

HORIZON ACADEMY[®]

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Name.:

Date :

Test No.:

Subject Code.:

Time : 3 Hrs.

M.M. : 720

HORIZON TEST SERIES

for
**Medical
Entrance Exam.**
2016

[SET - B]

INSTRUCTIONS FOR STUDENTS

1. Read each question carefully.
2. It is mandatory to use Blue/Black Ball Point Pen to darken the appropriate circle in the answer sheet.
3. Mark should be dark and should complete fill the circle.
4. Rough work must be done on the Question Paper, no additional sheet will be provided for this purpose.
5. Do not use white-fluid or any other rubbing material on answer sheet. No change in the answer once marked.
6. Student cannot use log tables and calculators or any other material in the examination hall.
7. Before attempting the question paper, student should ensure that the test paper contains all pages and no page is missing.
8. Each correct answer carries four marks. One mark will be deducted for each incorrect answer from the total score.
9. Before handing over the answer sheet to the invigilator, candidate should check the particulars have been filled and marked correctly.
10. Immediately after the prescribed examination time is over, the answer sheet to be returned to the invigilator.
11. Use of Calculator and other Electronic device is not permitted.

Test No. 27

Topics of The Test

Physics	Electrostatics
Chemistry	Aldehydes & Ketones
Biology	Zoology : Porifera, Coelenterata, Ctenophora, Platyhelminthes, Nematelminthes Botany : Biological Classification & Plant growth.

Test No. 27

[PHYSICS]

- In a region of constant potential
 - the electric field is uniform
 - the electric field is zero
 - there can be no charge inside the region
 - both (B) and (C) are correct
- A cube of side x has a charge q at each of its vertices. The potential due to this charge array at the centre of the cube is

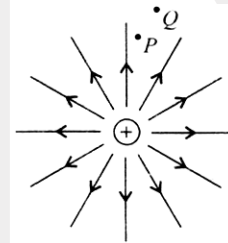
(A) $\frac{4q}{3\pi\epsilon_0 x}$	(B) $\frac{4q}{\sqrt{3}\pi\epsilon_0 x}$
(C) $\frac{3q}{4\pi\epsilon_0 x}$	(D) $\frac{3q}{\sqrt{3}\pi\epsilon_0 x}$
- The potential at a point due to a charge of 5×10^{-7} C located 10 cm away is 4.5×10^4 V, work done in bringing a charge of 4×10^{-9} C from infinity to that point is

(A) 2.4×10^{-4} J	(B) 1.8×10^{-4} J
(C) 3.2×10^{-5} J	(D) 4.1×10^{-5} J
- The electric potential at a point in free space due to a charge Q coulomb is $Q \times 10^{11}$ V. The electric field at that point is

(A) $12\pi\epsilon_0 Q \times 10^{22}$ V m $^{-1}$
(B) $4\pi\epsilon_0 Q \times 10^{22}$ V m $^{-1}$
(C) $12\pi\epsilon_0 Q \times 10^{20}$ V m $^{-1}$
(D) $4\pi\epsilon_0 Q \times 10^{20}$ V m $^{-1}$
- A molecule of a substance has a permanent electric dipole moment of magnitude 10^{-30} cm. A mole of this substance is polarised by applying a strong electrostatic field of magnitude 10^7 V m $^{-1}$. The direction of field is changed by an angle 60° . The heat released by the substance in aligning its dipole along the new direction of the field is Assume 100 % polarization

- | | |
|----------|----------|
| (A) -6 J | (B) -3 J |
| (C) 3 J | (D) 6 J |
- The distance between H^+ and Cl^- ions in HCl molecules is 1.38 \AA . The potential due to this dipole at a distance of 10 \AA on the axis of dipole is

(A) 2.1 V	(B) 1.8 V
(C) 0.2 V	(D) 1.2 V
 - Figure shows the field lines of a positive point charge. The work done by the field in moving a small positive charge from Q to P is



