

Paper Code No: M38

260084
Question Booklet No.

ENTRANCE EXAMINATION – 2021 – 22

SET – D

SSF JAMIA MILLIA ISLAMIA
New Delhi

Roll No.

113820084

Signature of Invigilator

Time: 1 Hour 30 Minutes

Total Marks: 100

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, pag 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) (A) (B) (C) (D) (A) (B) (C) (D)

- a. Nucleoprotein b. Euchromatin
c. Chromatids d. Heterochromatin

- 1/4

2. Which of the following ecosystem consists of forest grassland and deserts?

- a. Artificial ecosystem b. Aquatic ecosystem
c. Natural ecosystem d. Terrestrial ecosystem

9

3. Name the disease caused by the deficiency of Niacin?

- a. Pellagra b. Rickets
c. Scurvy d. Pernicious anemia

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4. Which of them contains all the information required to fold the polypeptide chain in its 3-D structure?

- a. Cellular environment b. Amino acid sequences
c. RNA fold d. Histone protein

5. Name the mineral element which is required by a plant in a great amount?

- a. Calcium b. Cobalt
c. Phosphorus ✓d. Nitrogen

①

6. Which of the following is X-linked recessive disorder?

- a. Sickle cell anemia
- b. Color blindness
- c. PTC tasting
- d. Albinism

1/4

7. Organizing taxonomic information in logical classification is known as,

- a. Phenetic
- b. Phylogenetic
- c. Systematics
- d. Dendogram

8. Which of the following plant hormone is responsible for seed germination?

- a. Auxin
- b. Gibberellin
- c. Ethylene
- d. Abscissic acid

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9. Which of the following is the site of spermatogenesis?

- a. Epididymes
- b. Vasa deference
- c. Seminiferous tubules
- d. Rete testis

10. Which of the following is NOT a plasma protein?

- a. Fibronectin
- b. Albumin
- c. Globulin
- d. Fibrinogen

11. Which one of the following reactions is used for the purpose of recycling enzymes in bioprocesses?

- a. Isomelization
- b. Immobilization
- c. Phosphorylation
- d. Polymerization

12. Name the plant organelle which acts as a major site for an oxidative reaction?

- a. Peroxisomes
- b. Mitochondria
- c. Chloroplast
- d. Thylakoid

13. Synthesis of DNA polymerase occurs at

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- a. G I phase
- b. G2 phase
- c. S phase
- d. M phase



14. When the gynoecium is present in the top most position of **thalamus the flower is** known as

- a. Epigynous
- b. Peligynous
- c. Hypogynous
- d. Inferior

15. Mycoplasmas are different from other prokaryotes by

- a. presence of chitin in cell walls
- b. presence of murein in cell walls
- c. presence of proteins in cell walls
- d. absence of cell wall itself

16. Which metal ion is required for the enzymatic activities of nitrogenase and nitrate Reductase?

- a. Molybdenum
- b. Copper
- c. Iron
- d. Zinc

17. The subcellular organelle not bound by a single membrane is

- a. Golgi apparatus
- ✓ b. Lysosomes
- c. Endoplasmic reticulum
- d. Mitochondria



18. The storage carbohydrate in animal is

- a. Starch
- b. Cellulose
- ✓ c. Glycogen
- d. Glucose

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19. The following are the primary lymphoid organs in mammals

- a. Spleen and Thymus
- ✓ b. Bone marrow and Thymus
- c. Thymus and Lymph node
- d. Spleen and Lymph node



20. Chemolithotroph obtain their carbon from CO₂ and energy from

- a. Sunlight
- b. Water
- c. Inorganic compounds
- d. Organic compounds

21. The melting temperature (T_m) of DNA is
- a. proportional to the length of DNA
 - b. proportional to the guanine-cytosine (GC) content of DNA
 - c. the temperature at which all of the DNA is denatured
 - b. proportional to the purine content of DNA
22. In nature, carbon can exist in several forms like diamond, graphite, buckyball (C₆₀), etc. These are example of
- a. Isomers
 - b. Isotopes
 - c. Enantiomers
 - d. Allotropes
23. The causative organism of sleeping sickness is
- a. Trypanosoma
 - b. Wuchereria
 - c. Ascaris
 - d. Leishmania
24. The antibody class which can pass through placenta to protect the fetus is
- a. IgM
 - b. IgA
 - c. IgE
 - d. IgG
25. Death by cyanide poisoning is due to the inhibition of
- a. Cytochrome P 450
 - b. cytochrome b
 - c. Cytochrome c oxidase
 - d. cytochrome c reductase

