

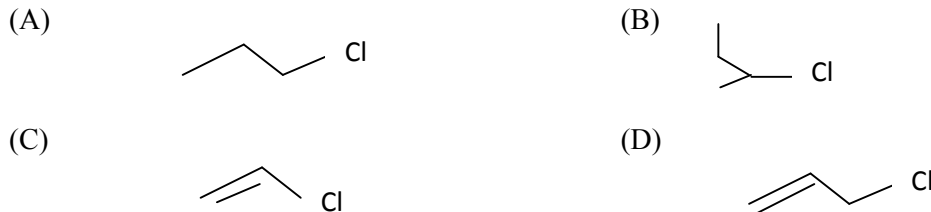
Sr. No.	Question
1.	A genome/ nucleoid consists of (A) Histone and RNA (B) A single double stranded DNA (C) A single stranded DNA (D) Histone and non-histone
2.	A bivalent consists of (A) Two chromatids and one chromosome (B) Four chromatids and two centromeres (C) Two chromatids and two centromeres (D) Four chromatids and four centromeres
3.	The mechanism of ATP formation both in chloroplast and mitochondria is explained in (A) Chemiosmotic theory (B) Munch's hypothesis (C) Relay pump theory (D) Cholodny-Wont's model
4.	Algae differs from Riccia and Marchantia in having (A) Multicellular body (B) Multicellular sex organs (C) Pyrenoids in the cell (D) Thalloid body
5.	Fern stele is a (A) Protostele (B) Dictyostele (C) Sphino-stele (D) None of these
6.	The protonema is a stage in the life cycle of (A) Riccia (B) Funaria (C) Bryophytes (D) Cycas
7.	Urcein dye is obtained from the lichen (A) Lasallia (B) Cladonia (C) Ramalin (D) Lecanora
8.	Schizolysigenous cavity is present in (A) Maize stem (B) Nymphaea root (C) Sunflower root (D) None of these
9.	An embryo may sometimes develop from cell of an embryo sac other than egg (A) Apospory (B) Partheogenesis (C) Parthenocarpy (D) Apogamy
10.	Systematic deals with (A) Identification of organisms (B) Classification of organisms (C) Diversity of all organisms and existing relationships amongst themselves (D) Identification, naming and classification of both plants and animals
11.	Plants need one of the following for ATP formation (A) N, P (B) N, Ca (C) K (D) N, Cu
12.	The overall goal of glycolysis, Krebs cycle and electron transport system is the formation of (A) Sugars (B) Nucleic acids (C) ATP in stepwise units (D) ATP in one large oxidation reaction
13.	A sudden change from anaerobic to aerobic process produces (A) Emerson effect (B) Hill reaction (C) Pasteur effect (D) Blackman's Law
14.	Root pressure occurs when there is: (A) More transpiration and more absorption (B) Less transpiration and more absorption (C) Less transpiration and less absorption (D) More transpiration and less absorption
15.	At which times there is no net gaseous exchange between leaves and the atmosphere (A) Day time (B) Night time (C) Dawn and Dusk (D) Midnight

16. NADPH⁺ is reduced to NADPH in:
 (A) PSI (B) PSII
 (C) Non-cyclic photophosphorylation (D) Calvin cycle
17. A competitive inhibitor of succinate dehydrogenase is:
 (A) Malate (B) Oxaloacetate
 (C) α -ketoglutarate (D) Malonate
18. How many stomata cover the leaf surface?
 (A) 0.03-0.04% (B) 10%
 (C) 1-2% (D) 50%
19. Phytohormone which induces triple response is:
 (A) ABA (B) C₂H₄
 (C) IAA (D) GA₃
20. The pH of a solution is 8.3 what is the [OH]?
 (A) 5×10^{-9} (B) 1×10^{-7}
 (C) 2×10^{-6} (D) 5×10^{-6}
21. The electrophoresis technique that uses isoelectric focusing is:
 (A) AGE (B) PFGE
 (C) 2D-PAGE (D) SDS-PAGE
22. In infrared spectroscopy, which frequency range is known as fingerprint region:
 (A) 400-1400 cm⁻¹ (B) 1400-900 cm⁻¹
 (C) 900-600 cm⁻¹ (D) 600-250 cm⁻¹
23. Vaccination is an example of
 (A) Naturally acquired active immunity (B) Artificially acquired active immunity
 (C) Naturally acquired passive immunity (D) Artificially acquired passive immunity
24. Synthetic seed is produced by encapsulating somatic embryo with:
 (A) Sodium chloride (B) Sodium alginate
 (C) Calcium acetate (D) Sodium nitrate
25. In tissue culture medium, the embryoids formed from pollen grains are due to:
 (A) Cellular totipotency (B) Organogenesis
 (C) Double fertilization (D) Test tube culture
26. The phenomenon of the reversion of mature cells to meristematic state leading to formation of callus:
 (A) Redifferentiation (B) Dedifferentiation
 (C) Either (A) or (B) (D) None of these
27. In tomato, fruit is a:
 (A) Drupe (B) Berry
 (C) Pepo (D) Achene
28. The final phase of development is:
 (A) Juvenile (B) Maturity
 (C) Seedling (D) Senescence
29. The water potential of pure water at atmospheric pressure is:
 (A) -2.3 bar (B) +2.3 bar
 (C) zero bar (D) one bar
30. Synchronization of reproductive behavior of plants with their environment is done by:
 (A) Photoperiod and vernalization (B) Respiration and vernalization
 (C) Transpiration and photoperiodism (D) Respiration and transpiration
31. National Science Day is celebrated on:
 (A) 5 June (B) 21 June
 (C) 28 February (D) 16 October

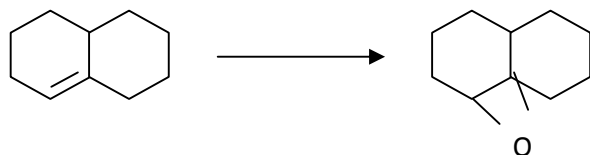
32. Which among the following monsoon is mainly responsible for rains in India?
 (A) South-East (B) North-West
 (C) South-West (D) North-East
33. Which gas is generally used in cold stores?
 (A) Ethylene (B) Oxygen
 (C) Methane (D) Acetelene
34. Growing of coconut, black pepper and ginger simultaneously in the same field is an example of:
 (A) Relay cropping (B) Intercropping
 (C) Multiple cropping (D) Multistoried_cropping
35. In pulses, limiting amino acids is:
 (A) Methionine (B) Valine
 (C) Lysine (D) Cystein
36. When a compressed gas is allowed to expand through a porous plug at a temperature above its inversion temperature, then
 (A) A fall in temperature is observed (B) A rise in temperature is observed
 (C) A rise after an initial fall in temperature is observed (D) No change in temperature is noticed
37. Gas A can be liquefied at room temperature by applying pressure but gas B cannot. This reflects
 (A) Critical temperature of B is less than that of A (B) Critical temperature of B is greater than that of A
 (C) Critical temperature of both A and B are greater than room temperature (D) No conclusion can be drawn on the critical temperature of A and B
38. Clausius-Clapeyron's equation gives the variation of
 (A) Boiling point of liquid with temperature (B) Vapour pressure of a liquid with temperature
 (C) Coefficient of viscosity of a liquid with pressure (D) Surface tension of a liquid with temperature
39. At any temperature T, the entropy of a solid substance (S_T) is given by the expression
 (A) $C_p dT$ (B) C_p / T
 (C) $\int_0^T C_p dT / T$ (D) $(C_p - C_v) / T$
40. The value of equilibrium constant for an endothermic reaction
 (A) Increases with increase in temperature (B) Decreases with increase in temperature
 (C) Is independent of temperature (D) Information not sufficient to draw any conclusion
41. Which of the following statement is not correct?
 (A) Fast reactions have low activation energy (B) Activation energy of a reaction depends on the chemical nature of reactants and products
 (C) A catalyst increases the rate of reaction by decreasing the activation energy of the reaction (D) With increase in temperature, the rate of reaction decreases in case of exothermic reactions
42. Which formula cannot be used to calculate the molar mass of a solute?
 (A) $\frac{K_b \times W_b \times 10^3}{\Delta T_b \times W_A}$ (B) $\frac{W_B RT}{\pi V}$
 (C) $\frac{\Delta T_b \times W_B \times 10^3}{K_b \times W_A}$ (D) $\frac{p_A^0 \times W_B \times M_A}{(p_A^0 - p) \times W_A}$

43. The EMF of the cell, $\text{Zn}|\text{Zn}^{2+}||\text{Ag}^+|\text{Ag}$ is independent of
 (A) The volume of Zn^{2+} and Ag^+ solutions (B) The molarity of Zn^{2+} ions in the solution
 (C) The molarity of Ag^+ ions in the solution (D) Temperature
44. What happens when electric current is passed through aqueous of sodium chloride
 (A) O^2 is evolved at cathode (B) O^2 is evolved at anode
 (C) pH of the solution gradually decreases (D) pH of the solution gradually increases
45. The dimensions of rate constant for a first order reaction involve
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46. The $t_{1/2}$ of a first order reaction is found to be 2 minutes. The percentage of the reactant left after 360 seconds is
 (A) 12.5 (B) 25
 (C) 15 (D) 7.5
47. The net energy change in a reversible, cyclic process is
 (A) $3/2 RT$ (B) Zero
 (C) Always >0 (D) Always <0
48. The magnetic quantum number for the last electron in the sodium atom (atomic number $z=11$) is
 (A) 3 (B) 2
 (C) 1 (D) 0
49. The octahedral molecular shape is associated with -----hybridisation.
 (A) sp^3d (B) sp^3d^2
 (C) sp^3d^3 (D) sp^3
50. Which of the following is the strongest acid
 (A) Acetic acid (B) Propionic acid
 (C) Butanoic acid (D) Chloroacetic acid
51. An example of natural semi conductor is
 (A) boron (B) silicon
 (C) aluminium (D) Phosphorous
52. The ionic strength of a solution containing 0.02 M Na_2SO_4 and 0.01 M MgCl_2 is
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 (C) 0.09 (D) 0.1
53. Balmer series consists of lines in the spectral range
 (A) 100-180 nm (B) 230-340 nm
 (C) 400-700 nm (D) 900-1100 nm
54. Aluminium chloride is a/an
 (A) Lewis acid (B) Lewis base
 (C) Bronsted-Lowry acid (D) Arrhenius acid
55. The pH of 10^{-8} N HCl is approximately
 (A) 8 (B) 7.02
 (C) 7 (D) 6.96
56. Covalent character of the bond is maximum in the case of
 (A) LiCl (B) NaCl
 (C) KCl (D) CaCl_2
57. This species generally act as Bronsted acid and base
 (A) HSO_4^- (B) Na_2CO_3
 (C) NH_3 (D) OH^-
58. This serves as a differentiating solvent for HCl, H_2SO_4 and HNO_3
 (A) Liquid NH_3 (B) H_2O
 (C) Liquid CH_3COOH (D) C_6H_6

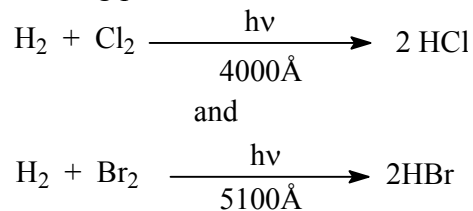
59. Silicon carbide widely used as an abrasive called carborundum belongs to the class of carbides known as
- (A) Ionic carbides (B) Interstitial carbides
(C) Covalent carbides (D) Silicates
60. Which of the following statement concerning probability density (Ψ^2) and radial distribution function ($4\pi r^2\Psi^2$) for s-orbital of H-like species is correct?
- (A) Ψ^2 is minimum at nucleus but $4\pi r^2\Psi^2$ is maximum at nucleus (B) Ψ^2 is maximum at nucleus but $4\pi r^2\Psi^2$ is minimum at nucleus
(C) Both Ψ^2 and $4\pi r^2\Psi^2$ are maximum at nucleus (D) Both Ψ^2 and $4\pi r^2\Psi^2$ are minimum at nucleus
61. Which conformer among the following is most unstable
- (A) (a,e) 1,2 - dimethyl cyclohexane (B) (a,e) 1,3 - dimethyl cyclohexane
(C) (a,a) 1,3 - dimethylcyclohexane (D) (a,a) 1,4 - dimethylcyclohexane
62. Which of the following compounds readily undergoes S_N1 reactions owing to the stability of its carbonium ion



63. Which reagent effects the following conversion?



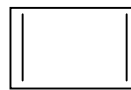
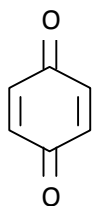
- (A) m- chloroperbenzoic acid (B) Acetic anhydride
(C) NaOH/ Br_2 (D) Acetic acid
64. Consider the following photochemical reactions:



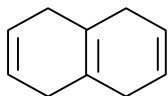
These reactions are the examples of which of the following?

- (A) Reactions of high and low quantum yields, respectively (B) Reactions of low and high quantum yields, respectively
(C) Reactions of quantum yields equal to one (D) Reactions of equal quantum yields but not equal to one

65. Which molecule is anti-aromatic among the following:
 (A) (B)



- (C) (D)



66. Acid strength of oxo-acids of halogens is in order

- (A) $\text{HOI} > \text{HOBr} > \text{HOCl} > \text{HOF}$ (B) $\text{HOF} > \text{HOCl} > \text{HOBr} > \text{HOI}$
 (C) $\text{HOCl} > \text{HOBr} > \text{HOI} > \text{HOF}$ (D) $\text{HOI} > \text{HOF} > \text{HOBr} > \text{HOCl}$

67. Teflon is synthesized by

- (A) Free radical polymerization of tetrafluoro ethylene (C_2F_4) (B) Condensation of hexane -1, 6- diamine and adipic acid
 (C) Condensation of E-amino caproic acid (D) Polymerization of Cyano ethylene

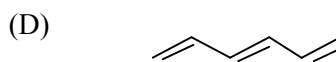
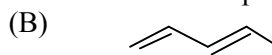
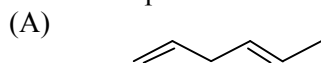
68. High resolution ^1H NMR spectrum of 1,3 – dichloropropane has _____ signals.

- (A) One triplet and one quintet (B) One triplet and one quartet
 (C) One triplet and two doublets (D) Two triplets and one quartet

69. Which heterocyclic compound is least aromatic among the following?

- (A) Furan (B) Pyrrole
 (C) Thiophene (D) Pyridine

70. Which compound will show the longest wavelength maxima in its UV spectrum?



71. Viroids differ from viruses for having:

- (A) Naked DNA molecule (B) Naked DNA molecule with viral genome
 (C) Naked RNA molecule (D) Satellite RNA molecule with viral genome

72. The character not chosen by Mendel for his work was:

- (A) Location of flower (B) Location of pod
 (C) Colour of flower (D) Colour of pod

73. Sickle cell anemia is an example of:

- (A) Missense mutation (B) Nonsense mutation
 (C) Silent mutation (D) Frame shift mutation

74. Constitutive genes are applicable to:

- (A) Operator genes (B) Overlapping genes
 (C) Housekeeping genes (D) Selfish genes

75. Multiple alleles are present:
 (A) At different loci on same chromosome (B) At same locus of the chromosome
 (C) On non-sister chromatids (D) On different chromosomes
76. Which one of the following is the basic structural and functional unit of ecology?
 (A) Ecotone (B) Ecosystem
 (C) Ecosphere (D) Ecotype
77. A type of behaviour in which animals learn to ignore stimulus which is repeated, is known as:
 (A) Habituation (B) Imprinting
 (C) Motivation (D) Sensitization
78. The ultimate source of organic evolution is:
 (A) Use and disuse of organs (B) Natural selection
 (C) Mutation (D) Isolation
79. PCR and Restricted Fragment Length Polymorphism are the methods of:
 (A) DNA Sequencing (B) Study of enzymes
 (C) Genetic fingerprinting (D) Genomic transformation
80. Which of the following is symbiotic nitrogen fixer?
 (A) *Azoll* (B) *Azotobacter*
 (C) *Glomus* (D) *Frankia*
81. Archenteron begins forming in:
 (A) Early gastrula (B) Late gastrula
 (C) Early morula (D) Blastula
82. Microbe used for biocontrol of pest butterfly caterpillars is:
 (A) *Trichoderma sp.* (B) *Saccharomyces cerevisiae*
 (C) *Bacillus thuringiensis* (D) *Streptococcus sp.*
83. The adults are radially symmetrical but larvae exhibit bilateral symmetry in:
 (A) Mollusca (B) Echinodermata
 (C) Hemichordata (D) Cephalochordata
84. A nerve has K^+ concentration:
 (A) More on the outside (B) Less on the outside
 (C) More on the inside (D) Equal on both sides of membrane
85. Amino acids proline, glycine, valine and threonine are coded by four codons each. It shows that the genetic code is:
 (A) Overlapping (B) Degenerate
 (C) Ambiguous (D) Universal
86. The frequency of 'O' blood group in children of parents belonging to blood group 'AB' is:
 (A) 0 per cent (B) 25 per cent
 (C) 50 per cent (D) 75 per cent
87. If a population becomes stagnant after exponential growth, its growth curve is:
 (A) Z-shaped (B) S-shaped
 (C) J-shaped (D) O-shaped
88. The era which includes maximum periods is:
 (A) Cenozoic (B) Proterozoic
 (C) Mesozoic (D) Palaeozoic
89. The commonly used vector (s) for human genome sequencing are:
 (A) T-DNA (B) BAC and YAC
 (C) Expression vectors (D) T&A cloning vectors
90. In earthworms, the fertilization takes place in:
 (A) Oviduct (B) Spermatheca
 (C) Clitellum (D) Cocoon

