

Paper Code No: B39

Question Booklet No. ...020283...

ENTRANCE EXAMINATION – 2021 – 22

SET – C

SSF JAMIA MILLIA ISLAMIA  
New Delhi

Roll No.

B3902283

Signature of Invigilator

Total Marks: 100

Time: 1 Hour 30 Minutes

Instructions to Candidates

1. Do not write your name or put any other mark of identification anywhere in the OMR Response Sheet. IF ANY MARK OF IDENTIFICATIONS IS DISCOVERED ANYWHERE IN OMR RESPONSE SHEET, the OMR sheet will be cancelled, and will not be evaluated.
2. This Question Booklet contains the cover page and a total of 100 Multiple Choice Questions of 1 mark each.
3. Space for rough work has been provided at the beginning and end. Available space on each page may also be used for rough work.
4. There is negative marking in Multiple Choice Questions. For each wrong answer, 0.25 marks will be deducted.
5. USE/POSSESSION OF ELECTRONIC GADGETS LIKE MOBILE PHONE, iPhone, iPad, pager ETC. is strictly PROHIBITED.
6. Candidate should check the serial order of questions at the beginning of the test. If any question is found missing in the serial order, it should be immediately brought to the notice of the Invigilator. No pages should be torn out from this question booklet.
7. Answers must be marked in the OMR Response sheet which is provided separately. OMR Response sheet must be handed over to the invigilator before you leave the seat.
8. The OMR Response sheet should not be folded or wrinkled. The folded or wrinkled OMR/Response Sheet will not be evaluated.
9. Write your Roll Number in the appropriate space (above) and on the OMR Response Sheet. Any other details, if asked for, should be written only in the space provided.
10. There are four options to each question marked A, B, C and D. Select one of the most appropriate options and fill up the corresponding oval/circle in the OMR Response Sheet provided to you. The correct procedure for filling up the OMR Response Sheet is mentioned below.

CORRECT METHOD

(A) (B) (C) (D)

WRONG METHODS

(A) (B) (C) (D) (A) (B) (C) (D) (A) (B) (C) (D) (A) (B) (C) (D) (A) (B) (C) (D) (A) (B) (C) (D)

- 1 The frequency of the node produced by plucking a given string increases as
- (a) The length of the string increases
  - (b) The tension in the string increases
  - (c) The tension in the string decreases
  - (d) The mass per unit length of the string increases

**SSF JAMIA MILLIA ISLAMIA**  
**New Delhi**

- 2 Doppler's effect is applicable for

- |                |                |
|----------------|----------------|
| (a) Sound Wave | (b) Space wave |
| (c) Water wave | (d) Heat wave  |

- 3 Which of the following statements is correct for any thermodynamic system?

- (a) The internal energy changes in all processes.
- (b) Internal energy and entropy are state functions.
- (c) The change in entropy can never be zero.
- (d) The work done in an adiabatic process is always zero.

- 4 What is value of  $C_p/C_v$  for air?

- |         |         |
|---------|---------|
| (a) 1   | (b) 1.2 |
| (c) 1.4 | (d) 2   |

- 5 The latent heat of steam at atmospheric pressure is
- (a) 1535 kJ/kg (b) 1875 kJ/kg  
(c) 2257 kJ/kg (d) 2685 kJ/kg
- 6 1 coulomb is equal to:
- (a)  $3 \times 10^9$  e.s.u. (b)  $13 \times 10^9$  e.s.u.  
(c)  $3 \times 10^{10}$  e.s.u. (d)  $13 \times 10^{10}$  e.s.u.
- 7 The capacitance of earth, viewed as a spherical conductor of radius 6408 km is
- (a) 1420  $\mu$ F (b) 712  $\mu$ F  
(c) 680  $\mu$ F (d) 540  $\mu$ F
- 8 Given three equal resistors, how many different combinations (taken all of them together) can be made?
- (a) 3 (b) 4  
(c) 5 (d) 6
- 9 Ohm's law is valid when the temperature of conductor is
- (a) Very low (b) Very high  
(c) Varying (d) Constant

**SSF JAMIA MILLIA ISLAMIA**  
New Delhi



10 Two wires of copper are of the same length but have different diameters. When they are connected in series across a battery, the heat generated is  $H_1$ . When connected in parallel across the same battery, the heat generated during the same time is  $H_2$  then