- | | |
|--------------|-----------------------|
| (A) zero | (B) positive |
| (C) negative | (D) data insufficient |
- Two thin wire rings each having a radius R are placed at a distance d apart with their axes coinciding. The charges on the two rings are $+q$ and $-q$. The potential difference between the centres of the the two rings is

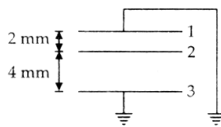
(A) $\frac{q}{4\pi\epsilon_0} \left[\frac{1}{R} - \frac{1}{\sqrt{R^2 + d^2}} \right]$
(B) zero
(C) $\frac{q}{2\pi\epsilon_0} \left[\frac{1}{R} - \frac{1}{\sqrt{R^2 + d^2}} \right]$
(D) $\frac{qR}{4\pi\epsilon_0 d^2}$

Space for Rough Work

9. Two tiny spheres carrying charges $1.8\mu\text{C}$ and $2.8\mu\text{C}$ are located at 40 cm apart. The potential at the mid-point of the line joining the two charges is
 (A) $3.8 \times 10^4\text{V}$ (B) $2.1 \times 10^5\text{V}$
 (C) $4.3 \times 10^4\text{V}$ (D) $3.6 \times 10^5\text{V}$
10. Two tiny spheres carrying charges $1.8\mu\text{C}$ and $2.8\mu\text{C}$ are located at 40 cm apart, the potential at a point 20 cm from the mid-point of the line joining the two charges in a plane normal to the line and passing through the mid-point is
 (A) $1.4 \times 10^5\text{V}$ (B) $4.2 \times 10^3\text{V}$
 (C) $2.9 \times 10^5\text{V}$ (D) $3.7 \times 10^5\text{V}$
11. Consider a uniform electric field in the z-direction. The potential is a constant
 (A) for any x for a given z
 (B) for any y for a given z
 (C) on the x - y plane for a given z
 (D) all of these
12. Equipotential surfaces
 (A) are closer in regions of large electric fields compared to regions of lower electric fields
 (B) will be more crowded near sharp edges of a conductor
 (C) will always be equally spaced
 (D) both (A) and (B) are correct
13. Two charges of magnitude 5 nC and -2 nC , one placed at points (2 cm, 0, 0) and (x cm, 0, 0) in a region of space, where there is no other external field. If the electrostatic potential energy of the system is $-0.5\mu\text{J}$. The value of x is
 (A) 20 cm (B) 80 cm
 (C) 4 cm (D) 16 cm
14. A test charge is moved from low potential point to a higher potential point. The potential energy of test charge will
 (A) remains the same (B) increase
 (C) decrease (D) becomes zero
15. An electric dipole of moment \vec{p} is placed in a uniform electric field \vec{E} . Then
 (i) the torque on the dipole is $\vec{p} \times \vec{E}$
 (ii) the potential energy of the system is $\vec{p} \cdot \vec{E}$
 (iii) the resultant force on the dipole is zero
 Choose the correct option.
 (A) (i), (ii) and (iii) are correct
 (B) (i) and (iii) are correct and (ii) is wrong
 (C) only (i) is correct
 (D) (i) and (ii) are correct and (iii) is wrong
16. If a conductor has a potential $V \neq 0$ and there are no charges anywhere else outside, then
 (A) there must be charges on the surface or inside itself.
 (B) there cannot be any charge in the body of the conductor.
 (C) there must be charges only on the surface.
 (D) both (A) and (B) are correct.
17. Which of the following statements is false for a perfect conductor?
 (A) The surface of the conductor is an equipotential surface.
 (B) The electric field just outside the surface of a conductor is perpendicular to the surface.
 (C) The charge carried by a conductor is always uniformly distributed over the surface of the conductor.
 (D) None of these
18. Two metal spheres, one of radius R and the other of radius $2R$, both have same surface charge density σ . If they are brought in contact and separated, then the new surface charge densities on each of the sphere are respectively.
 (A) $\frac{5}{2}\sigma, \frac{5}{4}\sigma$ (B) $\frac{5}{3}\sigma, \frac{5}{6}\sigma$
 (C) $\frac{3}{5}\sigma, \frac{6}{5}\sigma$ (D) $\frac{2}{3}\sigma, \frac{1}{2}\sigma$