91. Whenever expression of a trait is limited to one sex, it is known as:
 (A) Sex linked trait (B) Sex influenced trait
 (C) Sex limited trait (D) None of these
92. Hirudin can be extracted from transgenic plant:
 (A) *Brassica napus* (B) *Bacillus napus*
 (C) *Bt* brinjal (D) *Bt Brassica napus*
93. Which of the following is not a bacterial disease:
 (A) Leprosy (B) Infantile paralysis
 (C) Diphtheria (D) Cholera
94. Complete linkage has been reported in:
 (A) Human male (B) Human female
 (C) Male *Drosophila* (D) Female *Drosophila*
95. Enzyme used in formation of cDNA from mRNA is:
 (A) RNA polymerase (B) DNA polymerase
 (C) Reverse transcriptase (D) Gyrase
96. Example of a digenetic parasite is:
 (A) *Entamoeba* (B) *Enterobium*
 (C) *Planaria* (D) *Schistosoma*
97. If the total amount of adenine and thymine in a double stranded DNA is 45%, the amount of Guanine in this DNA will be:
 (A) 22.5% (B) 27.5%
 (C) 45% (D) 55%
98. Modern classification is based on:
 (A) Physiology (B) Fossils
 (C) Phylogeny (D) Morphology
99. Considering fermentation at industrial level, micro-organism *Bacillus* is used to form:
 (A) Ethanol (B) Formic acid
 (C) Acrylic acid (D) Glycerol
100. Production of transgenic animals requires transfections of:
 (A) Egg or embryo (B) Stem cells
 (C) Red blood cells (D) All of these

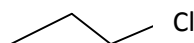
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2.	<p>In tomato, fruit is a:</p> <p>(A) Drupe (B) Berry (C) Pepo (D) Achene</p>
3.	<p>The final phase of development is:</p> <p>(A) Juvenile (B) Maturity (C) Seedling (D) Senescence</p>
4.	<p>The water potential of pure water at atmospheric pressure is:</p> <p>(A) -2.3 bar (B) $+2.3$ bar (C) zero bar (D) one bar</p>
5.	<p>Synchronization of reproductive behavior of plants with their environment is done by:</p> <p>(A) Photoperiod and vernalization (B) Respiration and vernalization (C) Transpiration and photoperiodism (D) Respiration and transpiration</p>
6.	<p>National Science Day is celebrated on:</p> <p>(A) 5 June (B) 21 June (C) 28 February (D) 16 October</p>
7.	<p>Which among the following monsoon is mainly responsible for rains in India?</p> <p>(A) South-East (B) North-West (C) South-West (D) North-East</p>
8.	<p>Which gas is generally used in cold stores?</p> <p>(A) Ethylene (B) Oxygen (C) Methane (D) Acetelene</p>
9.	<p>Growing of coconut, black pepper and ginger simultaneously in the same field is an example of:</p> <p>(A) Relay cropping (B) Intercropping (C) Multiple cropping (D) Multistoried_cropping</p>
10.	<p>In pulses, limiting amino acids is:</p> <p>(A) Methionine (B) Valine (C) Lysine (D) Cystein</p>
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13.	<p>Clausius-Clapeyron's equation gives the variation of</p> <p>(A) Boiling point of liquid with temperature (B) Vapour pressure of a liquid with temperature (C) Coefficient of viscosity of a liquid with pressure (D) Surface tension of a liquid with temperature</p>

14. At any temperature T , the entropy of a solid substance (S_T) is given by the expression
 (A) $C_p dT$ (B) C_p/T
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18. The EMF of the cell, $Zn|Zn^{2+}||Ag^+|Ag$ is independent of
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 (A) sp^3d (B) sp^3d^2
 (C) sp^3d^3 (D) sp^3

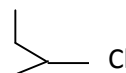
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 (C) Covalent carbides (D) Silicates
35. Which of the following statement concerning probability density (Ψ^2) and radial distribution function ($4\pi r^2\Psi^2$) for s-orbital of H-like species is correct?
 (A) Ψ^2 is minimum at nucleus but $4\pi r^2\Psi^2$ is maximum at nucleus (B) Ψ^2 is maximum at nucleus but $4\pi r^2\Psi^2$ is minimum at nucleus
 (C) Both Ψ^2 and $4\pi r^2\Psi^2$ are maximum at nucleus (D) Both Ψ^2 and $4\pi r^2\Psi^2$ are minimum at nucleus
36. Which conformer among the following is most unstable
 (A) (a,e) 1,2 – dimethyl cyclohexane (B) (a,e) 1,3 – dimethyl cyclohexane
 (C) (a,a) 1,3 - dimethylcyclohexane (D) (a,a) 1,4 – dimethylcyclohexane

37. Which of the following compounds readily undergoes S_N1 reactions owing to the stability of its carbonium ion

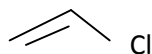
(A)



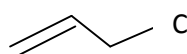
(B)



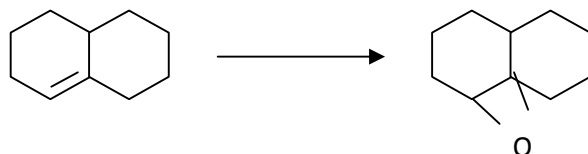
(C)



(D)



38. Which reagent effects the following conversion?



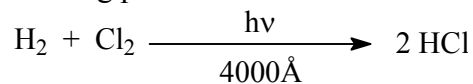
(A) m-chloroperbenzoic acid

(B) Acetic anhydride

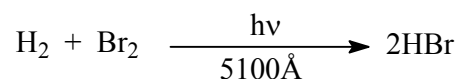
(C) NaOH/ Br_2

(D) Acetic acid

39. Consider the following photochemical reactions:



and



These reactions are the examples of which of the following?

(A) Reactions of high and low quantum yields, respectively

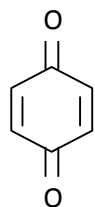
(B) Reactions of low and high quantum yields, respectively

(C) Reactions of quantum yields equal to one

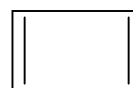
(D) Reactions of equal quantum yields but not equal to one

40. Which molecule is anti-aromatic among the following:

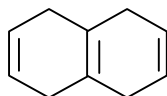
(A)



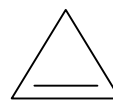
(B)



(C)



(D)



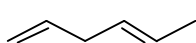
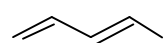
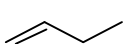
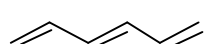
41. Acid strength of oxo-acids of halogens is in order

(A) $HOI > HOBr > HOCl > HOF$

(B) $HOF > HOCl > HOBr > HOI$

(C) $HOCl > HOBr > HOI > HOF$

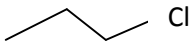
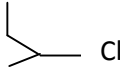
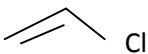
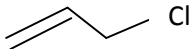
(D) $HOI > HOF > HOBr > HOCl$

42. Teflon is synthesized by
 (A) Free radical polymerization of tetrafluoro ethylene (C₂F₄) (B) Condensation of hexane -1, 6- diamine and adipic acid
 (C) Condensation of E-amino caproic acid (D) Polymerization of Cyano ethylene
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 (A)  (B) 
 (C)  (D) 
46. Viroids differ from viruses for having:
 (A) Naked DNA molecule (B) Naked DNA molecule with viral genome
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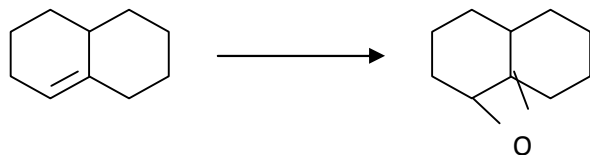
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 (C) Sex limited trait (D) None of these
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 (A) *Brassica napus* (B) *Bacillus napus*
 (C) *Bt* brinjal (D) *Bt Brassica napus*
68. Which of the following is not a bacterial disease:
 (A) Leprosy (B) Infantile paralysis
 (C) Diphtheria (D) Cholera
69. Complete linkage has been reported in:
 (A) Human male (B) Human female
 (C) Male *Drosophila* (D) Female *Drosophila*

70. Enzyme used in formation of cDNA from mRNA is:
 (A) RNA polymerase (B) DNA polymerase
 (C) Reverse transcriptase (D) Gyrase
71. Example of a digenetic parasite is:
 (A) *Entamoeba* (B) *Enterobium*
 (C) *Planaria* (D) *Schistosoma*
72. If the total amount of adenine and thymine in a double stranded DNA is 45%, the amount of Guanine in this DNA will be:
 (A) 22.5% (B) 27.5%
 (C) 45% (D) 55%
73. Modern classification is based on:
 (A) Physiology (B) Fossils
 (C) Phylogeny (D) Morphology
74. Considering fermentation at industrial level, micro-organism *Bacillus* is used to form:
 (A) Ethanol (B) Formic acid
 (C) Acrylic acid (D) Glycerol
75. Production of transgenic animals requires transfections of:
 (A) Egg or embryo (B) Stem cells
 (C) Red blood cells (D) All of these
76. A genome/ nucleoid consists of
 (A) Histone and RNA (B) A single double stranded DNA
 (C) A single stranded DNA (D) Histone and non-histone
77. A bivalent consists of
 (A) Two chromatids and one chromosome (B) Four chromatids and two centromeres
 (C) Two chromatids and two centromeres (D) Four chromatids and four centromeres
78. The mechanism of ATP formation both in chloroplast and mitochondria is explained in
 (A) Chemiosmotic theory (B) Munch's hypothesis
 (C) Relay pump theory (D) Cholodny-Wont's model
79. Algae differs from Riccia and Marchantia in having
 (A) Multicellular body (B) Multicellular sex organs
 (C) Pyrenoids in the cell (D) Thalloid body
80. Fern stele is a
 (A) Protostele (B) Dictyostele
 (C) Sphinocele (D) None of these
81. The protonema is a stage in the life cycle of
 (A) Riccia (B) Funaria
 (C) Bryophytes (D) Cycas
82. Urcein dye is obtained from the lichen
 (A) Lasallia (B) Cladonia
 (C) Ramalin (D) Lecanora
83. Schizolysigenous cavity is present in
 (A) Maize stem (B) Nymphaea root
 (C) Sunflower root (D) None of these
84. An embryo may sometimes develop from cell of an embryo sac other than egg
 (A) Apospory (B) Partheogenesis
 (C) Parthenocarpy (D) Apogamy
85. Systematic deals with
 (A) Identification of organisms (B) Classification of organisms
 (C) Diversity of all organisms and existing relationships amongst themselves (D) Identification, naming and classification of both plants and animals

86. Plants need one of the following for ATP formation
 (A) N, P (B) N, Ca
 (C) K (D) N, Cu
87. The overall goal of glycolysis, Krebs cycle and electron transport system is the formation of
 (A) Sugars (B) Nucleic acids
 (C) ATP in stepwise units (D) ATP in one large oxidation reaction
88. A sudden change from anaerobic to aerobic process produces
 (A) Emerson effect (B) Hill reaction
 (C) Pasteur effect (D) Blackman's Law
89. Root pressure occurs when there is:
 (A) More transpiration and more absorption (B) Less transpiration and more absorption
 (C) Less transpiration and less absorption (D) More transpiration and less absorption
90. At which times there is no net gaseous exchange between leaves and the atmosphere
 (A) Day time (B) Night time
 (C) Dawn and Dusk (D) Midnight
91. NADPH^+ is reduced to NADPH in:
 (A) PSI (B) PSII
 (C) Non-cyclic photophosphorylation (D) Calvin cycle
92. A competitive inhibitor of succinate dehydrogenase is:
 (A) Malate (B) Oxaloacetate
 (C) α - ketoglutarate (D) Malonate
93. How many stomata cover the leaf surface?
 (A) 0.03-0.04% (B) 10%
 (C) 1-2% (D) 50%
94. Phytohormone which induces triple response is:
 (A) ABA (B) C_2H_4
 (C) IAA (D) GA_3
95. The pH of a solution is 8.3 what is the $[\text{OH}]$?
 (A) 5×10^{-9} (B) 1×10^{-7}
 (C) 2×10^{-6} (D) 5×10^{-6}
96. The electrophoresis technique that uses isoelectric focusing is:
 (A) AGE (B) PFGE
 (C) 2D-PAGE (D) SDS-PAGE
97. In infrared spectroscopy, which frequency range is known as fingerprint region:
 (A) $400\text{-}1400 \text{ cm}^{-1}$ (B) $1400\text{-}900 \text{ cm}^{-1}$
 (C) $900\text{-}600 \text{ cm}^{-1}$ (D) $600\text{-}250 \text{ cm}^{-1}$
98. Vaccination is an example of
 (A) Naturally acquired active immunity (B) Artificially acquired active immunity
 (C) Naturally acquired passive immunity (D) Artificially acquired passive immunity
99. Synthetic seed is produced by encapsulating somatic embryo with:
 (A) Sodium chloride (B) Sodium alginate
 (C) Calcium acetate (D) Sodium nitrateP
100. In tissue culture medium, the embryoids formed from pollen grains are due to:
 (A) Cellular totipotency (B) Organogenesis
 (C) Double fertilization (D) Test tube culture

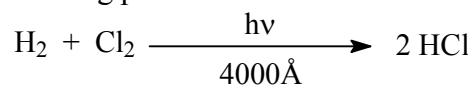
Sr. No.	Question
1.	An example of natural semi conductor is (A) boron (B) silicon (C) aluminium (D) Phosphorous
2.	The ionic strength of a solution containing 0.02 M Na_2SO_4 and 0.01 M MgCl_2 is (A) 0.03 (B) 0.06 (C) 0.09 (D) 0.1
3.	Balmer series consists of lines in the spectral range (A) 100-180 nm (B) 230-340 nm (C) 400-700 nm (D) 900-1100 nm
4.	Aluminium chloride is a/an (A) Lewis acid (B) Lewis base (C) Bronsted-Lowry acid (D) Arrhenius acid
5.	The pH of 10^{-8} N HCl is approximately (A) 8 (B) 7.02 (C) 7 (D) 6.96
6.	Covalent character of the bond is maximum in the case of (A) LiCl (B) NaCl (C) KCl (D) CaCl_2
7.	This species generally act as Bronsted acid and base (A) HSO_4^- (B) Na^2CO_3 (C) NH_3 (D) OH^-
8.	This serves as a differentiating solvent for HCl, H_2SO_4 and HNO_3 (A) Liquid NH_3 (B) H_2O (C) Liquid CH_3COOH (D) C_6H_6
9.	Silicon carbide widely used as an abrasive called carborundum belongs to the class of carbides known as (A) Ionic carbides (B) Interstitial carbides (C) Covalent carbides (D) Silicates
10.	Which of the following statement concerning probability density (Ψ^2) and radial distribution function ($4\pi r^2\Psi^2$) for s-orbital of H-like species is correct? (A) Ψ^2 is minimum at nucleus but $4\pi r^2\Psi^2$ is maximum at nucleus (B) Ψ^2 is maximum at nucleus but $4\pi r^2\Psi^2$ is minimum at nucleus (C) Both Ψ^2 and $4\pi r^2\Psi^2$ are maximum at nucleus (D) Both Ψ^2 and $4\pi r^2\Psi^2$ are minimum at nucleus
11.	Which conformer among the following is most unstable (A) (a,e) 1,2 – dimethyl cyclohexane (B) (a,e) 1,3 – dimethyl cyclohexane (C) (a,a) 1,3 - dimethylcyclohexane (D) (a,a) 1,4 – dimethylcyclohexane
12.	Which of the following compounds readily undergoes $\text{S}_{\text{N}}1$ reactions owing to the stability of its carbonium ion (A)  Cl (B)  Cl (C)  Cl (D)  Cl

13. Which reagent effects the following conversion?

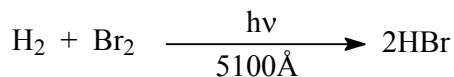


- (A) m- chloroperbenzoic acid
 (B) Acetic anhydride
 (C) NaOH/Br₂
 (D) Acetic acid

14. Consider the following photochemical reactions:



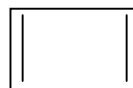
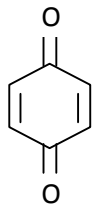
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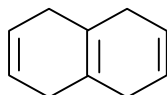
These reactions are the examples of which of the following?

- (A) Reactions of high and low quantum yields, respectively
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 (C) Reactions of quantum yields equal to one
 (D) Reactions of equal quantum yields but not equal to one
15. Which molecule is anti-aromatic among the following:

- (A) (B)



- (C) (D)



16. Acid strength of oxo-acids of halogens is in order

- (A) HOI > HOBr > HOCl > HOF
 (B) HOF > HOCl > HOBr > HOI
 (C) HOCl > HOBr > HOI > HOF
 (D) HOI > HOF > HOBr > HOCl

17. Teflon is synthesized by

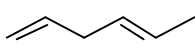
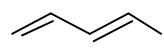
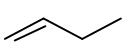
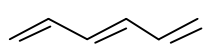
- (A) Free radical polymerization of tetrafluoro ethylene (C₂F₄)
 (B) Condensation of hexane -1, 6- diamine and adipic acid
 (C) Condensation of E-amino caproic acid
 (D) Polymerization of Cyano ethylene

18. High resolution ¹H NMR spectrum of 1,3 – dichloropropane has _____ signals.

- (A) One triplet and one quintet
 (B) One triplet and one quartet
 (C) One triplet and two doublets
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19. Which heterocyclic compound is least aromatic among the following?