(a)  $H_1 = H_2$

(b)  $H_1 < H_2$

(c)  $H_1 > H_2$

(d)  $H_1 > H_2$

sc  $\rightarrow H_1$   
 $\frac{1}{H_2}$

11 Why is the Wheatstone bridge more accurate than other methods of measuring resistances:

(a) It is a null method

(b) It is based on Kirchhoff's laws

(c) It has four resistances

(d) It does not involve ohm's law

12 The strength of the magnetic field around an infinite current carrying conductor is

(a) Same everywhere

(b) Inversely proportional to the distance

(c) Directly proportional to the distance

(d) None of these

SSF JAMIA MILLIA ISLAMIA  
New Delhi

13 In a moving coil galvanometer, we use a radial magnetic field so that the galvanometer scale is

(a) Exponential

(b) Linear

(c) Algebraic

(d) Logarithmic

- 14 Maxwell's equation involving is  $\frac{d\vec{B}}{dt}$  obtained-from:
- (a) Ampere's law (b) Gauss's law  
(c) Faraday's law (d) Biot-Savart's law
- 15 The angle of deviation for a prism is greatest for
- (a) Violet (b) Red  
(c) Orange (d) Yellow
- 16 In Young double slit experiment, a minimum is obtained when the phase difference of the superposing waves, is ( $n \in I$ )
- (a)  $n\pi$  (b)  $(n + 1/2)\pi$   
(c)  $(2n - 1)\pi$  (d) zero
- SSF JAMIA MILLIA ISLAMIA**  
**New Delhi**
- 17 Semiconductors of both p-type and n-type are produced by
- (a) Ionic solids ~~(b) Covalent solids~~  
(c) Metallic solids (d) Molecular solids
- 18 According to the special theory of relativity, clocks in a moving reference frame, compared to identical clocks in a stationary reference frame, appear to run
- a) Slower b) At the same rate  
c) Faster d) Backward in time

19 The magnetic quantum number specifies

- (a) Size of orbital (b) Shape of orbital  
(c) Orientation of orbital (d) Nuclear Stability

20 Which of the following statements does not form a part of Bohr's model of hydrogen atom?

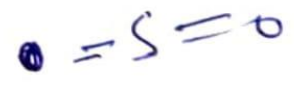
- (a) Energy of the electrons in the orbit is quantized  
(b) The electron in the orbit nearest the nucleus has the lowest energy  
(c) Electrons revolve in different orbits around the nucleus  
(d) The position and velocity of the electrons in the orbit cannot be determined simultaneously

SSF JAMIA MILLIA ISLAMIA  
New Delhi

or 816

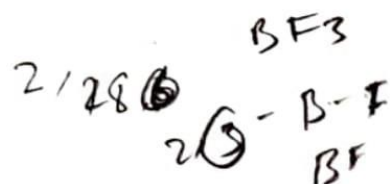
21 The electronic configuration of an element is  $1s^2, 2s^2 2p^6, 3s^2 3p^3$ . What is the atomic number of the element which is just below the above element in the periodic table

- (a) 31 (b) 34  
(c) 33 (d) 49



22 The hybrid state of sulphur in  $SO_2$  molecule is

- (a)  $sp^2$  (b)  $sp^3$   
(c)  $sp$  (d)  $sp^3d$



[7]

23 The theory which explains that gases consist of molecules, which are in rapid motion is known as

- (a) Daltons Atomic Theory
- (b) Bohr's Theory
- (c) Rutherfords Atomic Theory
- (d) Kinetic Molecular Theory

24 In a reversible process the system absorbs 600 kJ heat and performs 250 kJ work on the surroundings. What is the increase in the internal energy of the system?

- (a) 850 kJ
- (b) 600 kJ
- (c) 350 kJ
- (d) 250 kJ

25 The enthalpies of combustion of carbon and carbon monoxide are -393.5 and -283.0 kJ mol<sup>-1</sup> respectively. The enthalpy of formation of carbon monoxide is

