Fluorine
  - B) Chlorine
  - C) Bromine
  - D) Iodine
- Q-83:** Compounds attracted by applied strong magnetic field are called
- A) diamagnetic
  - B) paramagnetic
  - C) good conductor
  - D) ferromagnetic
- Q-84:** Geometry of the complex compounds usually depends upon
- A) type of ligands
  - B) types of hybridization in the elements of ligands
  - C) hybridization of central metal
  - D) All of above
- Q-85:** Avogadro's number may represent
- A) volume of particles
  - B) number of particles
  - C) mass of particles
  - D) All of the above
- Q-86:** Qualitative analysis is carried out for
- A) identification of elements
  - B) estimation of amounts of elements
  - C) molar ratio of elements
  - D) molar volume of elements

- Q-87:**Percentage of calcium in calcium carbonate is
- A) 80%
  - B) 30%
  - C) 40%
  - D) 20%
- Q-88:** All the following variables are used to describe gases except
- A) pressure
  - B) volume
  - C) moles
  - D) density
- Q-89:**In solids the temperature is the measure of
- A) Average kinetic energy of molecules
  - B) Vibrational kinetic energy
  - C) Translational kinetic energy
  - D) None of the above
- Q-90:**Fruit juices and fizzy drinks such as lemonade are often sold in Aluminium cans. What is the most important reason Aluminium is a suitable metal?
- A) Aluminium can be recycled
  - B) Aluminium has very low density
  - C) Aluminium is the most abundant metal in the earth crust
  - D) Aluminium is resistant to corrosion by organic acids.

## English

- Q-91:** The servant always complies \_\_\_\_\_ the wishes of his master.
- A) For
  - B) With
  - C) To
  - D) In
- Q-92:** He was appointed \_\_\_\_\_ the post of section officer.
- A) On
  - B) To
  - C) With
  - D) For
- Q-93:** Antonym of NEPOTISM is \_\_\_\_\_.
- A) Favoritism
  - B) Neophyte
  - C) Nearness
  - D) Impartial
- Q-94:** Synonym of ANOMALY is \_\_\_\_\_.
- A) Normal
  - B) Straight
  - C) Irregularity
  - D) Integrity
- Q-95:** They went \_\_\_\_\_ the rain.
- A) despite
  - B) in spite
  - C) under
  - D) avoiding
- Q-96:** She always jumps ..... the conclusion.
- A) in
  - B) on
  - C) to
  - D) with
- Q-97:** The movie was
- A) excited
  - B) excitement
  - C) exciting
  - D) excite

Q-98: If you study hard, you \_\_\_\_\_.

- A) are passing
- B) passed
- C) will pass
- D) would pass

Q-99: He said me. "Who is going with me?"

- A) He asked me who was going with him
- B) He asked me whom was going with him
- C) He asks me who was going with him
- D) He asked me who were going with him

Q-100: I said to him, "You are not a man of words"

- A) I told him that you were not a man of words.
- B) I tell him that he was not a man of words.
- C) I told him that he is not a man of words.
- D) I told him that he was not a man of words.

# Best of Luck