

1. Which of the following is incorrectly related to Glucose?

- ~~A.~~ It gives Fehling's test
- B. Exist in two crystalline forms
- C. It gives 2, 4-DNP test
- D. It reacts with Br_2 water

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2. Osmotic Pressure of a solution containing 1g protein in 100 mL solution at 300 K is 1.66 bar. What is the molecular weight of protein? ($R = 0.083 \text{ L bar mol}^{-1} \text{ K}^{-1}$)

- | | |
|--------|--------|
| A. 150 | B. 120 |
| C. 130 | D. 300 |

3. In a gas at 1 atm pressure and 27°C . A molecule has a diameter of 5\AA . Find mean free Path of molecules:

- | | |
|-----------------------------------|---------------------------------|
| A. $3.8 \times 10^{-8} \text{ m}$ | B. $2 \times 10^{-8} \text{ m}$ |
| C. $8.3 \times 10^{-9} \text{ m}$ | D. $3.2 \times 10^6 \text{ m}$ |

4. For a reaction $\text{A} \rightarrow \text{B}$ half-life period = 50 min, If reactant concentration is halved than half-life period is 25 min. then order of reaction will be

- | | |
|------|------|
| A. 0 | B. 1 |
| C. 2 | D. 3 |

[3]

5. The correct order of increasing bond length of C-H, C-O, C-C and C=C is:

- A. $\text{C-H} < \text{C=C} < \text{C-O} < \text{C-C}$
B. $\text{C-C} < \text{C=C} < \text{C-O} < \text{C-H}$
C. $\text{C-O} < \text{C-H} < \text{C-C} < \text{C=C}$
D. $\text{C-H} < \text{C-O} < \text{C-C} < \text{C=C}$

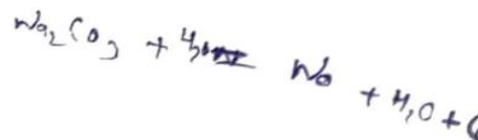
6. If $n=6$, the correct sequence for filling of electrons will be:

- A. $ns \rightarrow (n-2)^4 f \rightarrow (n-1)^5 d \rightarrow np^6$
B. $ns \rightarrow (n-1) d \rightarrow (n-2) f \rightarrow np$
C. $ns \rightarrow (n-2)^4 f \rightarrow np^6 \rightarrow (n-1)^3 d$
D. $ns \rightarrow np \rightarrow (n-1) d \rightarrow (n-2) f$

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7. The compound A on heating gives a colorless gas and a residue that is dissolved in water to obtain B. Excess of CO_2 is bubbled through aqueous solution of B, C is formed which is recovered in the solid form. Solid C on gentle heating gives back A. The compound is:

- A. Na_2CO_3 B. K_2CO_3
C. $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ D. CaCO_3



8. Among the elements Ca, Mg, P and Cl. the order of increasing atomic radii is:

- A. $\text{Cl} < \text{P} < \text{Mg} < \text{Ca}$ B. $\text{P} < \text{Cl} < \text{Ca} < \text{Mg}$
C. $\text{Ca} < \text{Mg} < \text{P} < \text{Cl}$ D. $\text{Mg} < \text{Ca} < \text{Cl} < \text{P}$

9. Which one of the following bonds produces a solid that reflects light in the visible region and whose electrical conductivity decreases with temperature and has high melting point?