Space for Rough Work

19. Two charged conducting spheres of radii a and b are connected to each other by a wire. The ratio of electric fields at the surfaces of two spheres is
- (A) $\frac{a}{b}$ (B) $\frac{b}{a}$
 (C) $\frac{a^2}{b^2}$ (D) $\frac{b^2}{a^2}$
20. Which among the following is an example of polar molecule ?
- (A) O_2 (B) H_2
 (C) N_2 (D) HCl
21. Choose the correct statement.
- (A) Polar molecules have permanent electric dipole moment.
 (B) CO_2 molecule is a polar molecule.
 (C) H_2O is a non-polar molecule.
 (D) The dipole field at large distances falls of as $\frac{1}{r^2}$.
22. Dielectric constant for a metal is
- (A) zero (B) infinite
 (C) 1 (D) 10
23. A parallel plate capacitor with air between the plates has a capacitance of 10 pF. The capacitance, if the distance between the plates is reduced by half and the space between them is filled with a substance of dielectric constant 4 is
- (A) 80 pF (B) 96 pF
 (C) 100 pF (D) 120 pF
24. Metallic sphere of radius R is charged to potential V . The charge q is proportional to
- (A) V (B) R
 (C) both V and R (D) none of these
25. Two parallel conducting plates of area $A = 2.5 \text{ m}^2$ each are placed 6 mm apart and are both earthed. A third plate, identical with the first two, is placed at a distance of 2 mm from one of the earthed plates and is given a charge of 1 C. The potential of the central plate is



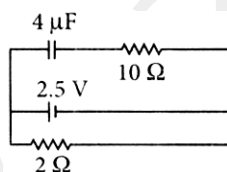
- (A) $6 \times 10^7 \text{ V}$ (B) $3 \times 10^7 \text{ V}$
 (C) $4 \times 10^7 \text{ V}$ (D) $2 \times 10^7 \text{ V}$
26. A parallel plate air capacitor is charged to a potential difference of V volts. After disconnecting the charging battery the distance between the plates of the capacitor is increased using an insulating handle. As a result the potential difference between the plates.
- (A) increases (B) decreases
 (C) does not change (D) becomes zero
27. A parallel plates air capacitor has a capacitance C . When it is half filled with a dielectric of dielectric constant 5, the percentage increase in the capacitance will be
- (A) 400% (B) 66.6%
 (C) 33.3% (D) 200%
28. In a parallel plate capacitor, the capacity increases if
- (A) area of the plate is decreased
 (B) distance between the plates increases
 (C) area of the plate is increased
 (D) dielectric constant decreases
29. The capacitance of a parallel plate capacitor with air as medium is $3 \mu\text{F}$. With the introduction of a dielectric medium between the plates, the capacitance becomes $15 \mu\text{F}$. The permittivity of the medium is
- (A) $5 \text{ C}^2\text{N}^{-1}\text{m}^{-2}$
 (B) $15 \text{ C}^2\text{N}^{-1}\text{m}^{-2}$
 (C) $0.44 \times 10^{-10} \text{ C}^2\text{N}^{-1}\text{m}^{-2}$
 (D) $8.854 \times 10^{-11} \text{ C}^2\text{N}^{-1}\text{m}^{-2}$
30. A parallel plate capacitor having area A and separated by distance d is filled by copper plate of thickness b . The new capacity is
- (A) $\frac{\epsilon_0 A}{d - \frac{b}{2}}$ (B) $\frac{\epsilon_0 A}{2d}$
 (C) $\frac{\epsilon_0 A}{d - b}$ (D) $\frac{\epsilon_0 A}{d - \frac{b}{2}}$