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26. How many NMR signals will you expect for 1, 2, 3-tribromopropane?
- Three signals, two doublets and a quintet
 - two signals, one a triplet and other a doublet
 - Five signals, four doublets and a quintet
 - Two signals, one a doublets and a quintet

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27. The shape of methyl carbocation is
- Tetrahedral
 - Trigonal planar
 - Angular
 - None of these
28. The rate of S_N2 reaction depends upon
- The nucleophile
 - Carbon skeleton
 - The leaving group
- 1 and 3
 - 1 only
 - 1 and 2
 - 1, 2 and 3
29. The order of acidic nature of alcohol is
- 1° alcohol $>$ 2° alcohol $>$ 3° alcohol
 - 3° alcohol $>$ 2° alcohol $>$ 1° alcohol
 - 1° alcohol $>$ 3° alcohol $>$ 2° alcohol
 - 2° alcohol $>$ 3° alcohol $>$ 1° alcohol

30. Carbylamine reaction and Riemer-Tiemer reactions occur by
- Carbocation intermediate and carbene intermediate respectively
 - Carbene and nitrene intermediate respectively
 - Carbene and carbene intermediate respectively
 - Nitrene and carbene intermediate respectively

31. Which of the following compounds undergo Cannizzaro reaction?

P. $(\text{CH}_3)_3\text{C}-\text{CHO}$

Q. $\text{C}_6\text{H}_5\text{CHO}$

R. $\text{C}_6\text{H}_5\text{CH}_2\text{CHO}$

S. $\text{CH}_3\text{CH}_2\text{CHO}$

Select the correct answer using codes given below:

a. P and Q

b. P and R

c. Q and R

d. Q and S

32. The degeneracy of a particle having energy $\frac{14h^2}{8ml^2}$ in 3D boxes is

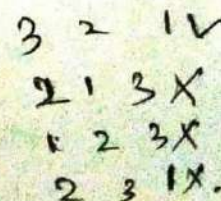
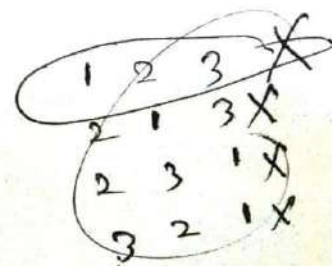
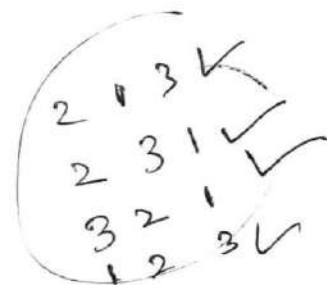
a. 5

b. 6

c. 7

d. 8

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33. In calcium fluoride structure, the coordination numbers of calcium and fluoride ions are

- | | |
|------------|------------|
| a. 8 and 4 | b. 6 and 8 |
| c. 4 and 4 | d. 4 and 8 |

34. Gold number is a measure of:

- a. stability of colloidal system
- b. coagulating power of a colloid
- c. size of colloidal particles
- d. efficiency of the protective colloid

35. If 4gm NaOH is added to 1 liter H_2O . Find change in pH

- | | |
|------|------|
| a. 7 | b. 5 |
| c. 6 | d. 3 |

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36. The Bohr orbit radius for the hydrogen atom ($n=1$) is approximately 0.530\AA . The radius for the first excited state ($n=2$) orbit is:

- | | |
|---------------------|---------------------|
| a. 0.13\AA | b. 1.06\AA |
| c. 4.77\AA | d. 2.12\AA |

37. The rate constant of a reaction does not depend upon:

- a. temperature
- b. concentration of reactants and products
- c. activation energy
- d. catalyst



38. The quantity of electricity needed to deposit 127.08 g of copper is

- a. 1 faraday
- b. 1 coulombs
- c. 4 faraday
- d. 1 ampere

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39. In physical adsorption, the forces associated are

- a. van der Waals
- b. tome
- c. Covalent
- d. H- bonding

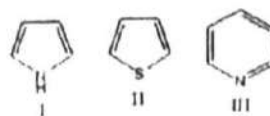
40. The number of degrees of freedom in an aqueous solution of sugar is