- A. Covalent bonding B. Metallic bonding
C. Vander Waal's bonding D. Ionic bonding

10. Which one of the following species does not exist under normal conditions?

- A. Li_2 B. Be_2^+
C. Be_2 D. B_2

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11. The ionization constant of ammonium hydroxide is 1.77×10^{-5} at 298K. Hydrolysis constant of ammonium chloride is:

- A. 5.65×10^{-12} B. 5.65×10^{-10}
C. 6.50×10^{-12} D. 5.65×10^{-13}

12. Which of the following oxides is not expected to react with sodium hydroxide?

- A. CaO $\text{NaOH} \leftarrow \text{CaO}$ B. BeO
C. B_2O_3 $\leftarrow \text{NaOH}$ D. SiO_2

13. Which has maximum heat of hydrogenation?

- A. Cis-2-butene B. Trans-2-butene
C. 1-butene D. Ethene

[5]

14. The bond energies of H-H, Br-Br and HBr are 433, 192 and 365 kJ/mol respectively. The ΔH for the reaction $H_2(g) + Br_2(g) \rightarrow 2HBr(g)$ is

A. +26 KJ
B. -105 kJ
C. -26 kJ
D. +105 kJ

$$\begin{array}{r} 433 \\ -192 \\ \hline 241 \\ -365 \\ \hline -26 \end{array}$$

15. The number of electrons delivered at the cathode during electrolysis by a current of 1 ampere in 60 seconds is (charge on electron = $1.60 \times 10^{-19} \text{ C}$)

A. 6×10^{23}
B. 6×10^{20}
C. 3.75×10^{20}
D. 7.48×10^{23}

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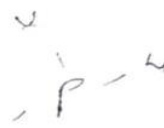
16. The molar concentration of 20 gram of NaOH presents in 5 litre of solution is

A. 1.0 moles/litre
B. 0.5 moles/litre
C. 0.2 moles/litre
D. 0.1 moles/litre

$$\frac{20}{40} = 0.5$$
$$\frac{0.5}{5} = 0.1$$

17. The species, having bond angles of 120° is

A. PH_3
B. ClF_3
C. NCl_3
D. BCl_3



18. Energy of electron is zero

A. near nucleus
B. at infinity
C. in first orbit
D. in last orbit

[6]

19. A Nucleus ${}_{92}\text{U}^{238}$ undergoes α decay. What is the Atomic no of the Nucleus produced?

A. 234

B. 90

☒ C. 236

D. 91

20. The wavelength of the first line of Lyman series for Hydrogen atom is equal to that of the Second Line of Balmer series for Hydrogen like ion. The atomic no Z of Hydrogen like ion is:

A. 3

B. 4

C. 1

D. 2

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21. Which of the following statements is not correct?

A. Insulin maintains sugar level in the blood of a human body

B. Ovalbumin is a simple food reserve in egg-white

☒ C. Blood proteins thrombin and fibrinogen are involved in blood clotting

☒ D. Denaturation makes the proteins more active

22. Double fertilization is exhibited by

☒ A. Gymnosperms

B. Algae

C. Fungi

☒ D. Angiosperms

23. Which of the following are found in extreme saline conditions?

- A. Archaeobacteria
- B. Eubacteria
- C. Cyanobacteria
- D. Mycobacteria

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24. What is the criterion for DNA fragments movement on agarose gel during gel electrophoresis?

- A. The larger the fragment size, the farther it moves
- B. The smaller the fragment size, the farther it moves
- C. Positively charged fragments move to farther end
- D. Negatively charged fragments do not move

25. Which one of the following statements is correct, with reference to enzymes?

- A. Apoenzyme = Holoenzyme + Coenzyme
- B. Holoenzyme = Apoenzyme + Coenzyme
- C. Coenzyme = Apoenzyme + Holoenzyme
- D. Holoenzyme = Coenzyme + Cofactor

26. During DNA replication, Okazaki fragments are used to **elongate**

- A. The leading strand towards replication fork
- B. The lagging strand towards replication fork
- C. The leading strand away from replication fork
- D. The lagging strand away from the replication fork

27. The process of separation and purification of expressed protein before marketing is called

- A. Upstream processing B. Downstream processing
C. Bioprocessing D. Postproduction processing

28. Mycorrhizae are the example of

- A. Fungistasis B. Amensalism
C. Antibiosis D. Mutualism

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29. Which of the following RNAs should be most abundant in animal cell?