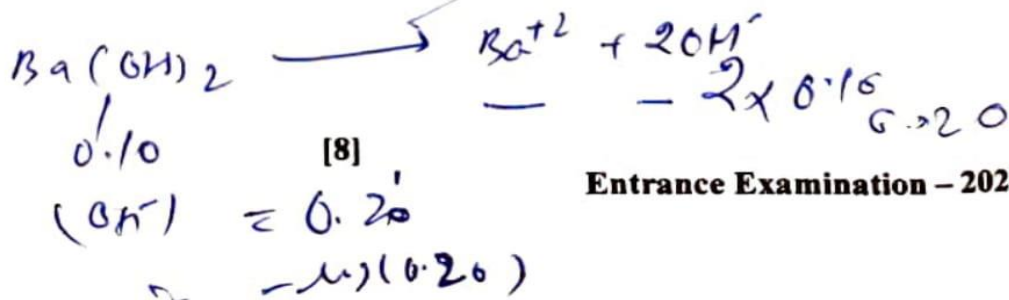
- (a) -676 kJ
- (b) 110.5 kJ
- (c) -110.5 kJ
- (d) 676.5 kJ

200

SSF JAMIA MILLIA ISLAMIA  
New Delhi

26 What is the pH of a 0.10 M solution of barium hydroxide, Ba(OH)<sub>2</sub>?

- (a) 11.31
- (b) 11.7
- (c) 13.30
- (d) None of these





27 Concentration of the  $\text{Ag}^+$  ions in a saturated solution of  $\text{Ag}_2\text{C}_2\text{O}_4$  is  $2.2 \times 10^{-4} \text{ mol L}^{-1}$ . Solubility product of  $\text{Ag}_2\text{C}_2\text{O}_4$  is

- (a)  $2.66 \times 10^{-12}$  (b)  $4.5 \times 10^{-11}$   
(c)  $5.3 \times 10^{-12}$  (d)  $2.42 \times 10^{-8}$

28 How many lithium atoms are present in a unit cell with edge length  $3.5 \text{ \AA}$  and density  $0.53 \text{ g cm}^{-3}$ ? (Atomic mass of  $\text{Li} = 6.94$ ):

- (a) 2 (b) 1  
(c) 4 (d) 6

SSF JAMIA MILLIA ISLAMIA  
New Delhi

29 In a Schottky defect

- (a) An ion moves to interstitial position between the lattice points  
(b) Electrons are trapped in a lattice site  
(c) Some lattice sites are vacant  
(d) Some extra cations are present in interstitial space

30 The law which indicates the relationship between solubility of a gas in liquid and pressure

- (a) Raoult's law (b) Henry's law  
(c) Lowering of vapour pressure (d) Van't Hoff law



31 How much electricity in terms of Faraday is required to produce 100 g of Ca from molten  $\text{CaCl}_2$ ?

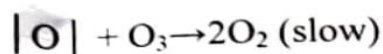
(a) 1F

(b) 2F

(c) 3F

(d) 5F

32 The chemical reaction,  $2\text{O}_3 \rightarrow 3\text{O}_2$  proceeds as



The rate law expression will be

(a)  $\text{Rate} = k [\text{O}] [\text{O}_3]$

(b)  $\text{Rate} = k [\text{O}_3]^2 [\text{O}_2]^{-1}$

(c)  $\text{Rate} = k [\text{O}_3]^2$

(d)  $\text{Rate} = k [\text{O}_2] [\text{O}]$

**SSF JAMIA MILLIA ISLAMIA**  
**New Delhi**

33 Fog is an example of colloidal system of

(a) Liquid in gas

(b) Gas in liquid

(c) Solid in gas

(d) Gas in solid

34 Half-life period of a first order reaction is 10 min. What percentage of the reaction will be completed in 100 min?

(a) 25%

(b) 50%

(c) 99.9%

(d) 75%

35 Usually,  $\text{CaCl}_2$  is preferred over  $\text{NaCl}$  for cleaning snow on roads particularly in very cold countries this is because

- (a)  $\text{NaCl}$  makes the road slippery but  $\text{CaCl}_2$  does not
- (b)  $\text{CaCl}_2$  is hygroscopic but  $\text{NaCl}$  is not
- (c)  $\text{CaCl}_2$  is less soluble in  $\text{H}_2\text{O}$  than  $\text{NaCl}$
- (d) Eutectic mixture of  $\text{CaCl}_2/\text{H}_2\text{O}$  freezes at  $-55^\circ\text{C}$  while that of  $\text{NaCl}/\text{H}_2\text{O}$  freezes at  $-18^\circ\text{C}$

36 The freezing point of heavy water is

- (a)  $0^\circ\text{C}$
- (b)  $3.8^\circ\text{C}$
- (c)  $4^\circ\text{C}$
- (d)  $1^\circ\text{C}$