- a. 1
- b. 2
- c. 3
- d. Zero

41. Which one of the following oxide is basic

- a. B_2O_3
- b. Li_2O
- c. BeO
- d. N_2O_5

50. Write down the decreasing order of the reactivity of following compounds



towards electrophiles

a. $II > III > I$

b. $II > I > III$

c. $III > I > II$

d. $I > II > III$

51. $\log 8 + \log 125 = ?$

a. 2

b. 3

c. 4

d. 5

52. $1 + \frac{1}{3!} + \frac{1}{5!} + \frac{1}{7!} + \dots =$

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a. e

b. e^{-1}

c. $\frac{e+e^{-1}}{2}$

d. $\frac{e-e^{-1}}{2}$

53. What is the value of x in the exponential equation $10 + e^{2x-4} = 11$?

a. 1

~~b.~~ 2

c. 3

d. 4



54. What is the displacement vector of the particle that moves from point P (2, 3, 5) to point Q (3, 4, 5)?

a. $2\hat{i} + 3\hat{j} + 2\hat{k}$

b. $\hat{i} + \hat{j}$

c. $\hat{i} + \hat{j} + \hat{k}$

d. $\hat{i} + \hat{j} - \hat{k}$

55. $|a \times b|^2 + |a \cdot b|^2 = 144$ and $|a| = 4$, then $|b|$ is equal to

a. 3

b. 4

c. 8

d. 12

56. The value of limit $\lim_{x \rightarrow 0} \{ \sin(a+x) - \sin(a-x) \} / x$ is

a. 0

b. 1

c. $2 \sin a$

d. $2 \cos a$

57. $\int_0^{\frac{\pi}{2}} \frac{a \sin x - b \cos x}{\sin x - \cos x} dx =$

a. $\frac{(a+b)\pi}{2}$

b. $\frac{(a-b)\pi}{2}$

c. $\frac{(a+b)\pi}{4}$

d. $\frac{(a-b)\pi}{4}$

58. Find the value of $\iint xy e^{x+y} dx dy$.

a. $ye^y (xe^x - e^x)$

b. $(ye^y - e^y)(xe^x - e^x)$

c. $(ye^y - e^y)xe^x$

d. $(ye^y - e^y)(xe^x + e^x)$

59. If $A = \begin{bmatrix} \lambda & 1 \\ -1 & -\lambda \end{bmatrix}$ then for what value of λ , $A^2 = 0$?

a. 0

✓ b. ± 1

✓ c. Only 1

d. Only -1

(1)

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60. If a set $A_n = [\frac{1}{n}, 1]$ for all $n \in \mathbb{N}$, then $\bigcap_{i=1}^{\infty} A_i =$

a. A_{∞}

b. $[0, 1]$

c. $\{0\}$

✓ d. $\{1\}$

(1)

61. What is the domain of the function $\ln(\ln \sin x)$ is

a. $(0, \infty)$

b. $[1, \infty]$

c. (e, ∞)

d. ϕ (empty set)

$\ln \frac{1}{\sin x}$ (1)

62. The modulus and principle argument of complex number $z = -1 - i$

a. $\sqrt{2}, 3\pi/4$

b. $\sqrt{2}, -3\pi/4$

✓ c. $\sqrt{2}, 5\pi/4$

d. $1, 3\pi/4$

(1)

63. If α and β are two roots of quadratic equation $ax^2 + bx + c = 0$, $a \neq 0$ then $\alpha^2 + \beta^2 =$

✓ a. $\frac{b^2 - 2ac}{a^2}$

b. $\frac{b^2 + 2ac}{a^2}$

c. $\frac{b^2 - ac}{a^2}$

d. $\frac{b^2 + ac}{a^2}$

(1)

64. If in a G.P. (Geometric Progression), the 3rd term is 24 and the 6th term is 192, then what will be the 4th term?

a. 48

b. 64

c. 72

d. 96



A.P. -
d.n.n

65. If a, b, c are in G.P. and $a^{1/x} = b^{1/y} = c^{1/z}$, then x, y, z are in

a. A.P.

b. G.P.

c. H.P.

d. None of the above



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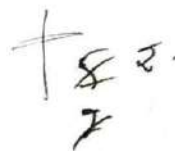
66. What is a points on the y-axis whose distance from the line $\frac{x}{3} + \frac{y}{4} = 1$ is 4 units.