- A. r-RNA B. t-RNA
C. m-RNA D. mi-RNA

30. The DNA fragments separated on an agarose gel can be visualized after staining with

- A. Bromophenol blue B. Acetocarmine
C. Aniline blue D. Ethidium bromide

31. Lungs are made up of air-filled sacs the alveoli. They do not collapse even after forceful expiration, because of:

- ☒ A. Residual Volume
- B. Inspiratory Reserve Volume
- C. Tidal Volume
- D. Expiratory Reserve Volume

32. An important characteristic that Hemichordates share with Chordates is

- A. Absence of notochord
- B. Ventral tubular nerve cord
- ☒ C. Pharynx with gill slits
- D. Pharynx without gill slits

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33. Phosphoenol pyruvate (PEP) is the primary CO_2 acceptor in:

- A. C_3 plants
- ☒ B. C_4 plants
- C. C_2 plants
- D. C_3 and C_4 plants

34. Which of the characteristic feature are not present in Annelids?

- ☒ A. Closed circulatory system
- B. Pseudocoelome
- C. Metamerism
- D. Double ventral ganglionated nerve cord

35. Gout that leads to arthritis is associated with the abnormality of

- ☒ A. Protein metabolism
- B. RNA metabolism
- C. Purine metabolism
- ☒ D. Pyrimidine metabolism

36. If Henle's loop is removed from mammal nephrons, the result will be:

- A. Urine will be concentrated
- ☒ B. Urine will be diluted
- C. Urine will be mixed with blood
- D. No urine will be formed

37. H_2 donor during photosynthesis is:

- A. ATP
- B. NADP
- ☒ C. NADPH
- D. NADH

38. ATP production in photosynthesis is called as:

- A. Phototropism
- B. Phosphorylation
- C. Photo-oxidation
- ☒ D. Photophosphorylation

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39. Among the following stem cells, which are found in umbilical cord?

- ☒ A. Embryonic stem cells
- B. Adult stem cells
- C. Cord blood stem cells
- ☒ D. All of the above

40. Which of the following molecule will not be produced during fermentation?

- A. H₂O B. CO₂
- C. Ethanol D. Lactic acid

41. The cell in the central nervous system are functionally equivalent to Schwann cell is the:

- A. Astrocyte B. Neuron
C. Oligodendrocyte D. Microglial cell

42. K_m of an enzyme should be:

- A. Low B. High
C. Medium D. Any

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43. Which is not a reducing sugar?

- A. Glucose B. Fructose
C. Mannose D. Sucrose

44. If the chyme of a person, who had orally consumed only starch as food, is analyzed before it enters the duodenum, it will show the presence of:

- A. Maltose and glucose
- B. Dextrin and maltose only
- C. Starch, dextrans and maltose
- D. Starch, dextrans and glucose

45. Which of the following events occurs in the descending limb of loop of Henle?
- A. 70-80% of electrolytes and water are reabsorbed by this segment.
 - B. It is permeable to water but almost impermeable to electrolytes. This concentrates the filtrate as it moves down.
 - C. Reabsorption of HCO_3^- and selective secretion of hydrogen and potassium ions and NH_3 to maintain the pH.
 - D. It is impermeable to water but allows the transport of electrolytes actively or passively.

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46. Which of the following are considered as a part of the endomembrane system?
- A. Golgi complex, vacuole and ribosomes
 - B. Mitochondria, ER and lysosomes
 - C. ER, Chloroplast and vacuole
 - D. Lysosomes, ER and Golgi complex
47. Adenine is 30% then what would be the % of guanine in a dsDNA
- A - T
G - C
- A. 10%
 - B. 30%
 - C. 40%
 - D. 20%

48. FADH₂ is produced during which of the following reaction?

- A. Fumaric acid to malic acid
- B. Succinyl Co-A to succinic acid
- C. Succinic acid to fumaric acid
- D. Isocitric acid to oxaloacetic acid