37 In general, the Boron trihalides act as

- (a) Strong reducing agent
- (b) Lewis Acids
- (c) Lewis Bases
- (d) Dehydrating Agents

SSF JAMIA MILLIA ISLAMIA  
New Delhi

38 Atomicity of phosphorus is

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

39 The melting points of  $\text{Cu}$ ,  $\text{Ag}$  and  $\text{Au}$  follow the order

- (a)  $\text{Cu} > \text{Ag} > \text{Au}$
- (b)  $\text{Cu} > \text{Au} > \text{Ag}$
- (c)  $\text{Au} > \text{Ag} > \text{Cu}$
- (d)  $\text{Ag} > \text{Au} > \text{Cu}$

- 40 Which of the following types of glass accounts for about 90% of manufactured glass?
- (a) Potash-lime glass (b) Soda-lime glass  
(c) Potash-lead glass (d) Soda-lead glass
- 41 The thermo plastics resins are usually soluble in
- (a) Organic solvents (b) only in some organic solvents  
(c) Polar solvents (d) only in water
- 42 Which of these chemicals is used to dissolve the soap to make a transparent soap?
- (a) Ethanoic Acid (b) Ethanol  
(c) Benzene (d) Propylene
- 43 The ligand  $N(CH_2CH_2NH_2)$  is
- (a) Bidentate (b) Tridentate  
(c) Tetradentate (d) Pentadentate
- 44 Inductive effect involves
- (a) Displacement of  $\sigma$  electrons  
(b) Delocalization of  $\pi$  electrons  
(c) Delocalization of  $\sigma$ -electrons  
(d) Displacement of  $\pi$ -electrons

SSF JAMIA MILLIA ISLAMIA  
New Delhi

45 Which of the following compounds will exhibit geometrical isomerism?

- (a) 1 - Phenyl - 2-butene (b) 3- Phenyl - 1 - butene  
(c) 2 - Phenyl - 1 - butane (d) 1, 1 - Diphenyl - propene

46 Which of the following reactions follows Markovnikov's rule?

- (a)  $C_2H_4 + HBr$  (b)  $C_3H_5 + Cl_2$   
(c)  $C_3H_5 + HBr$  (d)  $C_3H_5 + Br_2$

47 Propanone on reaction with alkyl magnesium bromide followed by hydrolysis will produce

- (a) Primary alcohol (b) Secondary alcohol  
(c) Tertiary alcohol (d) Carboxylic acid

SSF JAMIA MILLIA ISLAMIA  
New Delhi

48 Which among the following is most reactive to give nucleophilic addition?

- (a)  $FCH_2CHO$  (b)  $ClCH_2CHO$   
(c)  $BrCH_2CHO$  (d)  $ICH_2CHO$

49 Primary, secondary and tertiary amines may be separated by using

- (a) Iodoform (b) Diethyl oxalate  
(c) Benzene sulphonyl chloride (d) Acetyl chloride



- 50 The reaction between phenol and chloroform in the presence of aqueous  $\text{NaOH}$  is
- (a) Nucleophilic substitution reaction
  - (b) Electrophilic addition reaction
  - (c) Electrophilic substitution reaction
  - (d) Nucleophilic addition reaction

- 51 The coal tar fraction which contains phenol is

- (a) Heavy Oil
- (b) Light Oil
- (c) Middle Oil
- (d) Green Oil

**SSF JAMIA MILLIA ISLAMIA**  
New Delhi

- 52 If A, B and C are any three sets, then  $A \times (B \cup C)$  is equal to

- (a)  $(A \times B) \cup (A \times C)$
- (b)  $(A \cup B) \times (A \cup C)$
- (c) None of these
- (d)  $(A \times B) \cap (A \times C)$

- 53 Let the function 'f' be defined by  $f(x) = 5x^2 + 2 \forall x \in \mathbb{R}$ , then 'f' is

- (a) Onto function
- (b) One-one, onto function
- (c) One-one, into function
- (d) Many-one into function

- 54 If  $1/(b+c)$ ,  $1/(c+a)$ ,  $1/(a+b)$  are in AP then

- (a) a, b, c are in AP
- (b)  $a^2, b^2, c^2$  are in AP
- (c)  $1/a, 1/b, 1/c$  are in AP
- (d) none of these