- (A) Furan
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20. Which compound will show the longest wavelength maxima in its UV spectrum?
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22. The character not chosen by Mendel for his work was:
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 (C) Male *Drosophila* (D) Female *Drosophila*
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- (A) sp^3d (B) sp^3d^2
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- (A) Acetic acid (B) Propionic acid
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Sr. No.	Question
1.	Which one of the following is the basic structural and functional unit of ecology? (A) Ecotone (B) Ecosystem (C) Ecosphere (D) Ecotype
2.	A type of behaviour in which animals learn to ignore stimulus which is repeated, is known as: (A) Habituation (B) Imprinting (C) Motivation (D) Sensitization
3.	The ultimate source of organic evolution is: (A) Use and disuse of organs (B) Natural selection (C) Mutation (D) Isolation
4.	PCR and Restricted Fragment Length Polymorphism are the methods of: (A) DNA Sequencing (B) Study of enzymes (C) Genetic fingerprinting (D) Genomic transformation
5.	Which of the following is symbiotic nitrogen fixer? (A) <i>Azoll</i> (B) <i>Azotobacter</i> (C) <i>Glomus</i> (D) <i>Frankia</i>
6.	Archenteron begins forming in: (A) Early gastrula (B) Late gastrula (C) Early morula (D) Blastula
7.	Microbe used for biocontrol of pest butterfly caterpillars is: (A) <i>Trichoderma sp.</i> (B) <i>Saccharomyces cerevisiae</i> (C) <i>Bacillus thuringiensis</i> (D) <i>Streptococcus sp.</i>
8.	The adults are radially symmetrical but larvae exhibit bilateral symmetry in: (A) Mollusca (B) Echinodermata (C) Hemichordata (D) Cephalochordata
9.	A nerve has K ⁺ concentration: (A) More on the outside (B) Less on the outside (C) More on the inside (D) Equal on both sides of membrane
10.	Amino acids proline, glycine, valine and threonine are coded by four codons each. It shows that the genetic code is: (A) Overlapping (B) Degenerate (C) Ambiguous (D) Universal
11.	The frequency of 'O' blood group in children of parents belonging to blood group 'AB' is: (A) 0 per cent (B) 25 per cent (C) 50 per cent (D) 75 per cent
12.	If a population becomes stagnant after exponential growth, its growth curve is: (A) Z-shaped (B) S-shaped (C) J-shaped (D) O-shaped
13.	The era which includes maximum periods is: (A) Cenozoic (B) Proterozoic (C) Mesozoic (D) Palaeozoic
14.	The commonly used vector (s) for human genome sequencing are: (A) T-DNA (B) BAC and YAC (C) Expression vectors (D) T&A cloning vectors

15. In earthworms, the fertilization takes place in:
 (A) Oviduct (B) Spermatheca
 (C) Clitellum (D) Cocoon
16. Whenever expression of a trait is limited to one sex, it is known as:
 (A) Sex linked trait (B) Sex influenced trait
 (C) Sex limited trait (D) None of these
17. Hirudin can be extracted from transgenic plant:
 (A) *Brassica napus* (B) *Bacillus napus*
 (C) *Bt brinjal* (D) *Bt Brassica napus*
18. Which of the following is not a bacterial disease:
 (A) Leprosy (B) Infantile paralysis
 (C) Diphtheria (D) Cholera
19. Complete linkage has been reported in:
 (A) Human male (B) Human female
 (C) Male *Drosophila* (D) Female *Drosophila*
20. Enzyme used in formation of cDNA from mRNA is:
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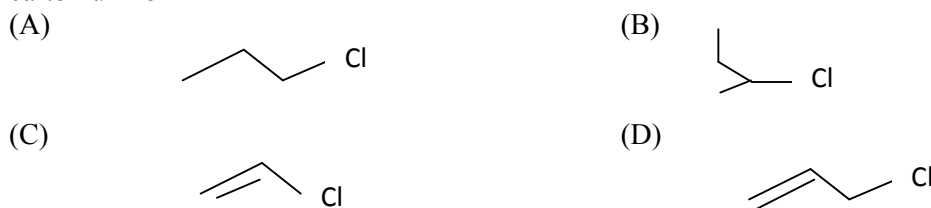
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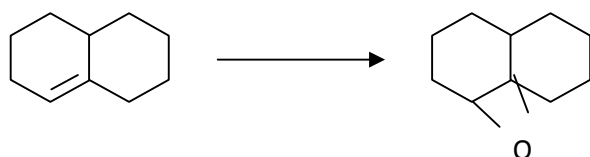
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76. An example of natural semi conductor is
 (A) boron (B) silicon
 (C) aluminium (D) Phosphorous
77. The ionic strength of a solution containing 0.02 M Na_2SO_4 and 0.01 M $MgCl_2$ is
 (A) 0.03 (B) 0.06
 (C) 0.09 (D) 0.1
78. Balmer series consists of lines in the spectral range
 (A) 100-180 nm (B) 230-340 nm
 (C) 400-700 nm (D) 900-1100 nm
79. Aluminium chloride is a/an
 (A) Lewis acid (B) Lewis base
 (C) Bronsted-Lowry acid (D) Arrhenius acid
80. The pH of 10^{-8} N HCl is approximately
 (A) 8 (B) 7.02
 (C) 7 (D) 6.96
81. Covalent character of the bond is maximum in the case of
 (A) LiCl (B) NaCl
 (C) KCl (D) $CaCl_2$
82. This species generally act as Bronsted acid and base
 (A) HSO_4^- (B) Na_2CO_3
 (C) NH_3 (D) OH^-
83. This serves as a differentiating solvent for HCl, H_2SO_4 and HNO_3
 (A) Liquid NH_3 (B) H_2O
 (C) Liquid CH_3COOH (D) C_6H_6
84. Silicon carbide widely used as an abrasive called carborundum belongs to the class of carbides known as
 (A) Ionic carbides (B) Interstitial carbides
 (C) Covalent carbides (D) Silicates

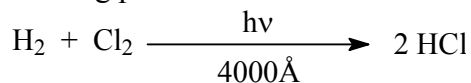
85. Which of the following statement concerning probability density (Ψ^2) and radial distribution function ($4\pi r^2\Psi^2$) for s-orbital of H-like species is correct?
- (A) Ψ^2 is minimum at nucleus but $4\pi r^2\Psi^2$ is maximum at nucleus
 (B) Ψ^2 is maximum at nucleus but $4\pi r^2\Psi^2$ is minimum at nucleus
 (C) Both Ψ^2 and $4\pi r^2\Psi^2$ are maximum at nucleus
 (D) Both Ψ^2 and $4\pi r^2\Psi^2$ are minimum at nucleus
86. Which conformer among the following is most unstable
- (A) (a,e) 1,2 – dimethyl cyclohexane
 (B) (a,e) 1,3 – dimethyl cyclohexane
 (C) (a,a) 1,3 - dimethylcyclohexane
 (D) (a,a) 1,4 – dimethylcyclohexane
87. Which of the following compounds readily undergoes S_N1 reactions owing to the stability of its carbonium ion



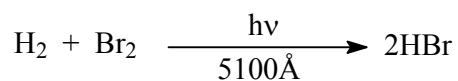
88. Which reagent effects the following conversion?



- (A) m- chloroperbenzoic acid
 (B) Acetic anhydride
 (C) NaOH/ Br_2
 (D) Acetic acid
89. Consider the following photochemical reactions:



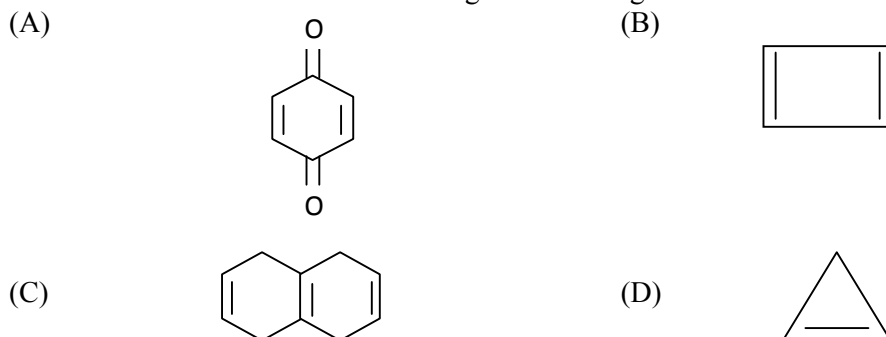
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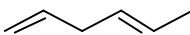
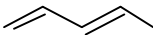
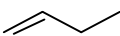
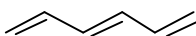


These reactions are the examples of which of the following?

- (A) Reactions of high and low quantum yields, respectively
 (B) Reactions of low and high quantum yields, respectively
 (C) Reactions of quantum yields equal to one
 (D) Reactions of equal quantum yields but not equal to one

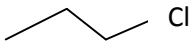
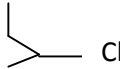
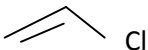
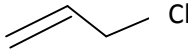
90. Which molecule is anti-aromatic among the following:



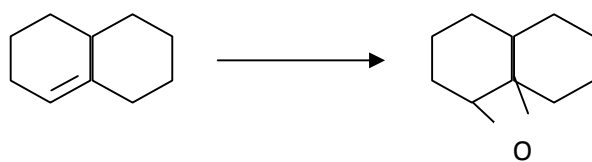
91. Acid strength of oxo-acids of halogens is in order
 (A) $\text{HOI} > \text{HOBr} > \text{HOCl} > \text{HOF}$ (B) $\text{HOF} > \text{HOCl} > \text{HOBr} > \text{HOI}$
 (C) $\text{HOCl} > \text{HOBr} > \text{HOI} > \text{HOF}$ (D) $\text{HOI} > \text{HOF} > \text{HOBr} > \text{HOCl}$
92. Teflon is synthesized by
 (A) Free radical polymerization of tetrafluoro ethylene (C_2F_4) (B) Condensation of hexane -1, 6- diamine and adipic acid
 (C) Condensation of E-amino caproic acid (D) Polymerization of Cyano ethylene
93. High resolution ^1H NMR spectrum of 1,3 – dichloropropane has _____ signals.
 (A) One triplet and one quintet (B) One triplet and one quartet
 (C) One triplet and two doublets (D) Two triplets and one quartet
94. Which heterocyclic compound is least aromatic among the following?
 (A) Furan (B) Pyrrole
 (C) Thiophene (D) Pyridine
95. Which compound will show the longest wavelength maxima in its UV spectrum?
 (A)  (B) 
 (C)  (D) 
96. Viroids differ from viruses for having:
 (A) Naked DNA molecule (B) Naked DNA molecule with viral genome
 (C) Naked RNA molecule (D) Satellite RNA molecule with viral genome
97. The character not chosen by Mendel for his work was:
 (A) Location of flower (B) Location of pod
 (C) Colour of flower (D) Colour of pod
98. Sickle cell anemia is an example of:
 (A) Missense mutation (B) Nonsense mutation
 (C) Silent mutation (D) Frame shift mutation
99. Constitutive genes are applicable to:
 (A) Operator genes (B) Overlapping genes
 (C) Housekeeping genes (D) Selfish genes
100. Multiple alleles are present:
 (A) At different loci on same chromosome (B) At same locus of the chromosome
 (C) On non-sister chromatids (D) On different chromosomes

Sr. No.	Question
1.	When a compressed gas is allowed to expand through a porous plug at a temperature above its inversion temperature, then (A) A fall in temperature is observed (B) A rise in temperature is observed (C) A rise after an initial fall in temperature is observed (D) No change in temperature is noticed
2.	Gas A can be liquefied at room temperature by applying pressure but gas B cannot. This reflects (A) Critical temperature of B is less than that of A (B) Critical temperature of B is greater than that of A (C) Critical temperature of both A and B are greater than room temperature (D) No conclusion can be drawn on the critical temperature of A and B
3.	Clausius-Clapeyron's equation gives the variation of (A) Boiling point of liquid with temperature (B) Vapour pressure of a liquid with temperature (C) Coefficient of viscosity of a liquid with pressure (D) Surface tension of a liquid with temperature
4.	At any temperature T, the entropy of a solid substance (S_T) is given by the expression (A) $C_p dT$ (B) C_p/T (C) $\int_0^T C_p dT / T$ (D) $(C_p - C_v)/T$
5.	The value of equilibrium constant for an endothermic reaction (A) Increases with increases of temperature (B) Decreases with increase of temperature (C) Is independent of temperature (D) Information not sufficient to draw any conclusion
6.	Which of the following statement is not correct? (A) Fast reactions have low activation energy (B) Activation energy of a reaction depends on the chemical nature of reactants and products (C) A catalyst increases the rate of reaction by decreasing the activation energy of the reaction (D) With increase in temperature, the rate of reaction decreases in case of exothermic reactions
7.	Which formula cannot be used to calculate the molar mass of a solute? (A) $\frac{K_b \times W_b \times 10^3}{\Delta T_b \times W_A}$ (B) $\frac{W_B RT}{\pi V}$ (C) $\frac{\Delta T_b \times W_B \times 10^3}{K_b \times W_A}$ (D) $\frac{p_A^0 \times W_B \times M_A}{(p_A^0 - p) \times W_A}$
8.	The EMF of the cell, $Zn Zn^{2+} Ag^+ Ag$ is independent of (A) The volume of Zn^{2+} and Ag^+ solutions (B) The molarity of Zn^{2+} ions in the solution (C) The molarity of Ag^+ ions in the solution (D) Temperature

9. What happens when electric current is passed through aqueous of sodium chloride
 (A) O^2 is evolved at cathode (B) O^2 is evolved at anode
 (C) pH of the solution gradually decreases (D) pH of the solution gradually increases
10. The dimensions of rate constant for a first order reaction involve
 (A) Time and concentration (B) Time only
 (C) Concentration only (D) Neither time nor concentration
11. The $t_{1/2}$ of a first order reaction is found to be 2 minutes. The percentage of the reaction left after 360 seconds is
 (A) 12.5 (B) 25
 (C) 15 (D) 7.5
12. The net energy change in a reversible, cyclic process is
 (A) $3/2 RT$ (B) Zero
 (C) Always >0 (D) Always <0
13. The magnetic quantum number for the last electron in the sodium atom (atomic number $z=11$) is
 (A) 3 (B) 2
 (C) 1 (D) 0
14. The octahedral molecular shape is associated with -----hybridisation.
 (A) sp^3d (B) sp^3d^2
 (C) sp^3d^3 (D) sp^3
15. Which of the following is the strongest acid
 (A) Acetic acid (B) Propionic acid
 (C) Butanoic acid (D) Chloroacetic acid
16. An example of natural semi conductor is
 (A) boron (B) silicon
 (C) aluminium (D) phosphorous
17. The ionic strength of a solution containing 0.02 M Na_2SO_4 and 0.01 M $MgCl_2$ is
 (A) 0.03 (B) 0.06
 (C) 0.09 (D) 0.1
18. Balmer series consists of lines in the spectral range
 (A) 100-180 nm (B) 230-340 nm
 (C) 400-700 nm (D) 900-1100 nm
19. Aluminium chloride is a/an
 (A) Lewis acid (B) Lewis base
 (C) Bronsted-Lowry acid (D) Arrhenius acid
20. The pH of 10^{-8} N HCl is approximately
 (A) 8 (B) 7.02
 (C) 7 (D) 6.96
21. Covalent character of the bond is maximum in the case of
 (A) LiCl (B) NaCl
 (C) KCl (D) $CaCl_2$
22. This species generally act as Bronsted acid and base
 (A) HSO_4^- (B) Na_2CO_3
 (C) NH_3 (D) OH^-

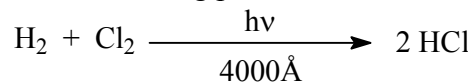
23. This serves as a differentiating solvent for HCl, H₂SO₄ and HNO₃
 (A) Liquid NH₃ (B) H₂O
 (C) Liquid CH₃COOH (D) C₆H₆
24. Silicon carbide widely used as an abrasive called carborundum belongs to the class of carbides known as
 (A) Ionic carbides (B) Interstitial carbides
 (C) Covalent carbides (D) Silicates
25. Which of the following statement concerning probability density (Ψ^2) and radial distribution function ($4\pi r^2\Psi^2$) for s-orbital of H-like species is correct?
 (A) Ψ^2 is minimum at nucleus but $4\pi r^2\Psi^2$ is maximum at nucleus (B) Ψ^2 is maximum at nucleus but $4\pi r^2\Psi^2$ is minimum at nucleus
 (C) Both Ψ^2 and $4\pi r^2\Psi^2$ are maximum at nucleus (D) Both Ψ^2 and $4\pi r^2\Psi^2$ are minimum at nucleus
26. Which conformer among the following is most unstable
 (A) (a,e) 1,2 - dimethyl cyclohexane (B) (a,e) 1,3 - dimethyl cyclohexane
 (C) (a,a) 1,3 - dimethylcyclohexane (D) (a,a) 1,4 - dimethylcyclohexane
27. Which of the following compounds readily undergoes S_N1 reactions owing to the stability of its carbonium ion
 (A)  Cl (B)  Cl
 (C)  Cl (D)  Cl

28. Which reagent effects the following conversion?

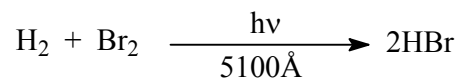


- (A) m- chloroperbenzoic acid (B) Acetic anhydride
 (C) NaOH/Br₂ (D) Acetic acid

29. 1. Consider the following photochemical reactions:



and

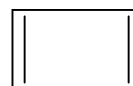
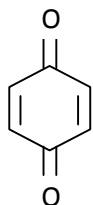


These reactions are the examples of which of the following?