a. (0, 4)

b. (0, 3)

c. (0, 32/3)

d. (0, -4)



-1/4

0 3/4

67. The focus of parabola $y^2 = 10x$ is:

a. (20, 0)

b. (10, 0)

c. (5, 0)

d. (2.5, 0)



$x^2 / y^2 = 10x$

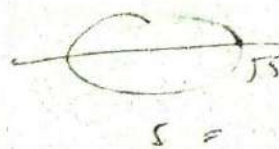
68. If the line $2x - y + k = 0$ is a diameter of the circle $x^2 + y^2 + 6x - 6y + 5 = 0$ then the value of k will be:

a. 3

b. 6

c. 9

d. 12



69. How many permutations of letter in the word "APPLE"

a. 5

b. 30

c. 60

d. 120

70. What is the coefficient of x in the expansion of $(x^2 + \frac{a}{x})^5$, a is any constant?

a. 10

b. $10a$

c. $10a^2$

d. $10a^3$

71. Evaluate $\int_0^\infty x^5 e^{-x} dx$

a. 0

b. 1

c. 120

d. 24

72. Two six faces dices are throwing. What is the probability that 5 or more is coming on upper face of any dice?

a. $\frac{20}{36}$

b. $\frac{24}{36}$

✓ c. $\frac{12}{36}$

4d. $\frac{6}{36}$

73. What are the positive roots of the equation $|x|^2 - 3|x| + 2 = 0$?

a. 1, 2

b. 1, 3

c. 3, 2

d. Roots are not exists

74. $\frac{d}{dx}(\cos^2 \sqrt{x})$ is equal to

a. $\frac{-\sin 2\sqrt{x}}{2\sqrt{x}}$

c. $\frac{-\cos 2\sqrt{x}}{2\sqrt{x}}$

b. $-\sin 2\sqrt{x}$

d. $-\cos 2\sqrt{x}$

$2 \cos \sqrt{x} (-\sin \sqrt{x}) \cdot \frac{1}{2\sqrt{x}}$

$-\frac{\sin 2\sqrt{x}}{2\sqrt{x}}$

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75. Let X be a continuous random variable with density $f(x) = \frac{1}{2}e^{-|x|}$, $-\infty < x < \infty$.

Then mean and variance

a. 0, 0

b. 0, 1

c. 0, 2

d. 0, $\sqrt{2}$

76. Planar wave front is obtained when source is situated at

a. Focal length

b. Infinity

c. Radius of curvature

d. Near to object

77. A phase difference of 5π corresponds to a path difference of

a. $\frac{\lambda}{2}$

b. 2λ

c. $\frac{2\lambda}{5}$

d. $\frac{5\lambda}{2}$

$\text{path} = \frac{\lambda}{2\pi} \times \text{phase}$

$= \frac{\lambda}{2\pi} \times 5\pi$

$\text{path} = \frac{2\pi}{\lambda} \times \text{path}$

$5\pi = \frac{2\pi}{\lambda} \times (5\lambda)$

$5\pi = \frac{2\pi}{\lambda} \times \text{path}$

$\frac{5\lambda}{2}$

$5\pi = \frac{2\pi}{\lambda} \times \text{path}$

[19]

Entrance Examination - 2021 - 22

M38 SET - 1

78. In total internal reflection, at critical angle

- a. Refracted ray travels perpendicular to interface of two surfaces
- b. Reflected ray travels perpendicular to interface of two surfaces
- c. Refracted ray travels parallel to interface of two surfaces
- d. None of these

79. Ratio of efficiency of half wave rectifier to full wave rectifier will be

- a. 1:1
- b. 1:2
- c. 2:1
- d. 1:4

$$\frac{0.48}{1.21}$$

$$\frac{48}{121} \times \frac{100}{100} = \frac{48}{121} \times 100 = 39.66\%$$

80. Gamma rays are

- a. Fast moving electrons
- b. Single ionized atom
- c. Large wavelength waves
- d. EM wave

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81. Frequency of simple pendulum is written as

- a. $2\pi\sqrt{g/l}$
- b. $2\pi\sqrt{l/g}$
- c. $(1/2\pi)\sqrt{g/l}$
- d. $(1/2\pi)\sqrt{l/g}$

82. Value of $(10010)_2$ is

- a. 10
- b. 12
- c. 16
- d. 18

$$1 \times 2^4 + 0 \times 2^3 + 0 \times 2^2 + 1 \times 2^1 + 0 \times 2^0 = 16 + 2 = 18$$