49. Monomer unit of sucrose is:-

- A. α -Glucose + α -Glucose
- B. α -Glucose + β -Fructose
- C. β -Galactose + β -Glucose
- D. α -Fructose + P-Fructose

50. Which peptide of pro-insulin is removed during processing of insulin?

- A. A-peptide
- B. B-peptide
- C. D-peptide
- D. C-peptide

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51. MS Swaminathan who was the pioneer mutation breeder, he had used in his breeding experiments:-

- A. γ -rays and wheat
- B. X-rays and wheat
- C. γ -rays and rice
- D. β -rays and wheat

52. Which of the following biomolecules is common to respiration-mediated breakdown of fats, carbohydrates and proteins?

- A. Glucose-6-phosphate B. Fructose 1, 6-bisphosphate
C. Pyruvic acid D. Acetyl CoA

53. Which of the following rRNAs acts as structural RNA as well as ribozyme in bacteria?

- A. 5S rRNA B. 18S rRNA
✓ C. 23S rRNA D. 5.8S rRNA

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54. Which kind of therapy was given in 1990 to a four-year-old girl with adenosine deaminase (ADA) deficiency?

- ✓ A. Gene therapy B. Chemotherapy
C. immunotherapy D. Radiation therapy

55. The process that involves the use of a complementary RNA molecule to prevent mRNA molecules from taking part in translation thereby preventing the expression of a gene is

- A. ELISA B. Spooling
C. Elution ✓ D. RNA interference

[15]

56. Pyruvate dehydrogenase complex, needed for the conversion of Pyruvic acid to acetyl- CoA is located in

- A. Intermembrane space of mitochondria
- B. Matrix of mitochondria
- C. Cytoplasm
- D. Grana of chloroplast

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57. During the conduction of nerve impulse the repolarization occurs with the

- | | |
|-------------------------|---------------------------------|
| A. Influx of K^+ ions | <u>B.</u> Influx of Na^+ ions |
| C. Efflux of K^+ ions | <u>D.</u> Efflux of Na ions |

58. Which one of the following structures is an organelle within an organelle?

- | | |
|-------------|---------------|
| A. Ribosome | B. Peroxisome |
| C. ER | D. Mesosome |

59. For its action, nitrogenase requires

- | | |
|--------------------------------|--------------------------|
| <u>A.</u> High input of energy | B. Light |
| C. Mn^{2+} | D. Super oxygen radicals |

60. Which one of the following represents a palindromic sequence in DNA?

A. 5' - GAATTC - 3'
3' - CTTAAG - 5'

B. 5' - CCAATG - 3'
3' - CAATCC - 5'

C. 5' - CATTAG - 3'
3' - GATAAC - 5'

D. 5' - GATACC - 3'
3' - CCTAAG - 5'

61. Which one of the following is called as the 'brewer's yeast'?

- A. *Saccharomyces ludwigi*
- B. *Saccharomyces cerevisiae*
- C. *Saccharomyces boulardii*
- D. *Saccharomyces pastorianus*

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62. Who coined the term linkage?

- | | |
|------------|-------------|
| A. Correns | B. Mendel |
| C. Morgan | D. de Vries |

63. Reflex action in a vertebrate is an essential display induced by a

- | | |
|-----------------------|----------------------|
| A. Sensory nerve | B. Motor nerve |
| C. Autonomic response | D. Sympathetic nerve |

64. DNA replication occurs in

- A. S phase B. G phase
~~C. G2 phase~~ D. ~~M phase~~

65. Common food poisoning microbes (is) are:

- A. Clostridium ~~B. E.Coli~~
C. Salmonella D. A and C

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66. Auto immune disorder affecting neuromuscular junction leading to fatigue, weakening and paralysis of skeletal muscle:

- A. Myasthenia gravis ~~B. Muscular dystrophy~~
C. Tetany ~~D. Arthritis~~

67. How many ATPs are formed by one molecule of acetyl CoA?

- ~~A. 15~~ B. 12
C. 1 D. 24

68. Construction of first recombinant DNA was done by using plasmid of:-

- A. Salmonella typhimurium
B. Escherichia coli
~~C. Bacillus thuringiensis~~
D. Yeast

69. In leaves of C4 plants malic acid synthesis during CO fixation occurs in:

- A. Bundle sheath
B. Guard cells
C. Epidermal cells
D. Mesophyll cells

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70. Which structure is absolutely necessary for many biological activities?

- A. Primary structure
B. α helix
C. β plated sheet
D. Tertiary structure

71. The sum of two numbers is 2000 and their LCM is 21879. The nos. are

- A. 1993, 7
B. 1991, 9
C. 1989, 11
D. 1987, 13

$$\begin{array}{r} 1989 \\ 1989 \\ \hline 21879 \end{array}$$

72. A man plants 15376 apple trees in his garden and arranges them so that there are as many rows as there are apple trees in each row. The numbers of rows are

- A. 124
B. 126
C. 134
D. 144

$$\begin{array}{r} 124 \\ 124 \\ \hline 496 \\ 248 \times \\ \hline 15376 \end{array}$$

$$\begin{array}{r} 126 \\ 126 \\ \hline 756 \\ 252 \times \\ \hline 15876 \end{array}$$

$$\begin{array}{r} 126 \\ 126 \\ \hline 756 \\ 252 \times \\ \hline 15876 \end{array}$$

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

- A. $(A - B) \cup (A - C)$
B. $(A - B) \cup C$
C. $(A - B) \cap C$
D. $(A - B) \cap (A - C)$

$$\begin{array}{r} 15376 \\ 126 \\ \hline 19876 \\ 126 \times \\ \hline 15376 \end{array}$$

$$\begin{array}{r} 124 \\ 124 \\ \hline 496 \\ 248 \times \\ \hline 15376 \end{array}$$

$$\begin{array}{r} 126 \\ 126 \\ \hline 756 \\ 252 \times \\ \hline 15876 \end{array}$$

$$\begin{array}{r} 134 \\ 134 \\ \hline 436 \\ 402 \times \\ \hline 17876 \end{array}$$

$$\begin{array}{r} 144 \\ 144 \\ \hline 576 \\ 576 \times \\ \hline 144 \times \\ 10736 \end{array}$$

B07 SET - B

Entrance Examination - 2021 - 22

74. The value of $\cos^2 x + \cos^2 y - 2\cos x \cos y \times \cos(x + y)$ is
- A. $\sin(x + y)$ B. $\sin^2(x + y)$
 C. $\sin^3(x + y)$ D. $\sin^4(x + y)$
75. Sum of two rational numbers is _____ number.
- A. Rational B. Irrational
 C. Integer D. Both 1, 2 and 3
76. The algebraic sum of the deviation of 20 observations measured from 30 is 2. So, the mean of observations is
- A. 30.0 B. 30.1
 C. 30.2 D. 30.3
77. Three identical dice are rolled. The probability that the same number will appear on each of them is
- A. $1/6$ B. $1/36$
 C. $1/18$ D. $3/28$

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78. If z lies on $|Z| = 1$, then $2/z$ lies on
- A. a circle B. an ellipse
 C. a straight line D. a parabola

79. The sum of n terms of the series $(1/1 \cdot 2) + (1/2 \cdot 3) + (1/3 \cdot 4) + \dots$ is

A. $n/(n+1)$

B. $1/(n+1)$

C. $1/n$

D. None of these

80. The equation of the line passing through the point $(2, 3)$ with slope 2 is

A. $2x + y - 1 = 0$

B. $2x - y + 1 = 0$

C. $2x - y - 1 = 0$

D. $2x + y + 1 = 0$

81. A car of mass 1000 kg negotiates a banked curve of radius 90 m on a frictionless road. If the banking angle is 45° , the speed of the car is:-