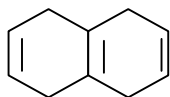
- (A) Reactions of high and low quantum yields, respectively
 (B) Reactions of low and high quantum yields, respectively
 (C) Reactions of quantum yields equal to one
 (D) Reactions of equal quantum yields but not equal to one

30. Which molecule is anti-aromatic among the following:

- (A) (B)



- (C) (D)



31. Acid strength of oxo-acids of halogens is in order

- (A) $\text{HOI} > \text{HOBr} > \text{HOCl} > \text{HOF}$
 (B) $\text{HOF} > \text{HOCl} > \text{HOBr} > \text{HOI}$
 (C) $\text{HOCl} > \text{HOBr} > \text{HOI} > \text{HOF}$
 (D) $\text{HOI} > \text{HOF} > \text{HOBr} > \text{HOCl}$

32. Teflon is synthesized by

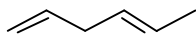
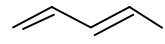
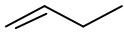
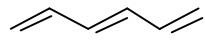
- (A) Free radical polymerization of tetrafluoro ethylene (C_2F_4)
 (B) Condensation of hexane -1, 6- diamine and adipic acid
 (C) Condensation of E-amino caproic acid
 (D) Polymerization of Cyano ethylene

33. High resolution ^1H NMR spectrum of 1,3 – dichloropropane has _____ signals.

- (A) One triplet and one quintet
 (B) One triplet and one quartet
 (C) One triplet and two doublets
 (D) Two triplets and one quartet

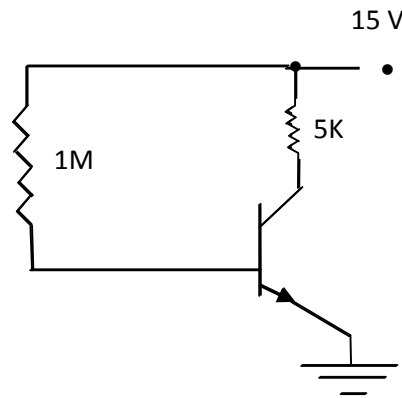
34. Which heterocyclic compound is least aromatic among the following?

- (A) Furan
 (B) Pyrrole
 (C) Thiophene
 (D) Pyridine

35. Which compound will show the longest wavelength maxima in its UV spectrum?
- (A)  (B) 
- (C)  (D) 
36. The $2^+ \rightarrow 0^+$ transition is a ____ transition:
- (A) Electric dipole (B) Magnetic dipole
(C) Magnetic quadrupole (D) Electric quadrupole
37. After 72 hours, the quantity of a sample of $^{24}_{11}\text{Na}$ is found to be 3.125% of the original sample quantity. Determine the half-life of the sample (in hrs).
- (A) 3 (B) 4.5
(C) 9 (D) 18
38. Obtain the threshold energy (in Mev) for the reaction : $^{209}_{83}\text{Bi} (p, ^2_1\text{H}) ^{208}_{83}\text{Bi}$ [Some useful data: (Masses)p = 938 Mev, $^{209}\text{Bi} = 208.980394 \text{ u}$; $^{208}\text{Bi} = 207.979731 \text{ u}$; $^2\text{H} = 2.014102 \text{ u}$]
- (A) 6.01842 (B) 6.04743
(C) 6.05987 (D) 6.089765
39. From meson theory of nuclear forces, the potential energy of interaction between two nucleons is proportional to
- (A) $C \cdot \frac{e^{r/R}}{r}$ (B) $-C \cdot \frac{e^{-r/R}}{r}$
(C) $C \cdot \frac{e^{R/r}}{r}$ (D) $-C \cdot \frac{-R/r}{r}$
40. If the observed total angular momentum of the deuteron '1' has a magnitude 1, then based on this data alone, the orbital angular momentum 'l' can take values:
- (A) 0,1,2 (B) 0,2
(C) 0 (D) 0.1
41. The Uranium series with parent $^{238}_{92}\text{U}$ decays by emission of 8α and 6β particles. The end product has Z & A
- (A) 82 & 208 (B) 82 & 206
(C) 84 & 208 (D) 84 & 206
42. The detector that can measure the energy of gamma rays is
- (A) GM counter (B) Ionization chamber
(C) Scintillation detector (D) Cloud chamber

43. The angular momentum and parity of ${}^{17}_8\text{O}$ nucleus in the ground state according to the shell model is
 (A) 0^+ (B) $\frac{1}{2}^-$
 (C) $\frac{3}{2}^+$ (D) $\frac{5}{2}^+$
44. All baryons are made up of
 (A) Quark and an anti-quark combination (B) 2 quarks combination
 (C) 3 quark combination (D) 3 ante-quark combination
45. A cyclotron is operated at an oscillator frequency of 12 MHz and has a dee radius of 53 cm. The magnitude of the magnetic field required to accelerate protons, whose mass is 1.67×10^{-27} kg is
 (A) 0.8 T (B) 1.0 T
 (C) 1.6 T (D) 2.0 T
46. An oscillator always needs an amplifier with
 (A) Positive feedback (B) Negative feedback
 (C) Both types of feedback (D) An LC tank circuit
47. Compared to a bipolar transistor, the JFET has
 (A) Greater voltage gain (B) Much more input impedance
 (C) Less input impedance (D) None of these
48. A variable Wien bridge oscillator is to be designed to produce an output that can be adjusted from 100Hz to 1KHz. the capacitors used in the circuit are $0.01 \mu\text{F}$ each. What value of resistance is to be used in the circuit?
 (A) 15.9 K to 159 K (B) 159 K
 (C) 15.9 K (D) Any value of R
49. The feedback signal in a(n) _____ oscillator is derived from the capacitive voltage divider in the LC circuit.
 (A) Wein bridge (B) Armstrong
 (C) Colpitts (D) Hartley
50. A bridge rectifier with a capacitor input filter has an input voltage of $240 V_{\text{rms}}$. If the step-down transformer has a turns ratio of 8: 1, what is the output voltage? (ignore diode drops)
 (A) $30 V_{\text{rms}}$ (B) 42 V
 (C) 60 V (D) 84 V
51. The Common – Collector configuration has a _____ input impedance and a _____ output impedance.
 (A) Low, high (B) High, low
 (C) Low, low (D) High, high

52. The PIV across a non-conducting diode in a Full wave rectifier circuit equals approximately
 (A) Peak value of the secondary voltage (B) Twice the peak value of the secondary voltage
 (C) Half the peak value of the secondary voltage (D) Four times the peak value of the secondary voltage
53. As compared to a silicon rectifier diode an LED has a
 (A) Lower forward voltage and lower breakdown voltage (B) Lower forward voltage and higher breakdown voltage
 (C) Higher forward voltage and lower breakdown voltage (D) Higher forward voltage and higher breakdown voltage
54. The two ends of the load line for the following circuit are (in V, mA)



- (A) (15, 0) & (0, 3) (B) (0, 0) & (15, 0)
 (C) (3, 0) & (0, 15) (D) (0, 3) & (15, 3)
55. If the load resistance in a zener regulator circuit decreases, the zener current
 (A) Decreases (B) Increases
 (C) Remains the same (D) Equals the load current
56. Miller indices of a plane parallel to x and z – axes are
 (A) (100) (B) (010)
 (C) (001) (D) (101)
57. The average energy of an atomic oscillator is given by
 (A) $h\nu$ (B) $\frac{h\nu}{e^{h\nu/kt} - 1}$
 (C) $\frac{h\nu}{e^{-h\nu/kt} - 1}$ (D) $\frac{h\nu}{(e^{-h\nu/kt} - 1)^2}$
58. For a non-dispersive medium
 (A) $\omega = vk$ (B) $\omega = vk^2$
 (C) $\omega = vk^3$ (D) $\omega = vk^n (n \neq 1)$

59. If $a = b \neq c$ and $\alpha = \beta = \gamma = 90^\circ$, the crystal system is
 (A) triclinic (B) tetragonal
 (C) hexagonal (D) monoclinic
60. Bravais lattice for diamond structure is
 (A) sc (B) bcc
 (C) fcc (D) hcp
61. The distance between the adjacent atomic planes in CaCO_3 is 0.3 nm. The smallest angle of Bragg scattering for 0.03 nm X-ray is
 (A) 0° (B) 2.9°
 (C) 5.8° (D) 90°
62. Phonon is the quantum of
 (A) electromagnetic wave (B) elastic wave
 (C) gravitational wave (D) deBroglie wave
63. The reciprocal lattice to direct simple cubic lattice is
 (A) simple cubic (B) Body centered cubic
 (C) face centered cubic (D) base centered cubic
64. The Fermi energy of a metal is 1.4eV, the Fermi temperature of the metal is approximately
 (A) 1.6×10^3 K (B) 1.6×10^4 K
 (C) 1.6×10^5 K (D) 1.6×10^6 K
65. A superconductor is a _____ material
 (A) diamagnetic (B) paramagnetic
 (C) ferromagnetic (D) ferrimagnetic
66. The values of a for which $\{(1,a,1),(a,1,1),(1,1,a)\}$ in \mathbb{R}^3 are linearly independent in \mathbb{R}^3 are:
 (A) 0,1 (B) 1,-2
 (C) 1,2 (D) all values except 1 and -2
67. Which of below are true regarding solution of following linear system of equations

$$\begin{aligned} 2x - y + z &= 2, \\ x + 2y - z &= 3 \\ 3x + y + 2z &= -1 \end{aligned}$$

 (A) No Solution (B) Unique solution
 (C) Infinite solutions (D) $x=0, y=0, z=0$
68. Numerical Derivative of f (0.4) using Central Difference formula from below data:
 (0.3,7.38910),(0.4,7.4633),(0.5,7.5383),(0.6,7.6141),(0.7,7.6906) equals
 (A) 0 (B) 371
 (C) 746 (D) None of above

69. The differential equation $(A x + B y) dx + (C x + D y) dy = 0$ is exact, if and only if
- (A) $A = C$ (B) $A = D$
 (C) $B = C$ (D) $B = D$
70. Which one of the following is the integrating factor for the linear differential equation $\frac{dy}{dx} + P(x)y = Q(x)$:
- (A) $P(x) e^{\int x}$ (B) $Q(x) e^{\int x}$
 (C) $e^{\int P(x) dx}$ (D) $e^{\int Q(x) dx}$
71. Which of the following statements is NOT equivalent to the statement, “There exists either a computer scientist or a mathematician who knows both discrete math and Bioscience.”
- (A) There exists a person who is a computer scientist and who knows both discrete math and Bioscience or there exists a person who is a mathematician and who knows both discrete math and Bioscience.
 (B) There exists a person who is a computer scientist or there exists a person who is a mathematician who knows discrete math or who knows Bioscience.
 (C) There exists a person who is a computer scientist and who knows both discrete math and Bioscience or there exists a mathematician who knows both discrete math and Bioscience.
 (D) There exists a computer scientist who knows both discrete math and Bioscience or there exists a person who is a mathematician who knows both discrete math and Bioscience.
72. The values of k for which $f(x)=(1-k)^x$ can serve as probability distribution of a random variable which takes countable infinite values $0,1,2,3,\dots$
- (A) $k > 1$ (B) $0 < k < 1$
 (C) $k < 0$ (D) $k = 1$
73. A teacher gives a 20 point test to 10 students. The marks are 18, 15, 12, 6, 8, 2, 3, 5, 20, 10. Find the percentile rank of a score of 12.
- (A) 65% (B) 45%
 (C) 68% (D) 70%
74. Mean, Median and standard deviation for data set 10, 60, 50, 30, 40, 20 are given by
- (A) 35,35,17 (B) 34,34,17.1
 (C) 30,34,19 (D) 35,35,17.1
75. If a student randomly guesses 5 multiple choice questions each having 5 choices, the probability that student gets exactly 3 right answers is given by
- (A) 0.04 (B) 0.05
 (C) 0.01 (D) 0.02

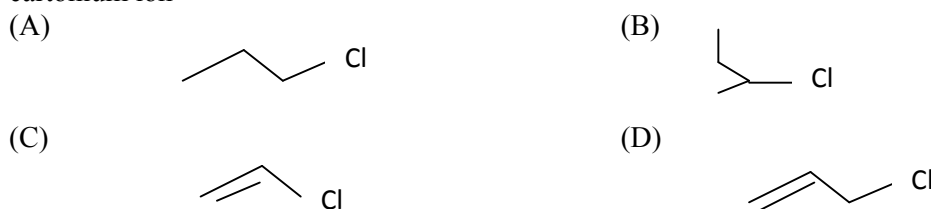
76. A rare but serious disease found in 0.01% of a certain population. A test has been developed that will become +ve for 98% of those who have the disease and be +ve only for 3% of those who don't have the disease. Probability that a person tested as +ve does not have the disease is given by
- (A) 0.997 (B) 0.917
(C) 0.003 (D) 0.100
77. If A & B are independent, then following are true
- (A) A & B' are independent (B) A' & B are independent.
(C) A' & B' are independent. (D) All of above are true
78. Rank of the matrix $\begin{bmatrix} 1 & 1 & 0 \\ 0 & 1 & 1 \\ 1 & 2 & 1 \end{bmatrix}$ is :
- (A) 2 (B) 1
(C) 3 (D) 0
79. Classify the following ordinary differential equation: $e^x dy/dx + 3y = x^2 y$
- (A) Separable and not linear (B) Linear and not separable
(C) Both separable and linear (D) Neither separable nor linear
80. General solution of 2nd ordinary differential equation $4y^{(2)} + 9y = 0$ is given by (where C1 and C2 are arbitrary constants):
- a)
- (A) $y = C_1 e^t + C_2 e^{-t}$ (B) $y = C_1 e^{2t} + C_2 e^{-t}$
(C) $y = C_1 \cos(t) + C_2 \sin(t)$ (D) $y = C_1 \cos(3t/2) + C_2 \sin(3t/2)$
81. Consider 2nd order ordinary differential equation $y^{(2)} + 2y^{(1)} - 8y = 0$. Suppose derivatives are taken with respect to variable t. The values of r for which the given differential equation has the solution of the form $y = e^{rt}$ are:
- (A) 2, -4 (B) 2, 4
(C) -2, 4 (D) -2, -4
82. The slope of the tangent line to the graph of f at x = 4, given that $f(x) = -x^2 + 4\sqrt{x}$ is
- (A) -8 (B) -10
(C) -9 (D) -7
83. The value of x where the function $f(x) = x^3 - 9x^2 + 24x + 4$ has a local maximum is
- (A) 2 (B) 1
(C) -2 (D) -1
84. The values of A and B so that function f defined by $f(x) = 2x^2$ for $x \leq 2$ and $f(x) = Ax + B$ for $x > 2$ is differentiable at $x = 2$ are
- (A) 8, 8 (B) 8, -8
(C) -8, -8 (D) -8, 8

85. The approximation of $\sin(1)$ obtained by Taylor's series approximation upto 5th degree about $x=0$ for $\sin(x)$ is given by:
 (A) $1 - \frac{1}{2} + \frac{1}{24}$ (B) $1 + \frac{1}{2} + \frac{1}{24}$
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86. The Maclaurian series for $1/(1-x)$ is $1+x+x^2+x^3+\dots$.
 The power series for $x^2/(1-x^2)$ is given by:
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87. If Arithmetic mean of a set of n data points is 106.6 where $n=8$, then Harmonic mean of given data
 (A) 0.8502 (B) 0.8510
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93. The sum of series $\sum_{n=2}^{\infty} \frac{6}{n(n+3)}$ is given by
 (A) 0 (B) $13/2$
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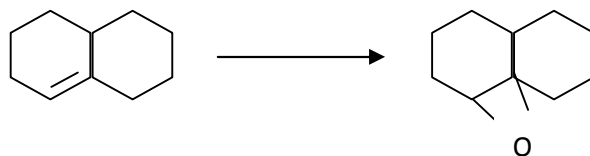
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Sr. No.	Question
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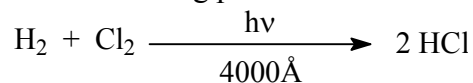
1. Which conformer among the following is most unstable
 (A) (a,e) 1,2 – dimethyl cyclohexane (B) (a,e) 1,3 – dimethyl cyclohexane
 (C) (a,a) 1,3 - dimethylcyclohexane (D) (a,a) 1,4 - dimethylcyclohexane
2. Which of the following compounds readily undergoes S_N1 reactions owing to the stability of its carbonium ion



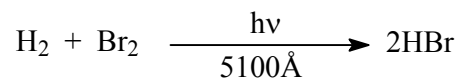
3. Which reagent effects the following conversion?



- (A) m- chloroperbenzoic acid (B) Acetic anhydride
 (C) NaOH/Br₂ (D) Acetic acid
4. 1. Consider the following photochemical reactions:



and

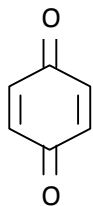


These reactions are the examples of which of the following?