Space for Rough Work

31. A parallel plate capacitor is made by placing n equally spaced plates connected alternatively. If the capacitance between any two adjacent plates is C then the resultant capacitance is
- (A) nC (B) $\frac{C}{n}$
 (C) $(n+1)C$ (D) $(n-1)C$
32. A capacitor has some dielectric between its plates, and the capacitor is connected to a dc source. The battery is now disconnected and then the dielectric is removed, then
- (A) capacitance will increase.
 (B) energy stored will decrease
 (C) electric field will increase
 (D) voltage will decrease
33. The number of ways one can arrange three identical capacitors to obtain distinct effective capacitances is
- (A) 8 (B) 6
 (C) 4 (D) 3
34. Three capacitors each of capacity $4\mu\text{F}$ are to be connected in such a way that the effective capacitance is $6\mu\text{F}$. This can be done by
- (A) connecting them in series
 (B) connecting them in parallel
 (C) connecting two in series and one in parallel
 (D) connecting two in parallel and one in series
35. A capacitor of capacitance C_1 is charged to a potential V and then connected in parallel to an uncharged capacitor of capacitance C_2 . The final potential difference across each capacitor will
- (A) $\frac{C_1V}{C_1+C_2}$ (B) $\frac{C_2V}{C_1+C_2}$
 (C) $1+\frac{C_2}{C_1}$ (D) $1-\frac{C_2}{C_1}$
36. Minimum number of capacitors each of $8\mu\text{F}$ and 250 V used to make a composite capacitor of $16\mu\text{F}$ and 1000 V are
- (A) 8 (B) 32
 (C) 16 (D) 24
37. Two capacitors of $2\mu\text{F}$ and $4\mu\text{F}$ are connected in parallel. A third capacitor of $6\mu\text{F}$ is connected in series. The combination is connected across a 12 V battery. The voltage across $2\mu\text{F}$ capacitor is
- (A) 2 V (B) 8 V
 (C) 6 V (D) 1 V
38. A capacitor of capacitance 700 pF is charged by 100 V battery. The electrostatic energy stored by the capacitor is
- (A) $2.5 \times 10^{-8}\text{ J}$ (B) $3.5 \times 10^{-6}\text{ J}$
 (C) $2.5 \times 10^{-4}\text{ J}$ (D) $3.5 \times 10^{-4}\text{ J}$
39. A capacitor is charged through a potential difference of 200 V , when 0.1 C charge is stored in it. The amount of energy released by it, when it is discharged is
- (A) 5 J (B) 10 J
 (C) 20 J (D) 2.5 J
40. A parallel plate capacitor has a uniform electric field E in the space between the plates. If the distance between the plates is d and area of each plate is A , the energy stored in the capacitor is
- (A) $\frac{1}{2}\epsilon_0 E^2$ (B) $\frac{E^2 Ad}{\epsilon_0}$
 (C) $\frac{1}{2}\epsilon_0 E^2 Ad$ (D) $\epsilon_0 E^2 Ad$
41. A parallel plate capacitor is filled by a dielectric whose relative permittivity varies with the applied voltage (V) as $\epsilon = \alpha V$ where $\alpha = 2V^{-1}$. A similar capacitor with no dielectric is charged to $V_0 = 78\text{ V}$. It is then connected to the uncharged capacitor with the dielectric. Final voltage on the capacitor is
- (A) 2 V (B) 3 V
 (C) 5 V (D) 6 V