55 The third term of a geometric progression is 4. The product of the first five terms is

(a) 43

(b) 45

(c) 44

(d) none of these

56 Four dice are rolled. The number of possible outcomes in which at least one dice shows 2 is

(a) 1296

(b) 671

(c) 625

(d) 585

57 The number of combination of  $n$  distinct objects taken  $r$  at a time be  $x$  is given by

(a)  ${}^{n/2}C_r$

(b)  ${}^{n/2}C_{r/2}$

(c)  ${}^nC_{r/2}$

(d)  ${}^nC_r$

**SSF JAMIA MILLIA ISLAMIA**  
**New Delhi**

58 In the binomial expansion of  $(a + b)^n$ , the coefficient of fourth and thirteenth terms are equal to each other, then the value of  $n$  is

(a) 10

(b) 15

(c) 20

(d) 25

59 In the expansion of  $(a + b)^n$ , if  $n$  is odd then the number of middle term is/are

(a) 0

(b) 1

(c) 2

(d) More than 2

[15]

Entrance Examination – 2021 - 22

65 Two lines  $a_1x + b_1y + c_1 = 0$  and  $a_2x + b_2y + c_2 = 0$  are coincident if

- (a)  $a_1/a_2 = b_1/b_2 \neq c_1/c_2$  (b)  $a_1/a_2 \neq b_1/b_2 = c_1/c_2$   
 (c)  $a_1/a_2 \neq b_1/b_2 \neq c_1/c_2$  (d)  $a_1/a_2 = b_1/b_2 = c_1/c_2$

66 If the length of the tangent from the origin to the circle centered at (2, 3) is 2 then the equation of the circle is

- (a)  $(x + 2)^2 + (y - 3)^2 = 3^2$  (b)  $(x - 2)^2 + (y + 3)^2 = 3^2$   
 (c)  $(x - 2)^2 + (y - 3)^2 = 3^2$  (d)  $(x + 2)^2 + (y + 3)^2 = 32$

**SSF JAMIA MILLIA ISLAMIA**  
**New Delhi**

67 The equation of parabola with vertex at origin the axis is along x-axis and passing through the point (2, 3) is

- (a)  $y^2 = 9x$  (b)  $y^2 = 9x/2$   
 (c)  $y^2 = 2x$  (b)  $y^2 = 2x/9$

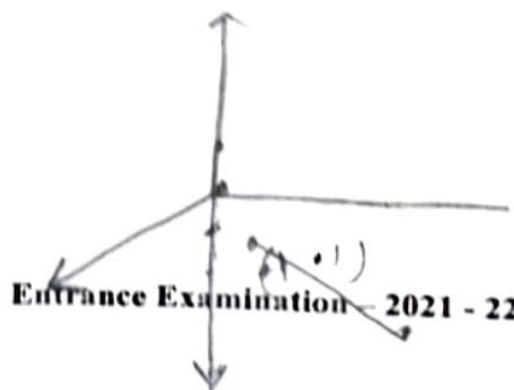
$$y^2 = 4ax$$

$$y^2 = 4ax$$

68 Three planes  $x + y = 0$ ,  $y + z = 0$ , and  $x + z = 0$

- (a) none of these  
 (b) meet in a line  
 (c) meet in a unique point  
 (d) meet taken two at a time in parallel lines

$$\begin{array}{l} x + y = 0 \\ y + z = 0 \\ x + z = 0 \end{array} \Rightarrow \begin{array}{l} x = -y \\ y = -z \\ x = -z \end{array} \Rightarrow \begin{array}{l} x = -y \\ y = -z \\ x = -(-z) = z \end{array} \Rightarrow \begin{array}{l} x = -y \\ y = -z \\ x = z \end{array}$$



69 The coordinates of the point where the line through (5, 1, 6) and (3, 4, 1) crosses the YZ plane is

- (a) (0, 17/2, 13/2) (b) (0, -17/2, -13/2)  
(c) (0, 17/2, -13/2) (d) None of these

70 If  $a \times \cos x + b \times \cos x = c$ , then the value of  $(a \times \sin x - b^2 \cos x)^2$  is

- (a)  $a^2 + b^2 + c^2$  (b)  $a^2 - b^2 - c^2$   
(c)  $a^2 - b^2 + c^2$  (d)  $a^2 + b^2 - c^2$