- (A) Reactions of high and low quantum yields, respectively (B) Reactions of low and high quantum yields, respectively
 (C) Reactions of quantum yields equal to one (D) Reactions of equal quantum yields but not equal to one

5. Which molecule is anti-aromatic among the following:

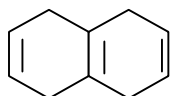
(A)



(B)



(C)



(D)



6. Acid strength of oxo-acids of halogens is in order

(A) $\text{HOI} > \text{HOBr} > \text{HOCl} > \text{HOF}$

(B) $\text{HOF} > \text{HOCl} > \text{HOBr} > \text{HOI}$

(C) $\text{HOCl} > \text{HOBr} > \text{HOI} > \text{HOF}$

(D) $\text{HOI} > \text{HOF} > \text{HOBr} > \text{HOCl}$

7. Teflon is synthesized by

(A) Free radical polymerization of tetrafluoro ethylene (C_2F_4)

(B) Condensation of hexane -1, 6- diamine and adipic acid

(C) Condensation of E-amino caproic acid

(D) Polymerization of Cyano ethylene

8. High resolution ^1H NMR spectrum of 1,3 - dichloropropane has _____ signals.

(A) One triplet and one quintet

(B) One triplet and one quartet

(C) One triplet and two doublets

(D) Two triplets and one quartet

9. Which heterocyclic compound is least aromatic among the following?

(A) Furan

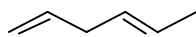
(B) Pyrrole

(C) Thiophene

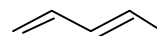
(D) Pyridine

10. Which compound will show the longest wavelength maxima in its UV spectrum?

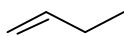
(A)



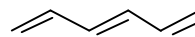
(B)



(C)



(D)



11. The $2+ \rightarrow 0+$ transition is a _____ transition:

(A) Electric dipole

(B) Magnetic dipole

(C) Magnetic quadrupole

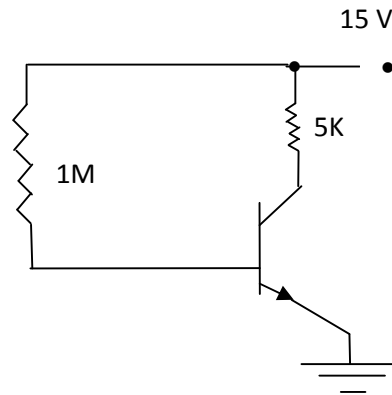
(D) Electric quadrupole

12. After 72 hours, the quantity of a sample of ${}_{11}^{24}\text{Na}$ is found to be 3.125% of the original sample quantity. Determine the half-life of the sample (in hrs).
 (A) 3 (B) 4.5
 (C) 9 (D) 18
13. Obtain the threshold energy (in Mev) for the reaction : ${}_{83}^{209}\text{Bi} (p, {}_1^2\text{H}) {}_{83}^{208}\text{Bi}$ [Some useful data: (Masses) $p = 938 \text{ Mev}$, ${}_{83}^{209}\text{Bi} = 208.980394 \text{ u}$; ${}_{83}^{208}\text{Bi} = 207.979731 \text{ u}$; ${}^2\text{H} = 2.014102 \text{ u}$]
 (A) 6.01842 (B) 6.04743
 (C) 6.05987 (D) 6.089765
14. From meson theory of nuclear forces, the potential energy of interaction between two nucleons is proportional to
 (A) $C \cdot \frac{e^{r/R}}{r}$ (B) $-C \cdot \frac{e^{-r/R}}{r}$
 (C) $C \cdot \frac{e^{R/r}}{r}$ (D) $-C \cdot \frac{-R/r}{r}$
15. If the observed total angular momentum of the deuteron '1' has a magnitude 1, then based on this data alone, the orbital angular momentum 'l' can take values:
 (A) 0,1,2 (B) 0,2
 (C) 0 (D) 0.1
16. The Uranium series with parent ${}_{92}^{238}\text{U}$ decays by emission of 8α and 6β particles. The end product has Z & A
 (A) 82 & 208 (B) 82 & 206
 (C) 84 & 208 (D) 84 & 206
17. The detector that can measure the energy of gamma rays is
 (A) GM counter (B) Ionization chamber
 (C) Scintillation detector (D) Cloud chamber
18. The angular momentum and parity of ${}_{8}^{17}\text{O}$ nucleus in the ground state according to the shell model is
 (A) 0^+ (B) $\frac{1}{2}^-$
 (C) $\frac{3}{2}^+$ (D) $\frac{5}{2}^+$
19. All baryons are made up of
 (A) Quark and an anti-quark combination (B) 2 quarks combination
 (C) 3 quark combination (D) 3 ante-quark combination

20. A cyclotron is operated at an oscillator frequency of 12 MHz and has a dee radius of 53 cm. The magnitude of the magnetic field required to accelerate protons, whose mass is 1.67×10^{-27} kg is
- (A) 0.8 T (B) 1.0 T
(C) 1.6 T (D) 2.0 T
21. An oscillator always needs an amplifier with
- (A) Positive feedback (B) Negative feedback
(C) Both types of feedback (D) An LC tank circuit
22. Compared to a bipolar transistor, the JFET has
- (A) Greater voltage gain (B) Much more input impedance
(C) Less input impedance (D) None of these
23. A variable Wien bridge oscillator is to be designed to produce an output that can be adjusted from 100Hz to 1KHz. the capacitors used in the circuit are $0.01 \mu\text{F}$ each. What value of resistance is to be used in the circuit?
- (A) 15.9 K to 159 K (B) 159 K
(C) 15.9 K (D) Any value of R
24. The feedback signal in a(n) _____ oscillator is derived from the capacitive voltage divider in the LC circuit.
- (A) Wein bridge (B) Armstrong
(C) Colpitts (D) Hartley
25. A bridge rectifier with a capacitor input filter has an input voltage of $240 V_{\text{rms}}$. If the step-down transformer has a turns ratio of 8: 1, what is the output voltage? (ignore diode drops)
- (A) $30 V_{\text{rms}}$ (B) 42 V
(C) 60 V (D) 84 V
26. The Common – Collector configuration has a _____ input impedance and a _____ output impedance.
- (A) Low, high (B) High, low
(C) Low, low (D) High, high
27. The PIV across a non-conducting diode in a Full wave rectifier circuit equals approximately
- (A) Peak value of the secondary voltage (B) Twice the peak value of the secondary voltage
(C) Half the peak value of the secondary voltage (D) Four times the peak value of the secondary voltage
28. As compared to a silicon rectifier diode an LED has a
- (A) Lower forward voltage and lower breakdown voltage (B) Lower forward voltage and higher breakdown voltage
(C) Higher forward voltage and lower breakdown voltage (D) Higher forward voltage and higher breakdown voltage

breakdown voltage

29. The two ends of the load line for the following circuit are (in V, mA)



- (A) (15, 0) & (0, 3) (B) (0, 0) & (15, 0)
(C) (3, 0) & (0, 15) (D) (0, 3) & (15, 3)
30. If the load resistance in a zener regulator circuit decreases, the zener current
(A) Decreases (B) Increases
(C) Remains the same (D) Equals the load current
31. Miller indices of a plane parallel to x and z – axes are
(A) (100) (B) (010)
(C) (001) (D) (101)
32. The average energy of an atomic oscillator is given by
(A) $h\nu$ (B) $\frac{h\nu}{e^{h\nu/kt} - 1}$
(C) $\frac{h\nu}{e^{-h\nu/kt} - 1}$ (D) $\frac{h\nu}{(e^{-h\nu/kt} - 1)^2}$
33. For a non-dispersive medium
(A) $\omega = vk$ (B) $\omega = vk^2$
(C) $\omega = vk^3$ (D) $\omega = vk^n$ ($n \neq 1$)
34. If $a = b \neq c$ and $\alpha = \beta = \gamma = 90^\circ$, the crystal system is
(A) triclinic (B) tetragonal
(C) hexagonal (D) monoclinic
35. Bravais lattice for diamond structure is
(A) sc (B) bcc
(C) fcc (D) hcp
36. The distance between the adjacent atomic planes in CaCO_3 is 0.3 nm. The smallest angle of Bragg scattering for 0.03 nm X- ray is
(A) 0° (B) 2.9°
(C) 5.8° (D) 90°

37. Phonon is the quantum of
 (A) electromagnetic wave (B) elastic wave
 (C) gravitational wave (D) deBroglie wave
38. The reciprocal lattice to direct simple cubic lattice is
 (A) simple cubic (B) Body centered cubic
 (C) face centered cubic (D) base centered cubic
39. The Fermi energy of a metal is 1.4eV, the Fermi temperature of the metal is approximately
 (A) 1.6×10^3 K (B) 1.6×10^4 K
 (C) 1.6×10^5 K (D) 1.6×10^6 K
40. A superconductor is a _____ material
 (A) diamagnetic (B) paramagnetic
 (C) ferromagnetic (D) ferrimagnetic
41. The values of a for which $\{(1,a,1),(a,1,1),(1,1,a)\}$ in R^3 are linearly independent in R^3 are:
 (A) 0,1 (B) 1,-2
 (C) 1,2 (D) all values except 1 and -2
42. Which of below are true regarding solution of following linear system of equations

$$\begin{aligned} 2x - y + z &= 2, \\ x + 2y - z &= 3 \\ 3x + y + 2z &= -1 \end{aligned}$$

 (A) No Solution (B) Unique solution
 (C) Infinite solutions (D) $x=0, y=0, z=0$
43. Numerical Derivative of f (0.4) using Central Difference formula from below data:
 (0.3,7.38910),(0.4,7.4633),(0.5,7.5383),(0.6,7.6141),(0.7,7.6906) equals
 (A) 0 (B) 371
 (C) 746 (D) None of above
44. The differential equation $(A x + B y) dx + (C x + D y) dy = 0$ is exact, if and only if
 (A) $A = C$ (B) $A = D$
 (C) $B = C$ (D) $B = D$
45. Which one of the following is the integrating factor for the linear differential equation
 $\frac{dy}{dx} + P(x)y = Q(x)$:
 (A) $P(x) e^{\int x}$ (B) $Q(x) e^{\int x}$

(C) $e^{\int P(x)dx}$

(D) $e^{\int Q(x) dx}$

46. Which of the following statements is NOT equivalent to the statement, "There exists either a computer scientist or a mathematician who knows both discrete math and Bioscience."
- (A) There exists a person who is a computer scientist and who knows both discrete math and Bioscience or there exists a person who is a mathematician and who knows both discrete math and Bioscience.
- (B) There exists a person who is a computer scientist or there exists a person who is a mathematician who knows discrete math or who knows Bioscience.
- (C) There exists a person who is a computer scientist and who knows both discrete math and Bioscience or there exists a mathematician who knows both discrete math and Bioscience.
- (D) There exists a computer scientist who knows both discrete math and Bioscience or there exists a person who is a mathematician who knows both discrete math and Bioscience.
47. The values of k for which $f(x)=(1-k)k^x$ can serve as probability distribution of a random variable which takes countable infinite values $0,1,2,3,\dots$
- (A) $k > 1$ (B) $0 < k < 1$
- (C) $k < 0$ (D) $k = 1$
48. A teacher gives a 20 point test to 10 students. The marks are 18, 15, 12, 6, 8, 2, 3, 5, 20, 10. Find the percentile rank of a score of 12.
- (A) 65% (B) 45%
- (C) 68% (D) 70%
49. Mean, Median and standard deviation for data set 10, 60, 50, 30, 40, 20 are given by
- (A) 35,35,17 (B) 34,34,17.1
- (C) 30,34,19 (D) 35,35,17.1
50. If a student randomly guesses 5 multiple choice questions each having 5 choices, the probability that student gets exactly 3 right answers is given by
- (A) 0.04 (B) 0.05
- (C) 0.01 (D) 0.02
51. A rare but serious disease found in 0.01% of a certain population. A test has been developed that will become +ve for 98% of those who have the disease and be +ve only for 3% of those who don't have the disease. Probability that a person tested as +ve does not have the disease is given by
- (A) 0.997 (B) 0.917
- (C) 0.003 (D) 0.100
52. If A & B are independent, then following are true
- (A) A & B' are independent (B) A' & B are independent.
- (C) A' & B' are independent. (D) All of above are true

53. Rank of the matrix $\begin{bmatrix} 1 & 1 & 0 \\ 0 & 1 & 1 \\ 1 & 2 & 1 \end{bmatrix}$ is :
- (A) 2 (B) 1
(C) 3 (D) 0
54. Classify the following ordinary differential equation: $e^x dy/dx + 3y = x^2 y$
- (A) Separable and not linear (B) Linear and not separable
(C) Both separable and linear (D) Neither separable nor linear
55. General solution of 2nd ordinary differential equation $4y^{(2)} + 9y = 0$ is given by (where C_1 and C_2 are arbitrary constants):
- a)
- (A) $y = C_1 e^t + C_2 e^{-t}$ (B) $y = C_1 e^{2t} + C_2 e^{-t}$
(C) $y = C_1 \cos(t) + C_2 \sin(t)$ (D) $y = C_1 \cos(3t/2) + C_2 \sin(3t/2)$
56. Consider 2nd order ordinary differential equation $y^{(2)} + 2y^{(1)} - 8y = 0$. Suppose derivatives are taken with respect to variable t . The values of r for which the given differential equation has the solution of the form $y = e^{rt}$ are:
- (A) 2, -4 (B) 2, 4
(C) -2, 4 (D) -2, -4
57. The slope of the tangent line to the graph of f at $x = 4$, given that $f(x) = -x^2 + 4\sqrt{x}$ is
- (A) -8 (B) -10
(C) -9 (D) -7
58. The value of x where the function $f(x) = x^3 - 9x^2 + 24x + 4$ has a local maximum is
- (A) 2 (B) 1
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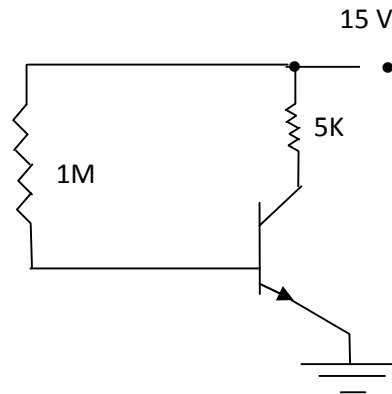
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 (C) Multiple cropping (D) Multistoried_cropping
75. In pulses, limiting amino acids is:
 (A) Methionine (B) Valine
 (C) Lysine (D) Cystein
76. When a compressed gas is allowed to expand through a porous plug at a temperature above its inversion temperature, then
 (A) A fall in temperature is observed (B) A rise in temperature is observed
 (C) A rise after an initial fall in temperature is observed (D) No change in temperature is noticed
77. Gas A can be liquefied at room temperature by applying pressure but gas B cannot. This reflects
 (A) Critical temperature of B is less than that of A (B) Critical temperature of B is greater than that of A
 (C) Critical temperature of both A and B are greater than room temperature (D) No conclusion can be drawn on the critical temperature of A and B
78. Clausius-Clapeyron's equation gives the variation of
 (A) Boiling point of liquid with temperature (B) Vapour pressure of a liquid with temperature
 (C) Coefficient of viscosity of a liquid with pressure (D) Surface tension of a liquid with temperature
79. At any temperature T, the entropy of a solid substance (S_T) is given by the expression
 (A) $C_p dT$ (B) C_p/T
 (C) $\int_0^T C_p dT / T$ (D) $(C_p - C_v)/T$
80. The value of equilibrium constant for an endothermic reaction

- (A) Increases with increases of temperature (B) Decreases with increase of temperature
 (C) Is independent of temperature (D) Information not sufficient to draw any conclusion
81. Which of the following statement is not correct?
 (A) Fast reactions have low activation energy (B) Activation energy of a reaction depends on the chemical nature of reactants and products
 (C) A catalyst increases the rate of reaction by decreasing the activation energy of the reaction (D) With increase in temperature, the rate of reaction decreases in case of exothermic reactions
82. Which formula cannot be used to calculate the molar mass of a solute?
 (A) $\frac{K_b \times W_b \times 10^3}{\Delta T_b \times W_A}$ (B) $\frac{W_B RT}{\pi V}$
 (C) $\frac{\Delta T_b \times W_B \times 10^3}{K_b \times W_A}$ (D) $\frac{p_A^0 \times W_B \times M_A}{(p_A^0 - p) \times W_A}$
83. The EMF of the cell, $\text{Zn}|\text{Zn}^{2+}||\text{Ag}^+|\text{Ag}$ is independent of
 (A) The volume of Zn^{2+} and Ag^+ solutions (B) The molarity of Zn^{2+} ions in the solution
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84. What happens when electric current is passed through aqueous of sodium chloride
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86. The $t_{1/2}$ of a first order reaction is found to be 2 minutes. The percentage of the reaction left after 360 seconds is
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88. The magnetic quantum number for the last electron in the sodium atom (atomic number $z=11$) is
 (A) 3 (B) 2
 (C) 1 (D) 0
89. The octahedral molecular shape is associated with -----hybridisation.
 (A) sp^3d (B) sp^3d^2
 (C) sp^3d^3 (D) sp^3
90. Which of the following is the strongest acid
 (A) Acetic acid (B) Propionic acid
 (C) Butanoic acid (D) Chloroacetic acid
91. An example of natural semi conductor is
 (A) boron (B) silicon

- (C) aluminium (D) Phosphorous
92. The ionic strength of a solution containing 0.02 M Na_2SO_4 and 0.01 M MgCl_2 is
 (A) 0.03 (B) 0.06
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97. This species generally act as Bronsted acid and base
 (A) HSO_4^- (B) Na^2CO_3
 (C) NH_3 (D) OH^-
98. This serves as a differentiating solvent for HCl, H_2SO_4 and HNO_3
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 (C) Both Ψ^2 and $4\pi r^2\Psi^2$ are maximum at nucleus (D) Both Ψ^2 and $4\pi r^2\Psi^2$ are minimum at nucleus

Sr. No.	Question
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- The Common – Collector configuration has a _____ input impedance and a _____ output impedance.
 (A) Low, high (B) High, low
 (C) Low, low (D) High, high
- The PIV across a non-conducting diode in a Full wave rectifier circuit equals approximately
 (A) Peak value of the secondary voltage (B) Twice the peak value of the secondary voltage
 (C) Half the peak value of the secondary voltage (D) Four times the peak value of the secondary voltage
- As compared to a silicon rectifier diode an LED has a
 (A) Lower forward voltage and lower breakdown voltage (B) Lower forward voltage and higher breakdown voltage
 (C) Higher forward voltage and lower breakdown voltage (D) Higher forward voltage and higher breakdown voltage
- The two ends of the load line for the following circuit are (in V, mA)



- (A) (15, 0) & (0, 3) (B) (0, 0) & (15, 0)
 (C) (3, 0) & (0, 15) (D) (0, 3) & (15, 3)
- If the load resistance in a zener regulator circuit decreases, the zener current
 (A) Decreases (B) Increases
 (C) Remains the same (D) Equals the load current
- Miller indices of a plane parallel to x and z – axes are
 (A) (100) (B) (010)
 (C) (001) (D) (101)

