

- Write the number of significant figures in the measurement 0.00060320 m^2 .
 A) 7 B) 3 C) 5 D) 8
- A physical quantity P is related to four observables a , b , c and d as follows
 $P = a^3 b^2 / cd^2$. The percentage errors of measurement in a , b , c and d are 1%, 3%, 4% and 2% respectively. What is the percentage error in quantity P ?
 A) 13% B) 17% C) 10% D) 1%
- A man walks on a straight road from his home to a market 2.5 km away with a speed of 5 km h^{-1} . Finding the market closed, he instantly turns and walks back home with a speed of 7.5 km h^{-1} . What is the average speed ?
 A) 7 kmh^{-1} B) 6 kmh^{-1} C) 6.25 kmh^{-1} D) 0
- $\vec{A} + \vec{B} = \vec{A} - \vec{B}$ what is the angle between $\vec{A}$ and $\vec{B}$?
 A) 180° B) 45° C) 90° D) 60°
- A ball is being rotated in a circle of radius 5 m with a constant tangential velocity of 20 m/s. A stone is also being rotated in a circle of radius 4 m with a constant tangential velocity of 16 m/s. Which one of the following choices is true about both the circular motions ?
 A) Both have same angular velocity
 B) Both have different angular velocity
 C) Angular velocity of ball > angular velocity of stone
 D) Angular velocity of stone > angular velocity of ball
- A body is initially at rest. It undergoes one dimensional motion with constant acceleration. The power delivered to it at time t is proportional to
 A) $t^{1/2}$ B) t^2 C) $t^{3/2}$ D) t
- The escape velocities of two planets A and B are in the ratio 1 : 2. If the ratio of their radii respectively is 1 : 3, then the ratio of acceleration due to gravity of planet A to acceleration due to gravity of planet B will be

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B) 3/2

C) 2/3

D) 3/4

A

8. A force $\vec{F} = a\hat{i} + 3\hat{j} + 6\hat{k}$ is acting at a point $\vec{r} = 2\hat{i} - 6\hat{j} - 12\hat{k}$. The value of 'a' for which the angular momentum about the origin is conserved, is
 A) -1 B) 0 C) 1 D) 2
9. A wire stretches by 1 mm when a force is applied. If the same force is applied to a second wire of same material, half the length and double the radius, what will be the extension ?
 A) 0.125 mm B) 0.5 mm C) 1 mm D) 2 mm
10. A liquid drop splits into smaller droplets. Which of the following statements is true about the total surface energy ?
 A) It remains the same B) It decreases
 C) It increases D) It depends on density
11. Consider a sinusoidal wave described by $y(x,t) = a \sin(kx - \omega t + \phi)$. If phase difference between two points separated by distance Δx is $\frac{\pi}{2}$, then the ratio of $\frac{\Delta x}{\lambda}$ is
 A) $\frac{1}{8}$ B) $\frac{1}{4}$
 C) $\frac{1}{2}$ D) $\frac{1}{16}$
12. In a forced oscillation, average power supplied by external force is maximum when
 A) Driving force and displacement are in phase
 B) Driving force and velocity are in phase
 C) Displacement and velocity are in phase
 D) Natural and driving frequencies are different
13. A gas has molar heat capacities C_p and C_v . If $C_p - C_v = R$, then the ratio of slopes of adiabatic $P - V$ curve to isothermal $P - V$ curve at a point is
 A) γ B) 1
 C) $\frac{\gamma}{\gamma - 1}$ D) Undefined

14. Which statement correctly differentiates heat and internal energy (U) ?
- A) Heat is a state variable; internal energy is not
 - B) Internal energy is energy in transit; heat is stored energy of a system
 - C) Heat is the sum of molecular kinetic and potential energies; internal energy is energy transfer due to temperature difference
 - D) Internal energy is a state variable; heat is energy in transit, not a property of the system
15. How many electrons are there in a body having 8 micro coulomb of charge ?
- A) 8×10^{16}
 - B) 5×10^{13}
 - C) 5×10^{16}
 - D) 3×10^{13}
16. Which of the following is not an equipotential surface ?
- A) surface of a charged conductor
 - B) equatorial plane of a dipole
 - C) axial plane of a dipole
 - D) a spherical surface surrounding a point charge
17. Which of the following elements do not obey Ohm's law ?
- A) Aluminium
 - B) Copper
 - C) Germanium
 - D) Nickel
18. Which one of the following is used for making standard resistors ?
- A) Manganin
 - B) Iron
 - C) Steel
 - D) Silver
19. Which of the following have negative susceptibility ?
- A) Aluminium
 - B) Cobalt
 - C) Chromium
 - D) Copper
20. A toroid has a core of inner radius 25 cm and outer radius 26 cm around which 3500 turns of wire is wound. If a current of 11A flows through it, what is the magnetic field inside the core ?
- A) 0T
 - B) 0.03T
 - C) 0.3T
 - D) 3T
21. Which of the following factors do not affect mutual inductance of a coil ?
- A) Nature of the material
 - B) Current passing through the coil
 - C) Distance between the coils
 - D) Geometry of the coils