SSF JAMIA MILLIA ISLAMIA  
New Delhi

71 If  $3 \tan^{-1} x + \cot^{-1} x = \pi$ , then x equals

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

72 The  $\begin{bmatrix} 2 & -1 & 4 \\ 1 & 0 & -5 \\ -4 & 5 & 7 \end{bmatrix} = \begin{bmatrix} 2 & 1 & -4 \\ -1 & 6 & 5 \\ 4 & -5 & 7 \end{bmatrix}$

- (a) Diagonal matrix (b) symmetric matrix  
(c) Skew symmetric matrix (d) none of these

73 The value of determinant  $\begin{vmatrix} b^2c^2 & bc & b+c \\ c^2a^2 & ca & c+a \\ a^2b^2 & ab & a+b \end{vmatrix}$

- (a)  $a^7 + b^7 + c^7$  (b)  $(a+b+c)^7$   
(c)  $(a^2 + b^2 + c^2)(a^5 + b^5 + c^5)$  (d) 0



74 If  $\omega$  is a non-real root of the equation  $x^2 - 1 = 0$ . Then

$$\begin{vmatrix} 1 & \omega & \omega^2 \\ \omega & \omega^2 & 1 \\ \omega^2 & 1 & \omega \end{vmatrix}$$

- (a) 0 (b) 1  
(c)  $\omega$  (d)  $\omega^2$

75 If A, B and C are angles of a triangle, then the determinant

$$\begin{vmatrix} 1 & \cos C & \cos B \\ \cos C & -1 & \cos A \\ \cos B & \cos A & -1 \end{vmatrix}$$

- (a) 0 (b) -1  
(c) 1 (d) None of these

SSF JAMIA MILLIA ISLAMIA  
New Delhi

76  $\int \sin^{-1} x dx$  is equal to

- (a)  $\cos^{-1} x + C$  (b)  $x \sin^{-1} x + \sqrt{1-x^2} + C$   
(c)  $\sqrt{1-x^2} + C$  (d)  $x \sin^{-1} x - \sqrt{1-x^2} + C$

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

77  $\int_0^1 \frac{x}{1+x} dx =$

- (a)  $1 - \log 2$  (b) 2  
(c)  $1 + \log 2$  (d)  $\log 2$

$$1 - \log 2$$

- 78 Evaluate:  $\int \frac{1 - \cos x}{\cos x(1 + \cos x)} dx$
- (a)  $\log |\sec x + \tan x| - 2 \tan(x/2) + C$   
 (b)  $\log |\sec x - \tan x| - 2 \tan(x/2) + C$   
 (c)  $\log |\sec x + \tan x| + 2 \tan(x/2) + C$   
 (d) None of these
- 79 The area of the region bounded by the circle  $x^2 + y^2 = 1$  is
- (a)  $2\pi$  sq. units (b)  $7\pi$  sq. units  
 (c)  $3\pi$  sq. units (d)  $4\pi$  sq. units
- SSF JAMIA MILLIA ISLAMIA**  
**New Delhi**
- 80 If  $x^m y^n = (x + y)^{m+n}$ , then  $dy/dx$  is equal to
- (a)  $(x+y)/xy$  (b)  $xy$   
 (c)  $x/y$  (d)  $y/x$
- 81 Solution of differential equation  $x dy - y dx = Q$  represents
- (a) a rectangular hyperbola  
 (b) parabola whose vertex is at origin  
 (c) straight line passing through origin  
 (d) a circle whose centre is at origin
- $x^2 - y^2 = 0$

82 Integrating factor of the differential equation  $\cos x (dy/dx) + y \sin x = 1$  is

(a)  $\cos x$

(b)  $\tan x$

(c)  $\sec x$

(d)  $\sin x$

83 If the difference of mode and median of a data is 24, then the difference of median and mean is

(a) 12

(b) 24

(c) 8

(d) 36

84 The coefficient of variation is computed by

(a)  $S.D./Mean \times 100$

(b)  $S.D./Mean$

(c)  $Mean./S.D \times 100$

(d)  $Mean/S.D.$

**SSF JAMIA MILLIA ISLAMIA**  
**New Delhi**

85 Variance is independent of change of

(a) Origin only

(b) scale only

(c) Origin and scale both

(d) none of these

86 The dimensional formula for velocity is

(a)  $[LT]$

(b)  $[LT^{-1}]$

(c)  $[L^2T]$

(d)  $[L^{-1}T]$

$\frac{d}{dt} - LT^{-1}$

87 A body starts from rest. If it travels with an acceleration of  $2 \text{ m/s}^2$ , its displacement at the end of 3 seconds is