7. The average energy of an atomic oscillator is given by
 (A) $h\nu$ (B) $\frac{h\nu}{e^{h\nu/kt}-1}$
 (C) $\frac{h\nu}{e^{-h\nu/kt}-1}$ (D) $\frac{h\nu}{(e^{-h\nu/kt}-1)^2}$
8. For a non-dispersive medium
 (A) $\omega = \nu k$ (B) $\omega = \nu k^2$
 (C) $\omega = \nu k^3$ (D) $\omega = \nu k^n$ ($n \neq 1$)
9. If $a = b \neq c$ and $\alpha = \beta = \gamma = 90^\circ$, the crystal system is
 (A) triclinic (B) tetragonal
 (C) hexagonal (D) monoclinic
10. Bravais lattice for diamond structure is
 (A) sc (B) bcc
 (C) fcc (D) hcp
11. The distance between the adjacent atomic planes in CaCO_3 is 0.3 nm. The smallest angle of Bragg scattering for 0.03 nm X-ray is
 (A) 0° (B) 2.9°
 (C) 5.8° (D) 90°
12. Phonon is the quantum of
 (A) electromagnetic wave (B) elastic wave
 (C) gravitational wave (D) deBroglie wave
13. The reciprocal lattice to direct simple cubic lattice is
 (A) simple cubic (B) Body centered cubic
 (C) face centered cubic (D) base centered cubic
14. The Fermi energy of a metal is 1.4eV, the Fermi temperature of the metal is approximately
 (A) 1.6×10^3 K (B) 1.6×10^4 K
 (C) 1.6×10^5 K (D) 1.6×10^6 K
15. A superconductor is a _____ material
 (A) diamagnetic (B) paramagnetic
 (C) ferromagnetic (D) ferrimagnetic
16. The values of a for which $\{(1,a,1),(a,1,1),(1,1,a)\}$ in \mathbb{R}^3 are linearly independent in \mathbb{R}^3 are:
 (A) 0,1 (B) 1,-2
 (C) 1,2 (D) all values except 1 and -2
17. Which of below are true regarding solution of following linear system of equations

$$\begin{aligned} 2x - y + z &= 2, \\ x + 2y - z &= 3 \\ 3x + y + 2z &= -1 \end{aligned}$$

 (A) No Solution (B) Unique solution
 (C) Infinite solutions (D) $x=0, y=0, z=0$

18. Numerical Derivative of $f(0.4)$ using Central Difference formula from below data:
 $(0.3, 7.38910), (0.4, 7.4633), (0.5, 7.5383), (0.6, 7.6141), (0.7, 7.6906)$ equals
- (A) 0 (B) 371
(C) 746 (D) None of above
19. The differential equation $(Ax + By) dx + (Cx + Dy) dy = 0$ is exact, if and only if
- (A) $A = C$ (B) $A = D$
(C) $B = C$ (D) $B = D$
20. Which one of the following is the integrating factor for the linear differential equation
 $\frac{dy}{dx} + P(x)y = Q(x)$:
- (A) $P(x)e^{\int x}$ (B) $Q(x)e^{\int x}$
(C) $e^{\int P(x)dx}$ (D) $e^{\int Q(x)dx}$
21. Which of the following statements is NOT equivalent to the statement, “There exists either a computer scientist or a mathematician who knows both discrete math and Bioscience.”
- (A) There exists a person who is a computer scientist and who knows both discrete math and Bioscience or there exists a person who is a mathematician and who knows both discrete math and Bioscience.
(B) There exists a person who is a computer scientist or there exists a person who is a mathematician who knows discrete math or who knows Bioscience.
(C) There exists a person who is a computer scientist and who knows both discrete math and Bioscience or there exists a mathematician who knows both discrete math and Bioscience.
(D) There exists a computer scientist who knows both discrete math and Bioscience or there exists a person who is a mathematician who knows both discrete math and Bioscience.
22. The values of k for which $f(x) = (1-k)^x$ can serve as probability distribution of a random variable which takes countable infinite values $0, 1, 2, 3, \dots$
- (A) $k > 1$ (B) $0 < k < 1$
(C) $k < 0$ (D) $k = 1$
23. A teacher gives a 20 point test to 10 students. The marks are 18, 15, 12, 6, 8, 2, 3, 5, 20, 10. Find the percentile rank of a score of 12.
- (A) 65% (B) 45%
(C) 68% (D) 70%
24. Mean, Median and standard deviation for data set 10, 60, 50, 30, 40, 20 are given by
- (A) 35, 35, 17 (B) 34, 34, 17.1
(C) 30, 34, 19 (D) 35, 35, 17.1

25. If a student randomly guesses 5 multiple choice questions each having 5 choices, the probability that student gets exactly 3 right answers is given by
 (A) 0.04 (B) 0.05
 (C) 0.01 (D) 0.02
26. A rare but serious disease found in 0.01% of a certain population. A test has been developed that will become +ve for 98% of those who have the disease and be +ve only for 3% of those who don't have the disease. Probability that a person tested as +ve does not have the disease is given by
 (A) 0.997 (B) 0.917
 (C) 0.003 (D) 0.100
27. If A & B are independent, then following are true
 (A) A & B' are independent (B) A' & B are independent.
 (C) A' & B' are independent. (D) All of above are true
28. Rank of the matrix $\begin{bmatrix} 1 & 1 & 0 \\ 0 & 1 & 1 \\ 1 & 2 & 1 \end{bmatrix}$ is :
 (A) 2 (B) 1
 (C) 3 (D) 0
29. Classify the following ordinary differential equation: $e^x dy/dx + 3y = x^2 y$
 (A) Separable and not linear (B) Linear and not separable
 (C) Both separable and linear (D) Neither separable nor linear
30. General solution of 2nd ordinary differential equation $4y^{(2)} + 9y = 0$ is given by (where C1 and C2 are arbitrary constants):
 a)
 (A) $y = C_1 e^t + C_2 e^{-t}$ (B) $y = C_1 e^{2t} + C_2 e^{-t}$
 (C) $y = C_1 \cos(t) + C_2 \sin(t)$ (D) $y = C_1 \cos(3t/2) + C_2 \sin(3t/2)$
31. Consider 2nd order ordinary differential equation $y^{(2)} + 2y^{(1)} - 8y = 0$. Suppose derivatives are taken with respect to variable t. The values of r for which the given differential equation has the solution of the form $y = e^{rt}$ are:
 (A) 2, -4 (B) 2, 4
 (C) -2, 4 (D) -2, -4
32. The slope of the tangent line to the graph of f at x = 4, given that $f(x) = -x^2 + 4\sqrt{x}$ is
 (A) -8 (B) -10
 (C) -9 (D) -7
33. The value of x where the function $f(x) = x^3 - 9x^2 + 24x + 4$ has a local maximum is
 (A) 2 (B) 1
 (C) -2 (D) -1

34. The values of A and B so that function f defined by $f(x) = 2x^2$ for $x \leq 2$ and $f(x) = Ax + B$ for $x > 2$ is differentiable at $x = 2$ are
 (A) 8, 8 (B) 8, -8
 (C) -8, -8 (D) -8, 8
35. The approximation of $\sin(1)$ obtained by Taylor's series approximation upto 5th degree about $x=0$ for $\sin(x)$ is given by:
 (A) $1 - \frac{1}{2} + \frac{1}{24}$ (B) $1 + \frac{1}{2} + \frac{1}{24}$
 (C) $1 - \frac{1}{6} + \frac{1}{120}$ (D) $1 + \frac{1}{2} + \frac{1}{120}$
36. The Maclaurian series for $1/(1-x)$ is $1+x+x^2+x^3+\dots$.
 The power series for $x^2/(1-x^2)$ is given by:
 (A) $x+x^2+x^3+\dots$ (B) $x^2+x^4+x^6+\dots$
 (C) $x^3+x^6+x^9+\dots$ (D) $1+x^2+x^4+x^6+\dots$
37. If Arithmetic mean of a set of n data points is 106.6 where $n=8$, then Harmonic mean of given data
 (A) 0.8502 (B) 0.8510
 (C) 0.8528 (D) 0.0850
38. Relationship among the averages
 (A) $HM \geq GM \geq AM$ (B) $AM \geq GM \geq HM$
 (C) $GM \leq HM \leq AM$ (D) $AM \geq HM < GM$
39. A race car is travelling on a straight track at a velocity of 80 meters per second when the brakes are applied at time $t=0$ seconds. From time $t=0$ to the moment the race car stops, the acceleration of the race car is given by $a(t) = -6t^2 - t$ meters per second per second. During this time period, how far does the race car travel?
 (A) 188.229m (B) 198.766m
 (C) 260.042m (D) 267.089m
40. A function f is continuous on the closed interval [2,5] with $f(2)=17$ and $f(5)=17$. Which of the following additional conditions guarantees that there is a number c in the open interval (2,5) such that $f^{(1)}(c)=0$?
 (A) No additional conditions are necessary. (B) f has a relative extrema on the open interval (2,5)
 (C) f is differentiable on the open interval (2,5) (D) finite integral of f between 2 and 5 exists.
41. An ice sculpture in the form of a sphere melts in such a way that it maintains its spherical shape. The volume of the sphere is decreasing at a constant rate of 2π cubic meters per hour. At what rate, in square meters per hour, is the surface area of the sphere decreasing at the moment when the radius is 5 meters?
 (A) $4\pi/5$ (B) 40π
 (C) 80π (D) 100π

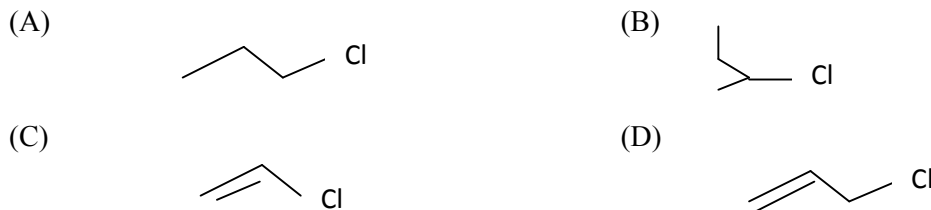
42. Sequence defined by $a_n = \ln(2n^3 + 2) - \ln(5n^3 + 2n^2 + 4)$ converges to
 (A) 0 (B) $\ln(2/5)$
 (C) $-\ln(2/5)$ (D) $2/5$
43. The sum of series $\sum_{n=2}^{\infty} \frac{6}{n(n+3)}$ is given by
 (A) 0 (B) $13/2$
 (C) $5/3$ (D) $13/6$
44. The area of region between the graph of $y=x^2$ and $y=-x$ from $x=0$ to $x=2$?
 (A) $2/3$ (B) $8/3$
 (C) 4 (D) $14/3$
45. An equation of line tangent to graph of $y=x+\cos(x)$ at the point (0,1) is
 (A) $y=2x+1$ (B) $y=x+1$
 (C) $y=x$ (D) $y=x-1$
46. National Science Day is celebrated on:
 (A) 5 June (B) 21 June
 (C) 28 February (D) 16 October
47. Which among the following monsoon is mainly responsible for rains in India?
 (A) South-East (B) North-West
 (C) South-West (D) North-East
48. Which gas is generally used in cold stores?
 (A) Ethylene (B) Oxygen
 (C) Methane (D) Acetylene
49. Growing of coconut, black pepper and ginger simultaneously in the same field is an example of:
 (A) Relay cropping (B) Intercropping
 (C) Multiple cropping (D) Multistoried cropping
50. In pulses, limiting amino acids is:
 (A) Methionine (B) Valine
 (C) Lysine (D) Cysteine
51. When a compressed gas is allowed to expand through a porous plug at a temperature above its inversion temperature, then
 (A) A fall in temperature is observed (B) A rise in temperature is observed
 (C) A rise after an initial fall in temperature is observed (D) No change in temperature is noticed
52. Gas A can be liquefied at room temperature by applying pressure but gas B cannot. This reflects
 (A) Critical temperature of B is less than that of A (B) Critical temperature of B is greater than that of A
 (C) Critical temperature of both A and B are greater than room temperature (D) No conclusion can be drawn on the critical temperature of A and B

53. Clausius-Clapeyron's equation gives the variation of
 (A) Boiling point of liquid with temperature (B) Vapour pressure of a liquid with temperature
 (C) Coefficient of viscosity of a liquid with pressure (D) Surface tension of a liquid with temperature
54. At any temperature T, the entropy of a solid substance (S_T) is given by the expression
 (A) $C_p dT$ (B) C_p/T
 (C) $\int_0^T C_p dT / T$ (D) $(C_p - C_v)/T$
55. The value of equilibrium constant for an endothermic reaction
 (A) Increases with increases of temperature (B) Decreases with increase of temperature
 (C) Is independent of temperature (D) Information not sufficient to draw any conclusion
56. Which of the following statement is not correct?
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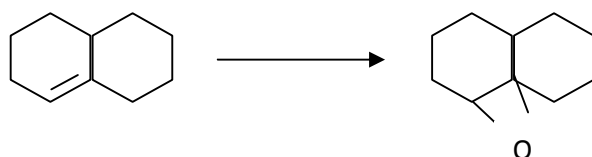
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76. Which conformer among the following is most unstable
 (A) (a,e) 1,2 - dimethyl cyclohexane (B) (a,e) 1,3 - dimethyl cyclohexane
 (C) (a,a) 1,3 - dimethylcyclohexane (D) (a,a) 1,4 - dimethylcyclohexane

77. Which of the following compounds readily undergoes S_N1 reactions owing to the stability of its carbonium ion

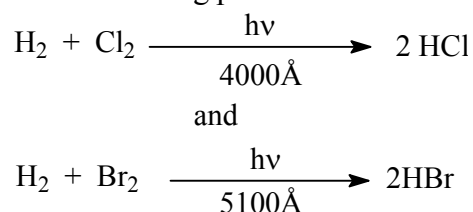


78. Which reagent effects the following conversion?



- (A) m- chloroperbenzoic acid (B) Acetic anhydride
 (C) NaOH/ Br_2 (D) Acetic acid

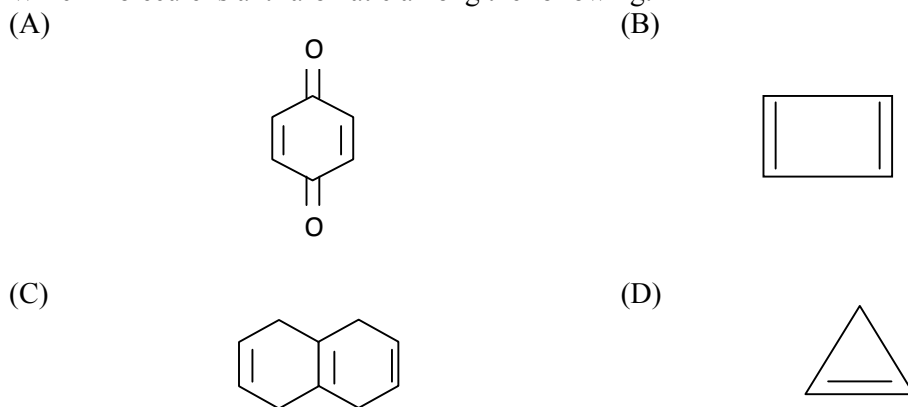
79. 1. Consider the following photochemical reactions:

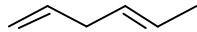
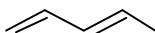
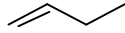
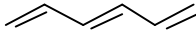


These reactions are the examples of which of the following?

- (A) Reactions of high and low quantum yields, respectively (B) Reactions of low and high quantum yields, respectively
 (C) Reactions of quantum yields equal to one (D) Reactions of equal quantum yields but not equal to one

80. Which molecule is anti-aromatic among the following:



81. Acid strength of oxo-acids of halogens is in order
 (A) $\text{HOI} > \text{HOBr} > \text{HOCl} > \text{HOF}$ (B) $\text{HOF} > \text{HOCl} > \text{HOBr} > \text{HOI}$
 (C) $\text{HOCl} > \text{HOBr} > \text{HOI} > \text{HOF}$ (D) $\text{HOI} > \text{HOF} > \text{HOBr} > \text{HOCl}$
82. Teflon is synthesized by
 (A) Free radical polymerization of tetrafluoro ethylene (C_2F_4) (B) Condensation of hexane -1, 6- diamine and adipic acid
 (C) Condensation of E-amino caproic acid (D) Polymerization of Cyano ethylene
83. High resolution ^1H NMR spectrum of 1,3 – dichloropropane has _____ signals.
 (A) One triplet and one quintet (B) One triplet and one quartet
 (C) One triplet and two doublets (D) Two triplets and one quartet
84. Which heterocyclic compound is least aromatic among the following?
 (A) Furan (B) Pyrrole
 (C) Thiophene (D) Pyridine
85. Which compound will show the longest wavelength maxima in its UV spectrum?
 (A)  (B) 
 (C)  (D) 
86. The $2^+ \rightarrow 0^+$ transition is a _____ transition:
 (A) Electric dipole (B) Magnetic dipole
 (C) Magnetic quadrupole (D) Electric quadrupole
87. After 72 hours, the quantity of a sample of $^{24}_{11}\text{Na}$ is found to be 3.125% of the original sample quantity. Determine the half-life of the sample (in hrs).
 (A) 3 (B) 4.5
 (C) 9 (D) 18
88. Obtain the threshold energy (in Mev) for the reaction : $^{209}_{83}\text{Bi} (p, ^2_1\text{H}) ^{208}_{83}\text{Bi}$ [Some useful data:
 (Masses) $p = 938 \text{ Mev}$, $^{209}\text{Bi} = 208.980394 \text{ u}$; $^{208}\text{Bi} = 207.979731 \text{ u}$; $^2\text{H} = 2.014102 \text{ u}$]
 (A) 6.01842 (B) 6.04743
 (C) 6.05987 (D) 6.089765
89. From meson theory of nuclear forces, the potential energy of interaction between two nucleons is proportional to
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90. If the observed total angular momentum of the deuteron '1' has a magnitude 1, then based on this data alone, the orbital angular momentum 'l' can take values:
 (A) 0,1,2 (B) 0,2
 (C) 0 (D) 0.1
91. The Uranium series with parent ${}^{238}_{92}\text{U}$ decays by emission of 8α and 6β particles. The end product has Z & A
 (A) 82 & 208 (B) 82 & 206
 (C) 84 & 208 (D) 84 & 206
92. The detector that can measure the energy of gamma rays is
 (A) GM counter (B) Ionization chamber
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 (C) $\frac{3}{2}^+$ (D) $\frac{5}{2}^+$
94. All baryons are made up of
 (A) Quark and an anti-quark combination (B) 2 quarks combination
 (C) 3 quark combination (D) 3 ante-quark combination
95. A cyclotron is operated at an oscillator frequency of 12 MHz and has a dee radius of 53 cm. The magnitude of the magnetic field required to accelerate protons, whose mass is 1.67×10^{-27} kg is
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97. Compared to a bipolar transistor, the JFET has
 (A) Greater voltage gain (B) Much more input impedance
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100. A bridge rectifier with a capacitor input filter has an input voltage of $240\text{ V}_{\text{rms}}$. If the step-down transformer has a turns ratio of 8: 1, what is the output voltage? (ignore diode drops)
- (A) 30 V_{rms} (B) 42 V
(C) 60 V (D) 84 V