31. The amount of water formed by the combustion of 0.5 mol methane is
A) 36 g B) 18 g C) 1.8 g D) 3.6 g
32. The molarity of a solution obtained by diluting 1 molar 250 ml hydrochloric acid to 1,000 ml is
A) 0.5 M B) 2.5 M C) 0.05 M D) 0.25 M
33. Number of unpaired electrons in nitrogen atom is
A) 3 B) 1 C) 5 D) 7
34. Which of the following orbital is symmetrical around the nucleus ?
A) s orbital B) p orbital
C) d orbital D) all of the above
35. Rutherford's gold foil experiment demonstrate
A) The existence of electrons B) The existence of orbits
C) The existence of nucleus D) All of the above
36. Which one of the following is a primary cell ?
A) Lead storage battery B) Fuel cell
C) Dry cell D) Nickel cadmium cell
37. The molar concentration of hydronium ion in a solution having pH = 3 is
A) 10^3 molL^{-1} B) $10^{-2} \text{ molL}^{-1}$
C) 10^2 molL^{-1} D) $10^{-3} \text{ molL}^{-1}$
38. Milk is an example of
A) Sol B) Emulsion
C) Gel D) None of these
39. Modern periodic law was designed by
A) Mendeleev B) Henry Moseley
C) Lavoisier D) Neils Bohr

40. The element shows maximum electronegativity is
A) Oxygen B) Chlorine C) Fluorine D) Iodine
41. Syn gas is
A) $\text{CO}_2 + \text{H}_2$ B) $\text{CO} + \text{N}_2$ C) $\text{CO} + \text{H}_2$ D) $\text{CO}_2 + \text{N}_2$
42. In the Clark's method, the substance used to remove hardness of water is
A) CaCO_3 B) CaCl_2 C) CaSO_4 D) Ca(OH)_2
43. Sodium hexa meta phosphate is commercially called
A) Calgon B) Gypsum C) Heavy water D) Zeolites
44. The chemical which is industrially known as perhydrol is
A) Ethanol B) Isopropyl alcohol
C) Hydrogen peroxide D) Methyl alcohol
45. The hardest naturally occurring substance is
A) Diamond B) Rock salt
C) Fullerenes D) Graphite
46. Ammonia can be synthesised by using the method is
A) Ostwald's process B) Contact process
C) Lead chamber method D) Haber process
47. Oleum is
A) $\text{H}_2\text{S}_2\text{O}_7$ B) $\text{H}_2\text{S}_2\text{O}_6$ C) $\text{H}_2\text{S}_2\text{O}_5$ D) $\text{H}_2\text{S}_2\text{O}_4$
48. The 'silver' UK coin is an alloy of
A) Copper and zinc B) Copper and nickel
C) Copper and silver D) Copper and tin
49. Which of the following is a narrow spectrum antibiotic ?
A) Chloramphenicol B) Penicillin G
C) Ofloxacin D) None of the above

50. Which of the following is incorrect about Sucrolose ?

- i. Sucrolose is the first popular artificial sweetening agent
- ii. It is trichloro derivative of Sucrose
- iii. It does not provide Calories
- iv. It is stable at cooking temperature

A) Only i and ii

B) Only i and iv

C) Only i

D) All of the above i, ii, iii, iv

51. Which metal atom is present in Vitamin B₁₂ ?

A) Fe

B) Mg

C) Co

D) Cu

52. Which of the following is correct about Sucrose ?

- i. Sucrose is a reducing sugar
- ii. In Sucrose the two monosaccharides are held together by a glycosidic linkage
- iii. Hydrolysis of Sucrose brings about change in the sign of optical rotation from laevo to dextro