Space for Rough Work

42. Two identical capacitors are joined in parallel, charged to a potential V , separated and then connected in series, the positive plate of one is connected to the negative of the other. Which of the following is true?
- (A) The charges on the free plates connected together are destroyed
 (B) The energy stored in the system increases.
 (C) The potential difference between the free plates is $2V$
 (D) The potential difference remains constant
43. Two spherical conductors each of capacity C are charged to potential V and $-V$. These are then connected by means of a fine wire. The loss of energy is
- (A) Zero
 (B) $\frac{1}{2} CV^2$
 (C) CV^2
 (D) $2CV^2$
44. A capacitor of $4\mu F$ is connected as shown in the circuit. The internal resistance of the battery is 0.5Ω . The amount of charge on the capacitor plates will be



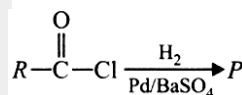
- (A) 0
 (B) $4\mu C$
 (C) $16\mu C$
 (D) $8\mu C$
45. Equipotentials at a great distance from a collection of charges whose total sum is not zero are approximately
- (A) spheres
 (B) planes
 (C) paraboloids
 (D) ellipsoids

[CHEMISTRY]

46. Which of the following structures is not correctly matched?

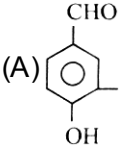
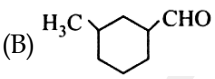
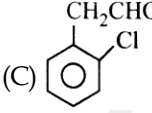
- (A) α -Methoxypropionaldehyde - $\text{H}_3\text{C}-\overset{\text{H}_3\text{CO}}{\underset{|}{\text{CH}}}-\overset{\text{O}}{\parallel}{\text{C}}-\text{H}$
 (B) 3-Hydroxybutanal - $\text{CH}_3-\overset{\text{OH}}{\underset{|}{\text{CH}}}-\text{CH}_2\text{CHO}$
 (C) 4-Oxopentanal - $\text{CH}_3\text{CH}_2\text{CH}_2-\overset{\text{O}}{\parallel}{\text{C}}-\text{CHO}$
 (D) Di-sec.-butylketone - $\text{CH}_3\text{CH}_2-\overset{\text{CH}_3}{\underset{|}{\text{CH}}}-\overset{\text{O}}{\parallel}{\text{C}}-\overset{\text{CH}_3}{\underset{|}{\text{CH}}}-\text{CH}_2\text{CH}_3$

47. Ketones ($R-\overset{\text{O}}{\parallel}{\text{C}}-R'$) can be obtained in one step by (where R and R' are alkyl groups)
- (A) hydrolysis of esters
 (B) oxidation of primary alcohols
 (C) oxidation of secondary alcohols
 (D) reaction of alkyl halides with alcohols
48. In the following reaction, product (P) is

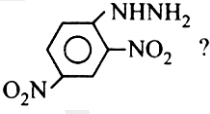


- (A) $R\text{CHO}$
 (B) $R\text{CH}_3$
 (C) $R\text{COOH}$
 (D) $R\text{CH}_2\text{OH}$
49. The addition of HCN to carbonyl compounds is an example of
- (A) nucleophilic addition
 (B) electrophilic addition
 (C) free radical addition
 (D) electromeric addition
50. An organic compound of molecular formula $\text{C}_3\text{H}_6\text{O}$ did not give a silver mirror with Tollen's reagent but gave an oxime with hydroxylamine. It may be
- (A) $\text{CH}_2=\text{CH}-\text{CH}_2-\text{OH}$
 (B) CH_3COCH_3
 (C) $\text{CH}_3\text{CH}_2\text{CHO}$
 (D) $\text{CH}_2=\text{CH}-\text{OCH}_3$