Sr. No.	Question
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1. A rare but serious disease found in 0.01% of a certain population. A test has been developed that will become +ve for 98% of those who have the disease and be +ve only for 3% of those who don't have the disease. Probability that a person tested as +ve does not have the disease is given by

(A) 0.997	(B) 0.917
(C) 0.003	(D) 0.100

2. If A & B are independent, then following are true

(A) A & B' are independent	(B) A' & B are independent.
(C) A' & B' are independent.	(D) All of above are true

3. Rank of the matrix $\begin{bmatrix} 1 & 1 & 0 \\ 0 & 1 & 1 \\ 1 & 2 & 1 \end{bmatrix}$ is :

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

4. Classify the following ordinary differential equation: $e^x dy/dx + 3y = x^2 y$

(A) Separable and not linear	(B) Linear and not separable
(C) Both separable and linear	(D) Neither separable nor linear

5. General solution of 2nd ordinary differential equation $4y^{(2)} + 9y = 0$ is given by (where C1 and C2 are arbitrary constants):

a)	
(A) $y = C_1 e^t + C_2 e^{-t}$	(B) $y = C_1 e^{2t} + C_2 e^{-t}$
(C) $y = C_1 \cos(t) + C_2 \sin(t)$	(D) $y = C_1 \cos(3t/2) + C_2 \sin(3t/2)$

6. Consider 2nd order ordinary differential equation $y^{(2)} + 2y^{(1)} - 8y = 0$. Suppose derivatives are taken with respect to variable t. The values of r for which the given differential equation has the solution of the form $y = e^{rt}$ are:

(A) 2, -4	(B) 2, 4
(C) -2, 4	(D) -2, -4

7. The slope of the tangent line to the graph of f at $x = 4$, given that $f(x) = -x^2 + 4\sqrt{x}$ is

(A) -8	(B) -10
(C) -9	(D) -7

8. The value of x where the function $f(x) = x^3 - 9x^2 + 24x + 4$ has a local maximum is
 (A) 2 (B) 1
 (C) -2 (D) -1
9. The values of A and B so that function f defined by $f(x) = 2x^2$ for $x \leq 2$ and $f(x) = Ax + B$ for $x > 2$ is differentiable at $x = 2$ are
 (A) 8, 8 (B) 8, -8
 (C) -8, -8 (D) -8, 8
10. The approximation of $\sin(1)$ obtained by Taylor's series approximation upto 5th degree about $x=0$ for $\sin(x)$ is given by:
 (A) $1 - \frac{1}{2} + \frac{1}{24}$ (B) $1 + \frac{1}{2} + \frac{1}{24}$
 (C) $1 - \frac{1}{6} + \frac{1}{120}$ (D) $1 + \frac{1}{2} + \frac{1}{120}$
11. The Maclaurian series for $1/(1-x)$ is $1+x+x^2+x^3+\dots$.
 The power series for $x^2/(1-x^2)$ is given by:
 (A) $x+x^2+x^3+\dots$ (B) $x^2+x^4+x^6+\dots$
 (C) $x^3+x^6+x^9+\dots$ (D) $1+x^2+x^4+x^6+\dots$
12. If Arithmetic mean of a set of n data points is 106.6 where $n=8$, then Harmonic mean of given data
 (A) 0.8502 (B) 0.8510
 (C) 0.8528 (D) 0.0850
13. Relationship among the averages
 (A) $HM \geq GM \geq AM$ (B) $AM \geq GM \geq HM$
 (C) $GM \leq HM \leq AM$ (D) $AM \geq HM < GM$
14. A race car is travelling on a straight track at a velocity of 80 meters per second when the brakes are applied at time $t=0$ seconds. From time $t=0$ to the moment the race car stops, the acceleration of the race car is given by $a(t) = -6t^2 - t$ meters per second per second. During this time period, how far does the race car travel?
 (A) 188.229m (B) 198.766m
 (C) 260.042m (D) 267.089m
15. A function f is continuous on the closed interval $[2,5]$ with $f(2)=17$ and $f(5)=17$. Which of the following additional conditions guarantees that there is a number c in the open interval $(2,5)$ such that $f^{(1)}(c)=0$?
 (A) No additional conditions are necessary. (B) f has a relative extrema on the open interval $(2,5)$
 (C) f is differentiable on the open interval $(2,5)$ (D) finite integral of f between 2 and 5 exists.

16. An ice sculpture in the form of a sphere melts in such a way that it maintains its spherical shape. The volume of the sphere is decreasing at a constant rate of 2π cubic meters per hour. At what rate, in square meters per hour, is the surface area of the sphere decreasing at the moment when the radius is 5 meters?
 (A) $4\pi/5$ (B) 40π
 (C) 80π (D) 100π
17. Sequence defined by $a_n = \ln(2n^3 + 2) - \ln(5n^3 + 2n^2 + 4)$ converges to
 (A) 0 (B) $\ln(2/5)$
 (C) $-\ln(2/5)$ (D) $2/5$
18. The sum of series $\sum_{n=2}^{\infty} \frac{6}{n(n+3)}$ is given by
 (A) 0 (B) $13/2$
 (C) $5/3$ (D) $13/6$
19. The area of region between the graph of $y=x^2$ and $y=-x$ from $x=0$ to $x=2$?
 (A) $2/3$ (B) $8/3$
 (C) 4 (D) $14/3$
20. An equation of line tangent to graph of $y=x+\cos(x)$ at the point $(0,1)$ is
 (A) $y=2x+1$ (B) $y=x+1$
 (C) $y=x$ (D) $y=x-1$
21. National Science Day is celebrated on:
 (A) 5 June (B) 21 June
 (C) 28 February (D) 16 October
22. Which among the following monsoon is mainly responsible for rains in India?
 (A) South-East (B) North-West
 (C) South-West (D) North-East
23. Which gas is generally used in cold stores?
 (A) Ethylene (B) Oxygen
 (C) Methane (D) Acetylene
24. Growing of coconut, black pepper and ginger simultaneously in the same field is an example of:
 (A) Relay cropping (B) Intercropping
 (C) Multiple cropping (D) Multistoried cropping
25. In pulses, limiting amino acids is:
 (A) Methionine (B) Valine
 (C) Lysine (D) Cystine

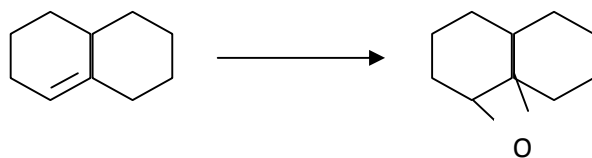
26. When a compressed gas is allowed to expand through a porous plug at a temperature above its inversion temperature, then
 (A) A fall in temperature is observed (B) A rise in temperature is observed
 (C) A rise after an initial fall in temperature is observed (D) No change in temperature is noticed
27. Gas A can be liquefied at room temperature by applying pressure but gas B cannot. This reflects
 (A) Critical temperature of B is less than that of A (B) Critical temperature of B is greater than that of A
 (C) Critical temperature of both A and B are greater than room temperature (D) No conclusion can be drawn on the critical temperature of A and B
28. Clausius-Clapeyron's equation gives the variation of
 (A) Boiling point of liquid with temperature (B) Vapour pressure of a liquid with temperature
 (C) Coefficient of viscosity of a liquid with pressure (D) Surface tension of a liquid with temperature
29. At any temperature T, the entropy of a solid substance (S_T) is given by the expression
 (A) $C_p dT$ (B) C_p/T
 (C) $\int_0^T C_p dT / T$ (D) $(C_p - C_v)/T$
30. The value of equilibrium constant for an endothermic reaction
 (A) Increases with increases of temperature (B) Decreases with increase of temperature
 (C) Is independent of temperature (D) Information not sufficient to draw any conclusion
31. Which of the following statement is not correct?
 (A) Fast reactions have low activation energy (B) Activation energy of a reaction depends on the chemical nature of reactants and products
 (C) A catalyst increases the rate of reaction by decreasing the activation energy of the reaction (D) With increase in temperature, the rate of reaction decreases in case of exothermic reactions
32. Which formula cannot be used to calculate the molar mass of a solute?
 (A) $\frac{K_b \times W_b \times 10^3}{\Delta T_b \times W_A}$ (B) $\frac{W_B RT}{\pi V}$
 (C) $\frac{\Delta T_b \times W_B \times 10^3}{K_b \times W_A}$ (D) $\frac{p_A^0 \times W_B \times M_A}{(p_A^0 - p) \times W_A}$
33. The EMF of the cell, $Zn|Zn^{2+}||Ag^+|Ag$ is independent of
 (A) The volume of Zn^{2+} and Ag^+ solutions (B) The molarity of Zn^{2+} ions in the solution
 (C) The molarity of Ag^+ ions in the solution (D) Temperature
34. What happens when electric current is passed through aqueous of sodium chloride
 (A) O_2 is evolved at cathode (B) O_2 is evolved at anode
 (C) pH of the solution gradually decreases (D) pH of the solution gradually increases

35. The dimensions of rate constant for a first order reaction involve
 (A) Time and concentration (B) Time only
 (C) Concentration only (D) Neither time nor concentration
36. The $t_{1/2}$ of a first order reaction is found to be 2 minutes. The percentage of the reaction left after 360 seconds is
 (A) 12.5 (B) 25
 (C) 15 (D) 7.5
37. The net energy change in a reversible, cyclic process is
 (A) $3/2 RT$ (B) Zero
 (C) Always >0 (D) Always <0
38. The magnetic quantum number for the last electron in the sodium atom (atomic number $z=11$) is
 (A) 3 (B) 2
 (C) 1 (D) 0
39. The octahedral molecular shape is associated with ----- hybridisation.
 (A) sp^3d (B) sp^3d^2
 (C) sp^3d^3 (D) sp^3
40. Which of the following is the strongest acid
 (A) Acetic acid (B) Propionic acid
 (C) Butanoic acid (D) Chloroacetic acid
41. An example of natural semi conductor is
 (A) boron (B) silicon
 (C) aluminium (D) Phosphorous
42. The ionic strength of a solution containing 0.02 M Na_2SO_4 and 0.01 M $MgCl_2$ is
 (A) 0.03 (B) 0.06
 (C) 0.09 (D) 0.1
43. Balmer series consists of lines in the spectral range
 (A) 100-180 nm (B) 230-340 nm
 (C) 400-700 nm (D) 900-1100 nm
44. Aluminium chloride is a/an
 (A) Lewis acid (B) Lewis base
 (C) Bronsted-Lowry acid (D) Arrhenius acid
45. The pH of 10^{-8} N HCl is approximately
 (A) 8 (B) 7.02
 (C) 7 (D) 6.96
46. Covalent character of the bond is maximum in the case of
 (A) LiCl (B) NaCl
 (C) KCl (D) $CaCl_2$
47. This species generally act as Bronsted acid and base
 (A) HSO_4^- (B) Na_2CO_3
 (C) NH_3 (D) OH^-

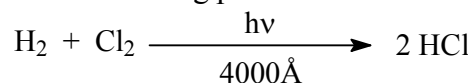
48. This serves as a differentiating solvent for HCl, H₂SO₄ and HNO₃
 (A) Liquid NH₃ (B) H₂O
 (C) Liquid CH₃COOH (D) C₆H₆
49. Silicon carbide widely used as an abrasive called carborundum belongs to the class of carbides known as
 (A) Ionic carbides (B) Interstitial carbides
 (C) Covalent carbides (D) Silicates
50. Which of the following statement concerning probability density (Ψ^2) and radial distribution function ($4\pi r^2\Psi^2$) for s-orbital of H-like species is correct?
 (A) Ψ^2 is minimum at nucleus but $4\pi r^2\Psi^2$ is maximum at nucleus (B) Ψ^2 is maximum at nucleus but $4\pi r^2\Psi^2$ is minimum at nucleus
 (C) Both Ψ^2 and $4\pi r^2\Psi^2$ are maximum at nucleus (D) Both Ψ^2 and $4\pi r^2\Psi^2$ are minimum at nucleus
51. Which conformer among the following is most unstable
 (A) (a,e) 1,2 - dimethyl cyclohexane (B) (a,e) 1,3 - dimethyl cyclohexane
 (C) (a,a) 1,3 - dimethylcyclohexane (D) (a,a) 1,4 - dimethylcyclohexane
52. Which of the following compounds readily undergoes S_N1 reactions owing to the stability of its carbonium ion



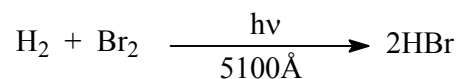
53. Which reagent effects the following conversion?



- (A) m- chloroperbenzoic acid (B) Acetic anhydride
 (C) NaOH/Br₂ (D) Acetic acid
54. 1. Consider the following photochemical reactions:



and

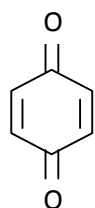


These reactions are the examples of which of the following?

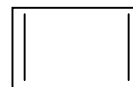
- (A) Reactions of high and low quantum yields, respectively (B) Reactions of low and high quantum yields, respectively
 (C) Reactions of quantum yields equal to one (D) Reactions of equal quantum yields but not equal to one

55. Which molecule is anti-aromatic among the following:

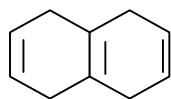
(A)



(B)



(C)



(D)



56. Acid strength of oxo-acids of halogens is in order

(A) $\text{HOI} > \text{HOBr} > \text{HOCl} > \text{HOF}$

(B) $\text{HOF} > \text{HOCl} > \text{HOBr} > \text{HOI}$

(C) $\text{HOCl} > \text{HOBr} > \text{HOI} > \text{HOF}$

(D) $\text{HOI} > \text{HOF} > \text{HOBr} > \text{HOCl}$

57. Teflon is synthesized by

(A) Free radical polymerization of tetrafluoro ethylene (C_2F_4)

(B) Condensation of hexane -1, 6- diamine and adipic acid

(C) Condensation of E-amino caproic acid

(D) Polymerization of Cyano ethylene

58. High resolution ^1H NMR spectrum of 1,3 – dichloropropane has _____ signals.

(A) One triplet and one quintet

(B) One triplet and one quartet

(C) One triplet and two doublets

(D) Two triplets and one quartet

59. Which heterocyclic compound is least aromatic among the following?

(A) Furan

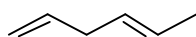
(B) Pyrrole

(C) Thiophene

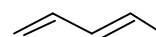
(D) Pyridine

60. Which compound will show the longest wavelength maxima in its UV spectrum?

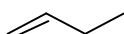
(A)



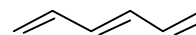
(B)



(C)



(D)



61. The $2+ \rightarrow 0+$ transition is a _____ transition:

(A) Electric dipole

(B) Magnetic dipole

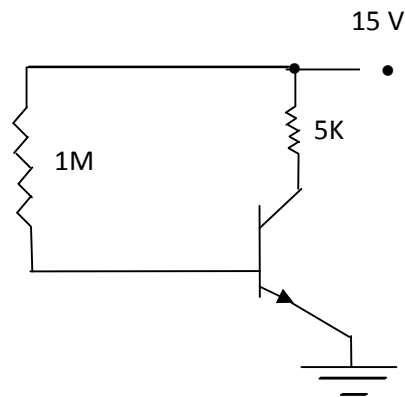
(C) Magnetic quadrupole

(D) Electric quadrupole

62. After 72 hours, the quantity of a sample of ${}_{11}^{24}\text{Na}$ is found to be 3.125% of the original sample quantity. Determine the half-life of the sample (in hrs).
 (A) 3 (B) 4.5
 (C) 9 (D) 18
63. Obtain the threshold energy (in Mev) for the reaction : ${}_{83}^{209}\text{Bi} (p, {}_1^2\text{H}) {}_{83}^{208}\text{Bi}$ [Some useful data: (Masses) $p = 938 \text{ Mev}$, ${}_{83}^{209}\text{Bi} = 208.980394 \text{ u}$; ${}_{83}^{208}\text{Bi} = 207.979731 \text{ u}$; ${}^2\text{H} = 2.014102 \text{ u}$]
 (A) 6.01842 (B) 6.04743
 (C) 6.05987 (D) 6.089765
64. From meson theory of nuclear forces, the potential energy of interaction between two nucleons is proportional to
 (A) $C \cdot \frac{e^{r/R}}{r}$ (B) $-C \cdot \frac{e^{-r/R}}{r}$
 (C) $C \cdot \frac{e^{R/r}}{r}$ (D) $-C \cdot \frac{-R/r}{r}$
65. If the observed total angular momentum of the deuteron '1' has a magnitude 1, then based on this data alone, the orbital angular momentum 'l' can take values:
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- (A) 15.9 K to 159 K (B) 159 K
(C) 15.9 K (D) Any value of R
74. The feedback signal in a(n) _____ oscillator is derived from the capacitive voltage divider in the LC circuit.
- (A) Wein bridge (B) Armstrong
(C) Colpitts (D) Hartley
75. A bridge rectifier with a capacitor input filter has an input voltage of $240 V_{\text{rms}}$. If the step-down transformer has a turns ratio of 8: 1, what is the output voltage? (ignore diode drops)
- (A) $30 V_{\text{rms}}$ (B) 42 V
(C) 60 V (D) 84 V
76. The Common – Collector configuration has a _____ input impedance and a _____ output impedance.
- (A) Low, high (B) High, low
(C) Low, low (D) High, high
77. The PIV across a non-conducting diode in a Full wave rectifier circuit equals approximately
- (A) Peak value of the secondary voltage (B) Twice the peak value of the secondary voltage
(C) Half the peak value of the secondary voltage (D) Four times the peak value of the secondary voltage
78. As compared to a silicon rectifier diode an LED has a
- (A) Lower forward voltage and lower breakdown voltage (B) Lower forward voltage and higher breakdown voltage
(C) Higher forward voltage and lower breakdown voltage (D) Higher forward voltage and higher breakdown voltage