A) Only i and ii

B) Only i and iii

C) Only ii

D) All of the above i, ii and iii

53. The nitrogen base not present in RNA is

A) Adenine

B) Guanine

C) Cytosine

D) Thymine

54. The compound that gives a reddish brown precipitate on heating with Fehling's reagent is

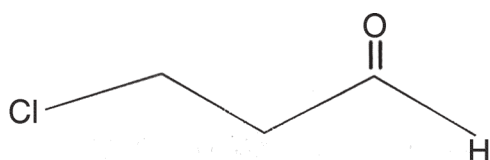
A) $\text{C}_6\text{H}_5 - \text{CHO}$

B) $\text{CH}_3 - \text{CHO}$

C) $\text{CH}_3 - \text{CO} - \text{CH}_3$

D) $\text{CH}_3 - \text{OH}$

55. Give the IUPAC name of the following compound.



A) 1-Chloropropanal

B) 1-Chloropropanol

C) 3-Chloropropanal

D) None of the above

63. The ratio of protein and lipid varies considerably in plasma membrane of different cells. The plasma membrane of human RBC has
- A) 40 percent proteins and 52 percent lipids
 - B) 40 percent lipids and 52 percent proteins
 - C) 40 percent proteins and 52 percent carbohydrates
 - D) 40 percent carbohydrates and 52 percent lipids
64. Pairing of homologous chromosome to form bivalent occur in which stage of meiosis ?
- A) Diplotene
 - B) Leptotene
 - C) Pachytene
 - D) Zygotene
65. Which of the following is a bacterial source of Single Cell Protein (SCP) ?
- A) *Methylophilus methylotrophus*
 - B) *Penicillium notatum*
 - C) *Saccharomyces Cerevisiae*
 - D) *Aspergillus niger*
66. Pusa Swarnim (Karan Rai) is resistant to which disease ?
- A) Rust of Wheat
 - B) Black rot
 - C) Leaf Curl virus
 - D) White rust
67. Which among the following are selectable marker of Pb-322 ?
- A) ampR, kanR
 - B) tetR, kanR
 - C) ampR, tetR
 - D) chlR, tetR
68. Cloning vector suitable for gene transfer in plants
- A) Ti Plasmid
 - B) Bacteriophage
 - C) YACs
 - D) pBR 322
69. The Selective marker in antibiotic resistant gene used in RDNA technology
- A) lacZ
 - B) LEU2
 - C) ampR
 - D) HIS3

70. Which of the following statement is correct about steps involved in Recombinant DNA technology ?

- a. Isolating a useful DNA segment from a donor organism.
- b. Homologous chromosome pair (Bivalents) lineup at equatorial plate.
- c. Splicing it into suitable vector to create a recombinant DNA.
- d. RNA polymerase moves along the template DNA strand.

- A) Only a and b
- B) Only c and d
- C) Only a and c
- D) All of the above

71. Which is an exception in an ecosystem where the sun is not the source of energy ?

- A) Deep-sea hydro thermal ecosystem
- B) Terrestrial ecosystem
- C) Lake ecosystem
- D) Desert ecosystem

72. What is the sequence of successional stages occurring in water called ?

- A) Xerarch succession
- B) Hydrarch succession
- C) Ecological succession
- D) Biological succession

73. One of the following is needed for the conversion of trypsinogen into trypsin

- A) HCl
- B) Enterokinase
- C) Lipase
- D) Zymase

74. Which of the following is removed from our body by the lungs ?

- A) CO₂ only
- B) H₂O only
- C) CO₂ and H₂O
- D) Ammonia

75. Which one of the following is pace maker of heart ?

- A) SA node
- B) AV node
- C) Both A) and B)
- D) None of these

76. Which of these is a bone of the appendicular skeleton ?
- A) Skull
B) Ribs
C) Clavicle
D) Sternum
77. The process where the blastocyst becomes firmly embedded in the uterine lining is called
- A) Fertilization
B) Ovulation
C) Cleavage
D) Implantation
78. Which hormone regulate sleep-wakeup cycle of the human body ?
- A) Prolactin
B) Cortisol
C) Progesterone
D) Melatonin
79. "Insecticides and pesticides used for controlling animal and plant diseases and pests, are toxic and have been polluting our environment." Biocontrol methods were developed for controlling these pathogens and pests. *Bacillus thuringiensis* (Bt), is a microbial agent used to control
- A) Aphids
B) Mosquitoes
C) Butterfly Caterpillars
D) Plant Root Pathogens
80. Common name of four vertebrate animals are given. From these identify the odd one with reference to presence or absence of jaw.
- A) Hag Fish
B) Angel Fish
C) Flying Fish
D) Dog Fish
81. "HIV is a member of virus group called Retrovirus." In HIV genetic information passes from
- A) Protein → DNA → RNA
B) DNA → Protein → RNA
C) RNA → Protein → DNA
D) RNA → DNA → Protein
82. "Human blood groups are determined by a single gene 1, this 1 gene have 3 alleles. These alleles form 6 genotype combinations. These genotypes have 4 phenotypic expressions, A, B, AB, O - blood groups." Of these 4 blood groups one is co-dominant. Identify the co-dominant from the following blood groups.
- A) O group
B) AB group
C) A group
D) B group