(a) 9 m

(b) 12 m

(c) 16 m

(d) 10 m

$$v =$$

$$a = 2 \text{ m/s}^2$$

$$t =$$

$$d =$$

$$dx =$$

88 When do we get maximum height in a simple projectile motion?

(a) When  $\theta = 45^\circ$

(b) When  $\theta = 60^\circ$

(c) When  $\theta = 90^\circ$

(d) When  $\theta = 0^\circ$

**SSF JAMIA MILLIA ISLAMIA**  
New Delhi

89 When a body P moves on a circular path, the centripetal acceleration is

(a) Directed inwards from P, to the centre of the circle

(b) Directed tangential to the circumference of the circle, at P

(c) Directed perpendicular to the plane of the circle, at P

(d) Directed outward, perpendicular to the circumference of the circle

90 A block of wood is placed on a surface. A force is applied parallel to the surface to move the body. The frictional force developed acts

(a) Normal to the surface upwards

(b) Normal to the surface downwards

(c) Along the direction of the applied force

(d) Opposite to the direction of the applied force



91 A body of mass 10 kg is initially at a height of 20 m above the ground. It falls to a height of 5 m above the ground. Its potential energy in the new position is

(a) 490 J

(b) 50 J

(c) 100 J

(d) 300 J

150

92 A satellite S is move in an elliptical orbit around the earth. The mass of the satellite is very small compared to the mass of the earth

(a) The acceleration of S is always directed towards the centre of the earth.

(b) The angular momentum of S about the centre of the earth changes in direction, but its magnitude remains constant.

(c) The total mechanical energy of S varies periodically with time.

(d) The linear momentum of S remains constant in magnitude.

SSF JAMIA MILLIA ISLAMIA  
New Delhi

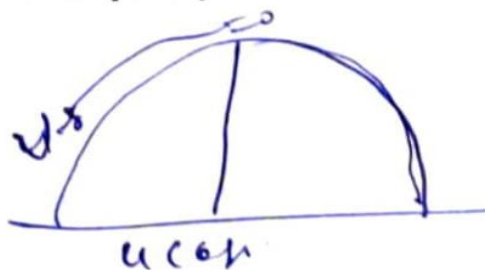
93 For a body moving with simple harmonic motion, the number of cycles per second, is known as its

(a) Oscillation

(b) Amplitude

(c) Periodic time

(d) Frequency



[23]

Entrance Examination – 2021 - 22

94 A particle moves on a circular path with decreasing speed. Choose the correct statement.

- (a) Angular momentum remains constant.
- (b) Acceleration is towards the centre.
- (c) Particle moves on a spiral path with increasing radius.
- (d) The direction of angular momentum remains constant.

95 When two bodies collide elastically, then

- (a) Kinetic energy of the system alone is conserved
- (b) Only momentum is conserved
- (c) Both energy and momentum are conserved
- (d) Neither energy nor momentum is conserved

96 The moment of inertia of a thin spherical shell is

- |                |                |
|----------------|----------------|
| (a) $Mr^4/2$   | (b) $Mr^2$     |
| (c) $2/3 Mr^2$ | (d) $2/5 Mr^2$ |

**SSF JAMIA MILLIA ISLAMIA**  
**New Delhi**

97 If a body is rotating about an axis, passing through its centre of mass then its angular momentum is directed along its

- |                   |                      |
|-------------------|----------------------|
| (a) Radius        | (b) Tangent          |
| (c) Circumference | (d) Axis of rotation |

98 Two wires have the same material and length, but their masses are in the ratio of 4:3. If they are stretched by the same force, their elongations will be in the ratio of

(a) 2 : 3

(b) 3 : 4

(c) 4 : 3

(d) 9 : 16

**SSF JAMIA MILLIA ISLAMIA**  
**New Delhi**

99 The height of a liquid in a fine capillary tube

(a) Increases with an increase in the density of a liquid

(b) Decreases with a decrease in the diameter of the tube

(c) Decreases with an increase in the surface tension

(d) Increases as the effective value of acceleration due to gravity is decreased

100 When a particle performing uniform circular motion of radius 10 cm undergoes the SHM, what will be its amplitude?

(a) 10 cm

(b) 5 cm

(c) 2.5 cm

(d) 20 cm