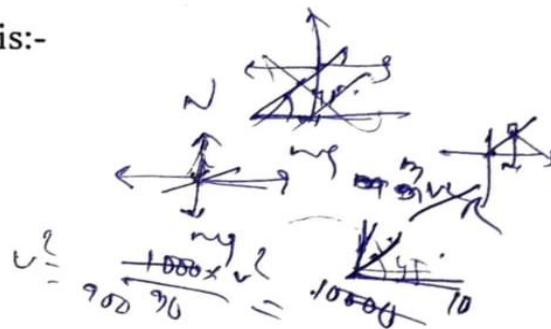
A. 5 m/s

B. 10 m/s

C. 20 m/s

D. 30 m/s

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82. When a beam of white light passes through a prism it splits up into different colours, violet is bent most because:

☒ A. μ of glass for violet rays is smaller than for other rays

B. μ of glass for violet rays is greater than for other rays

C. μ is same for all colours but violet rays have smaller wavelength

D. μ is same for all colours but violet rays have longer wavelength



90. Electromagnets are made of soft Iron because soft Iron has:

- A. High retentivity and Low coercive force
- ~~B.~~ Low retentivity and High coercive force
- C. High retentivity and High coercive force
- ~~D.~~ Low retentivity and Low coercive force

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91. In thermodynamic processes which of the following statements is not true:

- A. In an Adiabatic process $PV^\gamma = \text{constant}$
- B. In an Adiabatic process the system is insulated from the surroundings
- ~~C.~~ In an Isochoric process pressure remains constant
- D. In an Isothermal process the temperature remains constant

92. Which of the following statements are incorrect?

- ~~A.~~ Nuclear forces are always attractive
- B. Nuclear force are stronger than coulombian force at distance of femtometer
- ~~C.~~ Nuclear force are repulsive at distance less than or equal to 0.8 femtometer
- D. Nuclear forces are spin dependent

93. In Zener diode, the Zener breakdown takes place

- | | |
|-------------------------|---------------------------------|
| A. Below 6 V | B. At 6 V |
| C. Above 6 V | D. None of the above |

94. Photodiode is used in the detection of

- ☒ A. Visible light B. Invisible light
C. No light D. Both visible and invisible light

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95. A hollow sphere, a solid sphere, a disc and a ring all having same mass and radius are rolled down on an inclined plane. If no slipping takes place, which one will take the smallest time to cover a given length?

- A. hollow sphere B. solid sphere
C. disc D. ring

96. What is the respective number of α and β particles emitted in the following

radioactive decay ${}_{90}\text{X}^{200} \xrightarrow[10]{32} {}_{80}\text{Y}^{168}$

- A. 6 and 8 B. 8 and 8
C. 6 and 6 D. 8 and 6

97. A particle of mass m is rotating by means of a string in a vertical circle. The difference in the tension at the bottom and top would be:

- A. 6 mg B. 4 mg
C. 3 mg D. 2 mg

[25]

98. The relation between magnetic susceptibility X_m and relative permeability μ_r is:-

A. $X_m = \mu_r$

B. $X_m - 1 = \mu_r$

C. $\mu_r = 1 + X_m$

D. $\mu_r = 1 - X_m$

99. A current of 2 A flows through a 2Ω resistor when connected across a battery. The same battery supplies a current of 0.5A when connected across a 9Ω resistor. The internal resistance of the battery is

A. 0.5Ω

B. $1/3 \Omega$

C. $1/4 \Omega$

D. 1Ω

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100. The earth is Flattened at the poles and bulges at the equator, this is due the fact that

A. The earth revolves around the sun in an elliptical orbit

B. The angular velocity of spinning about its axis is more at the equator

☒ C. The centrifugal force is more at the equator than at the poles

D. None of these