84. The speed of sound is maximum in

- a. 2 b. 4
c. 6 ~~c.~~ d. 8

84. The speed of sound is maximum in

- a. Solid b. Liquid
c. Gas ~~d.~~ Vacuum

85. Rain drop acquires spherical shape due to

- a. Viscosity ✓ b. Surface tension
c. Friction d. Elasticity

86. Dimension of strain is

- ✓ a. $M^0 L^0 T^0$ b. $ML^{-1} T^1$
c. $M^2 L^1 T^{-1}$ d. $ML^{-1} T^{-1}$

87. Car travelling at a speed of 'u' m/s kids to stop in 't' sec. The skidding distance will be (assume uniform acceleration)

- a. $2ut$
- b. ut
- c. $ut/2$
- d. $ut/4$

$$V = \frac{d}{t}$$

88. A body is projected with velocity 10 m/s at 30° to the horizontal plane. The time of flight of projectile will be

a. 0.5 sec

b. 1 sec

c. 2 sec

d. 2.5 sec

$$T = \frac{2 \times 10 \sin 30^\circ}{10}$$

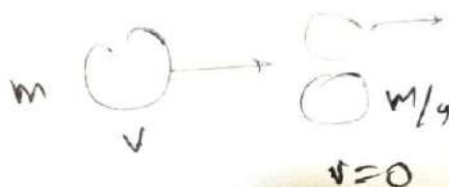
89. shell of mass m is moving with velocity v , suddenly breaks into two pieces. The part of shell having mass $m/4$ remains stationary, the velocity of other part of the shell will be

a. $1/2 v$

b. $1/4 v$

c. $3/4 v$

d. $4/3 v$



$$m v = m/4 (0) + 3m/4 v'$$

90. Radius of gyration for a solid sphere of radius R about its axis will be

a. $\sqrt{2/3} R$

b. $\sqrt{2/5} R$

c. $\sqrt{4/3} R$

d. $\sqrt{4/5} R$

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91. In steady state, capacitor connected to a de power supply acts as an

a. open circuit

b. short circuit

c. transient circuit

d. steady state circuit

92. The time taken by capacitor, C to reach steady state while charging it through de source and having a resistance, R in the circuit is

a. 1 RC

b. 2 RC

c. 3 RC

d. 5 RC

93. If the magnetic flux through each turn of coil consisting of 200 turns is $(t^2 - 3t)$ mli iii webers, where t is in seconds. The induced emf in the coil at $t = 4$ sec will be

a. -1 volt

b. +1 volt

c. -10 volt

d. +10 volts

94. A uniform line charge with linear charge density, λ lies along y axis. What flux crosses a spherical surface centered at the origin with $r = R$

a. $\lambda R / \epsilon_0$

b. $2\lambda R / \epsilon_0$

c. λ / ϵ_0

d. $2\lambda / \epsilon_0$

95. If we double the radius of a current carrying coil keeping current unchanged.

Then the magnetic field at the centre of the coil will be

a. Zero

b. Doubled

c. Halved

d. Unchanged

96. For a gas, the most probable speed at 400 K is

- a. Half the value at 100 K
- b. Double the value at 100 K
- c. Four times the value at 100 K
- d. Same as the value at 100 K

$$v \propto \frac{1}{\sqrt{2}}$$

97. Zero work is done during

- ☒ a. Isochoric process
- b. adiabatic process
- c. Isobaric process
- d. Isothermal process

$$PdV = Q$$

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98. If $C_p/C_v = 5/3$, then C_p will be

- a. $3/2 R$
- b. $2/3 R$
- ☒ c. $5/2 R$
- d. $2/5 R$

$$C_p - C_v = R$$
$$\frac{5}{2} R - \frac{3}{2} R = R$$

$$\frac{C_p}{C_v} = \frac{5}{3}$$

99. Boyle's law

- a. V is inversely proportional to T
- b. V is directly proportional to T
- ☒ c. P is inversely proportional to V
- d. P is directly proportional to V

$$\frac{2C_p}{5} = R$$
$$\frac{5}{2} R = R$$

100. For a close system, reversible process does work

- ☒ a. More than irreversible process
- ☐ b. Less than irreversible process
- ☐ c. Same as irreversible process
- ☐ d. May be less or may be more than irreversible process