83. "The genetic make up of human male is 44 autosomes and 2 sex chromosomes, X and Y. In female, 44 autosomes and 2 sex chromosomes, XX." Which chromosome/ chromosomes determine the sex of the male child in human ?
 A) X chromosomes B) Autosomes
 C) X and Y chromosomes D) Y chromosome
84. The genetic code is composed of 64 codons. 61 codons code for 20 amino acids. 3 codons are stop codons and do not code for amino acids. From the codons given below find out the odd one.
 A) UAA B) AUG C) UAG D) UGA
85. "Microorganisms like Bacteria, Fungus, Yeast etc., are useful to humans for many purposes." From the names of Bacterias given, find out the Bacteria used for the production of Biogas.
 A) Methanobacterium B) Lactobacillus
 C) Acetobacter D) Clostridium
86. "A body cavity or coelom is characteristic in most of the animals." A false coelom or pseudocoelom is found in which of the invertebrate phylum ?
 A) Phylum : Annelida B) Phylum : Aschelminthes
 C) Phylum : Platyhelminthes D) None of these
87. If A and B are non-empty sets, then $(A \cap B) \cup (A - B)$ is equal to
 A) B B) B' C) A D) A'
88. If $n(A) = 10$, $n(A \times B) = 10$, then $n(B)$ is
 A) 10 B) 1 C) 0 D) None of these
89. Incorrect statement is
 A) $\cos\theta = 1$ B) $\sin\theta = \frac{-1}{5}$ C) $\sec\theta = \frac{1}{2}$ D) $\tan\theta = 0$
90. The domain of $f(x) = \sqrt{25 - x^2}$ is
 A) $[-5, 5]$ B) $(-5, 5)$ C) $x \leq 5$ D) $x \geq 5$
91. Let a, b be two real numbers between 3 and 81 such that the resulting sequence 3, a, b, 81 is in a geometric progression. The value of a + b is

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B) 27

C) 81

D) 36

A

92. The 30th term of the arithmetic progression 10, 7, 4,.....is

- A) - 67 B) - 77 C) - 87 D) 57

93. The slope of the straight line $\frac{x}{10} - \frac{y}{4} = 3$ is

- A) $\frac{2}{5}$ B) $\frac{3}{5}$ C) $\frac{3}{7}$ D) $\frac{7}{5}$

94. The value of λ for which the vectors $i+j-k$ and $\lambda i+3j+k$ are perpendicular to

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

95. If $|\vec{a}|=3$, $|\vec{b}|=4$ and $|\vec{a}-\vec{b}|=\sqrt{7}$, then $\vec{a} \cdot \vec{b}$ is equal to

- A) 8 B) 9 C) 10 D) 12

96. The eccentricity of the ellipse $x^2 + \frac{y^2}{4} = 1$ is

- A) $\frac{\sqrt{3}}{4}$ B) $\frac{\sqrt{3}}{2}$ C) $\frac{1}{2}$ D) $\frac{1}{\sqrt{3}}$

97. If $f(x) = x^6 + 6^x$, then $f'(x)$ is

- A) $12x$ B) $6x^5 + x.6^{x-1}$
C) $6x^5 + 6^x \log 6$ D) x^6

98. $\sin 765^\circ$ is equal to

- A) 1 B) $\frac{1}{2}$ C) $\frac{\sqrt{3}}{2}$ D) $\frac{1}{\sqrt{2}}$

99. The number of arrangements containing all the seven letters of the word 'ALRIGHT' that begins with LG is

- A) 520 B) 120 C) 340 D) 400

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100. In a group of 100 persons, 80 people can speak Malayalam and 60 can speak English.
Then the number of people who speak English only is

A) 25

B) 30

C) 40

D) 20

A