79. The two ends of the load line for the following circuit are
(in V, mA)



- | | |
|---|---|
| <p>(A) (15, 0) & (0, 3)</p> <p>(C) (3, 0) & (0, 15)</p> | <p>(B) (0, 0) & (15, 0)</p> <p>(D) (0, 3) & (15, 3)</p> |
|---|---|
80. If the load resistance in a zener regulator circuit decreases, the zener current
- | | |
|--|---|
| <p>(A) Decreases</p> <p>(C) Remains the same</p> | <p>(B) Increases</p> <p>(D) Equals the load current</p> |
|--|---|
81. Miller indices of a plane parallel to x and z – axes are
- | | |
|-----------------------------------|-----------------------------------|
| <p>(A) (100)</p> <p>(C) (001)</p> | <p>(B) (010)</p> <p>(D) (101)</p> |
|-----------------------------------|-----------------------------------|
82. The average energy of an atomic oscillator is given by
- | | |
|--|--|
| <p>(A) $h\nu$</p> <p>(C) $\frac{h\nu}{e^{-h\nu/kt} - 1}$</p> | <p>(B) $\frac{h\nu}{e^{h\nu/kt} - 1}$</p> <p>(D) $\frac{h\nu}{(e^{-h\nu/kt} - 1)^2}$</p> |
|--|--|
83. For a non-dispersive medium
- | | |
|---|--|
| <p>(A) $\omega = vk$</p> <p>(C) $\omega = vk^3$</p> | <p>(B) $\omega = vk^2$</p> <p>(D) $\omega = vk^n (n \neq 1)$</p> |
|---|--|
84. If $a = b \neq c$ and $\alpha = \beta = \gamma = 90^\circ$, the crystal system is
- | | |
|---|---|
| <p>(A) triclinic</p> <p>(C) hexagonal</p> | <p>(B) tetragonal</p> <p>(D) monoclinic</p> |
|---|---|
85. Bravais lattice for diamond structure is
- | | |
|------------------------------|-------------------------------|
| <p>(A) sc</p> <p>(C) fcc</p> | <p>(B) bcc</p> <p>(D) hcp</p> |
|------------------------------|-------------------------------|
86. The distance between the adjacent atomic planes in CaCO_3 is 0.3 nm. The smallest angle of Bragg scattering for 0.03 nm X-ray is
- | | |
|---|--|
| <p>(A) 0°</p> <p>(C) 5.8°</p> | <p>(B) 2.9°</p> <p>(D) 90°</p> |
|---|--|

87. Phonon is the quantum of
 (A) electromagnetic wave (B) elastic wave
 (C) gravitational wave (D) deBroglie wave
88. The reciprocal lattice to direct simple cubic lattice is
 (A) simple cubic (B) Body centered cubic
 (C) face centered cubic (D) base centered cubic
89. The Fermi energy of a metal is 1.4eV, the Fermi temperature of the metal is approximately
 (A) 1.6×10^3 K (B) 1.6×10^4 K
 (C) 1.6×10^5 K (D) 1.6×10^6 K
90. A superconductor is a _____ material
 (A) diamagnetic (B) paramagnetic
 (C) ferromagnetic (D) ferrimagnetic
91. The values of a for which $\{(1,a,1),(a,1,1),(1,1,a)\}$ in R^3 are linearly independent in R^3 are:
 (A) 0,1 (B) 1,-2
 (C) 1,2 (D) all values except 1 and -2
92. Which of below are true regarding solution of following linear system of equations

$$\begin{aligned} 2x-y+z &= 2, \\ x+2y-z &= 3 \\ 3x+y+2z &= -1 \end{aligned}$$

 (A) No Solution (B) Unique solution
 (C) Infinite solutions (D) $x=0, y=0, z=0$
93. Numerical Derivative of f (0.4) using Central Difference formula from below data:
 (0.3,7.38910),(0.4,7.4633),(0.5,7.5383),(0.6,7.6141),(0.7,7.6906) equals
 (A) 0 (B) 371
 (C) 746 (D) None of above
94. The differential equation $(A x + B y) dx + (C x + D y) dy = 0$ is exact , if and only if
 (A) $A = C$ (B) $A = D$
 (C) $B = C$ (D) $B = D$
95. Which one of the following is the integrating factor for the linear differential equation
 $\frac{dy}{dx} + P(x)y = Q(x)$:
 (A) $P(x) e^{\int x}$ (B) $Q(x) e^{\int x}$
 (C) $e^{\int P(x) dx}$ (D) $e^{\int Q(x) dx}$

96. Which of the following statements is NOT equivalent to the statement, "There exists either a computer scientist or a mathematician who knows both discrete math and Bioscience."
- (A) There exists a person who is a computer scientist and who knows both discrete math and Bioscience or there exists a person who is a mathematician and who knows both discrete math and Bioscience.
- (B) There exists a person who is a computer scientist or there exists a person who is a mathematician who knows discrete math or who knows Bioscience.
- (C) There exists a person who is a computer scientist and who knows both discrete math and Bioscience or there exists a mathematician who knows both discrete math and Bioscience.
- (D) There exists a computer scientist who knows both discrete math and Bioscience or there exists a person who is a mathematician who knows both discrete math and Bioscience.
97. The values of k for which $f(x)=(1-k)k^x$ can serve as probability distribution of a random variable which takes countable infinite values $0,1,2,3,\dots$
- (A) $k>1$ (B) $0<k<1$
(C) $k<0$ (D) $k=1$
98. A teacher gives a 20 point test to 10 students. The marks are 18, 15, 12, 6, 8, 2, 3, 5, 20, 10. Find the percentile rank of a score of 12.
- (A) 65% (B) 45%
(C) 68% (D) 70%
99. Mean, Median and standard deviation for data set 10, 60, 50, 30, 40, 20 are given by
- (A) 35,35,17 (B) 34,34,17.1
(C) 30,34,19 (D) 35,35,17.1
100. If a student randomly guesses 5 multiple choice questions each having 5 choices, the probability that student gets exactly 3 right answers is given by
- (A) 0.04 (B) 0.05
(C) 0.01 (D) 0.02

M.Sc.

Answer Key PG Non Med A

Q. No.	Answer	Q. No.	Answer	Q. No.	Answer
1.	B	35.	D	69.	C
2.	A	36.	D	70.	C
3.	B	37.	B	71.	B
4.	C	38.	C	72.	B
5.	A	39.	B	73.	A
6.	D	40.	A	74.	D
7.	C	41.	B	75.	B
8.	A	42.	C	76.	A
9.	D	43.	D	77.	D
10.	B	44.	C	78.	A
11.	A	45.	A	79.	C
12.	B	46.	C	80.	D
13.	D	47.	B	81.	A
14.	B	48.	A	82.	D
15.	D	49.	C	83.	A
16.	B	50.	B	84.	B
17.	A	51.	B	85.	C
18.	B	52.	A	86.	B
19.	A	53.	C	87.	C
20.	D	54.	A	88.	B
21.	A	55.	A	89.	B
22.	B	56.	B	90.	C
23.	B	57.	B	91.	A
24.	C	58.	D	92.	B
25.	B	59.	B	93.	D
26.	C	60.	C	94.	D
27.	D	61.	B	95.	B
28.	A	62.	B	96.	C
29.	A	63.	A	97.	C
30.	D	64.	B	98.	A
31.	B	65.	A	99.	D
32.	A	66.	D	100.	A
33.	A	67.	B		
34.	A	68.	C		

Answer Key PG Non Med B

Q. No.	Answer	Q. No.	Answer	Q. No.	Answer
1.	C	35.	C	69.	D
2.	D	36.	B	70.	B
3.	A	37.	B	71.	C
4.	A	38.	A	72.	C
5.	D	39.	B	73.	A
6.	B	40.	A	74.	D
7.	A	41.	D	75.	A
8.	A	42.	B	76.	B
9.	A	43.	C	77.	A
10.	D	44.	C	78.	B
11.	D	45.	C	79.	C
12.	B	46.	B	80.	A
13.	C	47.	B	81.	D
14.	B	48.	A	82.	C
15.	A	49.	D	83.	A
16.	B	50.	B	84.	D
17.	C	51.	A	85.	B
18.	D	52.	D	86.	A
19.	C	53.	A	87.	B
20.	A	54.	C	88.	D
21.	C	55.	D	89.	B
22.	B	56.	A	90.	D
23.	A	57.	D	91.	B
24.	C	58.	A	92.	A
25.	B	59.	B	93.	B
26.	B	60.	C	94.	A
27.	A	61.	B	95.	D
28.	C	62.	C	96.	A
29.	A	63.	B	97.	B
30.	A	64.	B	98.	B
31.	B	65.	C	99.	C
32.	B	66.	A	100.	B
33.	D	67.	B		
34.	B	68.	D		

Answer Key PG Non Med C

Q. No.	Answer	Q. No.	Answer	Q. No.	Answer
1.	B	35.	C	69.	A
2.	A	36.	B	70.	D
3.	C	37.	C	71.	A
4.	A	38.	B	72.	B
5.	A	39.	B	73.	B
6.	B	40.	C	74.	C
7.	B	41.	A	75.	B
8.	D	42.	B	76.	C
9.	B	43.	D	77.	D
10.	C	44.	D	78.	A
11.	B	45.	B	79.	A
12.	B	46.	C	80.	D
13.	A	47.	C	81.	B
14.	B	48.	A	82.	A
15.	A	49.	D	83.	A
16.	D	50.	A	84.	A
17.	B	51.	B	85.	D
18.	C	52.	A	86.	D
19.	C	53.	B	87.	B
20.	C	54.	C	88.	C
21.	B	55.	A	89.	B
22.	B	56.	D	90.	A
23.	A	57.	C	91.	B
24.	D	58.	A	92.	C
25.	B	59.	D	93.	D
26.	A	60.	B	94.	C
27.	D	61.	A	95.	A
28.	A	62.	B	96.	C
29.	C	63.	D	97.	B
30.	D	64.	B	98.	A
31.	A	65.	D	99.	C
32.	D	66.	B	100.	B
33.	A	67.	A		
34.	B	68.	B		

Answer Key PG Non Med D

Q. No.	Answer	Q. No.	Answer	Q. No.	Answer
1.	A	35.	B	69.	C
2.	D	36.	A	70.	A
3.	A	37.	B	71.	C
4.	C	38.	D	72.	B
5.	D	39.	B	73.	A
6.	A	40.	D	74.	C
7.	D	41.	B	75.	B
8.	A	42.	A	76.	B
9.	B	43.	B	77.	A
10.	C	44.	A	78.	C
11.	B	45.	D	79.	A
12.	C	46.	A	80.	A
13.	B	47.	B	81.	B
14.	B	48.	B	82.	B
15.	C	49.	C	83.	D
16.	A	50.	B	84.	B
17.	B	51.	C	85.	C
18.	D	52.	D	86.	B
19.	D	53.	A	87.	B
20.	B	54.	A	88.	A
21.	C	55.	D	89.	B
22.	C	56.	B	90.	A
23.	A	57.	A	91.	D
24.	D	58.	A	92.	B
25.	A	59.	A	93.	C
26.	B	60.	D	94.	C
27.	A	61.	D	95.	C
28.	B	62.	B	96.	B
29.	C	63.	C	97.	B
30.	A	64.	B	98.	A
31.	D	65.	A	99.	D
32.	C	66.	B	100.	B
33.	A	67.	C		
34.	D	68.	D		

Answer Key PG Med A

Q. No.	Answer	Q. No.	Answer	Q. No.	Answer
1.	B	35.	A	69.	A
2.	B	36.	B	70.	D
3.	A	37.	A	71.	C
4.	C	38.	B	72.	B
5.	B	39.	C	73.	A
6.	B	40.	A	74.	C
7.	All	41.	D	75.	D
8.	A	42.	C	76.	B
9.	D	43.	A	77.	A
10.	C	44.	D	78.	C
11.	A	45.	B	79.	C
12.	C	46.	A	80.	D
13.	C	47.	B	81.	A
14.	B	48.	D	82.	C
15.	C	49.	B	83.	B
16.	C	50.	D	84.	C
17.	D	51.	B	85.	B
18.	C	52.	A	86.	A
19.	B	53.	B	87.	B
20.	C	54.	A	88.	D
21.	C	55.	D	89.	B
22.	B	56.	A	90.	D
23.	B	57.	B	91.	C
24.	B	58.	B	92.	A
25.	A	59.	C	93.	B
26.	B	60.	B	94.	C
27.	B	61.	C	95.	C
28.	D	62.	D	96.	D
29.	C	63.	A	97.	B
30.	A	64.	A	98.	C
31.	C	65.	D	99.	C
32.	C	66.	B	100.	A
33.	A	67.	A		
34.	D	68.	A		

Answer Key PG Med B

Q. No.	Answer	Q. No.	Answer	Q. No.	Answer
1.	B	35.	B	69.	C
2.	B	36.	C	70.	C
3.	D	37.	D	71.	D
4.	C	38.	A	72.	B
5.	A	39.	A	73.	C
6.	C	40.	D	74.	C
7.	C	41.	B	75.	A
8.	A	42.	A	76.	B
9.	D	43.	A	77.	B
10.	A	44.	A	78.	A
11.	B	45.	D	79.	C
12.	A	46.	C	80.	B
13.	B	47.	B	81.	B
14.	C	48.	A	82.	All
15.	A	49.	C	83.	A
16.	D	50.	D	84.	D
17.	C	51.	B	85.	C
18.	A	52.	A	86.	A
19.	D	53.	C	87.	C
20.	B	54.	C	88.	C
21.	A	55.	D	89.	B
22.	B	56.	A	90.	C
23.	D	57.	C	91.	C
24.	B	58.	B	92.	D
25.	D	59.	C	93.	C
26.	B	60.	B	94.	B
27.	A	61.	A	95.	C
28.	B	62.	B	96.	C
29.	A	63.	D	97.	B
30.	D	64.	B	98.	B
31.	A	65.	D	99.	B
32.	B	66.	C	100.	A
33.	B	67.	A		
34.	C	68.	B		

Answer Key PG Med C

Q. No.	Answer	Q. No.	Answer	Q. No.	Answer
1.	B	35.	B	69.	B
2.	A	36.	A	70.	C
3.	B	37.	B	71.	C
4.	A	38.	D	72.	B
5.	D	39.	B	73.	B
6.	A	40.	D	74.	B
7.	B	41.	C	75.	A
8.	B	42.	A	76.	B
9.	C	43.	B	77.	B
10.	B	44.	C	78.	D
11.	C	45.	C	79.	C
12.	D	46.	D	80.	A
13.	A	47.	B	81.	C
14.	A	48.	C	82.	C
15.	D	49.	C	83.	A
16.	B	50.	A	84.	D
17.	A	51.	B	85.	A
18.	A	52.	B	86.	B
19.	A	53.	A	87.	A
20.	D	54.	C	88.	B
21.	C	55.	B	89.	C
22.	B	56.	B	90.	A
23.	A	57.	All	91.	D
24.	C	58.	A	92.	C
25.	D	59.	D	93.	A
26.	B	60.	C	94.	D
27.	A	61.	A	95.	B
28.	C	62.	C	96.	A
29.	C	63.	C	97.	B
30.	D	64.	B	98.	D
31.	A	65.	C	99.	B
32.	C	66.	C	100.	D
33.	B	67.	D		
34.	C	68.	C		

Answer Key PG Med D

Q. No.	Answer	Q. No.	Answer	Q. No.	Answer
1.	B	35.	C	69.	D
2.	A	36.	A	70.	B
3.	C	37.	C	71.	A
4.	C	38.	C	72.	B
5.	D	39.	B	73.	D
6.	A	40.	C	74.	B
7.	C	41.	C	75.	D
8.	B	42.	D	76.	B
9.	C	43.	C	77.	A
10.	B	44.	B	78.	B
11.	A	45.	C	79.	A
12.	B	46.	C	80.	D
13.	D	47.	B	81.	A
14.	B	48.	B	82.	B
15.	D	49.	B	83.	B
16.	C	50.	A	84.	C
17.	A	51.	B	85.	B
18.	B	52.	B	86.	C
19.	C	53.	D	87.	D
20.	C	54.	C	88.	A
21.	D	55.	A	89.	A
22.	B	56.	C	90.	D
23.	C	57.	C	91.	B
24.	C	58.	A	92.	A
25.	A	59.	D	93.	A
26.	B	60.	A	94.	A
27.	B	61.	B	95.	D
28.	A	62.	A	96.	C
29.	C	63.	B	97.	B
30.	B	64.	C	98.	A
31.	B	65.	A	99.	C
32.	All	66.	D	100	D
33.	A	67.	C		
34.	D	68.	A		