Space for Rough Work

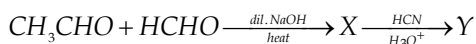
51. In nucleophilic addition reactions, the reactivity of carbonyl compounds follows the order
 (A) $\text{HCHO} > \text{RCHO} > \text{ArCHO} > \text{R}_2\text{CO} > \text{Ar}_2\text{CO}$
 (B) $\text{HCHO} > \text{R}_2\text{CO} > \text{Ar}_2\text{CO} > \text{RCHO} > \text{ArCHO}$
 (C) $\text{Ar}_2\text{CO} > \text{R}_2\text{CO} > \text{ArCHO} > \text{RCHO} > \text{HCHO}$
 (D) $\text{ArCHO} > \text{Ar}_2\text{CO} > \text{RCHO} > \text{R}_2\text{CO} > \text{HCHO}$
52. Which of the following names of the organic compounds is not correctly written?
 (A)  - 4-Hydroxy-3-methoxybenzaldehyde
 (B)  - 5-Methylcyclohexanecarbaldehyde
 (C)  - 2-(2-Chlorophenyl)ethanal
 (D) $\text{CH}_2=\text{CH}-\overset{\text{O}}{\parallel}{\text{C}}-\text{CH}=\text{CH}_2$ - Penta-1, 4-dien-3-one
53. A diene, buta-1,3-diene was subjected to ozonolysis to prepare aldehydes. Which of the following aldehydes will be obtained during the reaction?
 (A) $\begin{array}{c} \text{CHO} \\ | \\ \text{CHO} \end{array} + 2\text{HCHO}$
 (B) $\text{CH}_3\text{CHO} + 2\text{HCHO}$
 (C) $\text{CH}_3\text{CH}_2\text{CHO} + \text{CH}_3\text{CHO}$
 (D) $2\text{CH}_3\text{CH}_2\text{CHO}$
54. Benzaldehyde can be prepared from benzene by passing vapours of and in its solution in presence of catalyst mixture of aluminium chloride and cuprous chloride. The reaction is known as
 (A) HCl , SnCl_4 , Rosenmund reduction
 (B) CO , HCl , Gattermann-Koch reaction
 (C) CO_2 , H_2SO_4 , Clemmensen reduction
 (D) O_3 , alcohol, Wolff-Kishner reduction
55. Aldehydes other than formaldehyde react with Grignard's reagent to give addition products which on hydrolysis give
 (A) tertiary alcohols
 (B) secondary alcohols
 (C) primary alcohols
 (D) carboxylic acids
56. Which of the following will not give aldol condensation?
 (A) Phenyl acetaldehyde
 (B) 2-Methylpentanal
 (C) benzaldehyde
 (D) 1-Phenylpropanone
57. A compound (X) with a molecular formula $\text{C}_5\text{H}_{10}\text{O}$ gives a positive 2,4-DNP test but negative Tollen's test. On oxidation it gives a carboxylic acid (Y) with a molecular formula $\text{C}_3\text{H}_6\text{O}_2$. Potassium salt of (Y) undergoes Kolbe's reaction and gives a hydrocarbon (Z). (X), (Y) and (Z) respectively are
 (A) pentan-3-one, propanoic acid, butane
 (B) pentanal, pentanoic acid, octane
 (C) 2-methylbutanone, butanoic acid, hexane
 (D) 2,2-dimethylpropanone, propanoic acid, hexane
58. An organic compound (X) with molecular formula $\text{C}_9\text{H}_{10}\text{O}$ gives positive 2,4-DNP and Tollen's tests. It undergoes Cannizzaro reaction and on vigorous oxidation it gives, 1,4-benzenedicarboxylic acid. Compound (X) is
 (A) benzaldehyde
 (B) *o*-methylbenzaldehyde
 (C) *p*-ethylbenzaldehyde
 (D) 2,2-dimethylhexanal
59. Which of the following compounds does not react with NaHSO_3 ?
 (A) HCHO (B) $\text{C}_6\text{H}_5\text{COCH}_3$
 (C) CH_3COCH_3 (D) CH_3CHO

Space for Rough Work

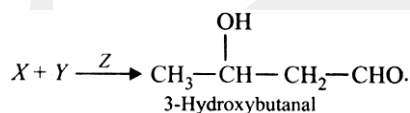
60. Compound (X) with molecular formula C_3H_8O is treated with acidified potassium dichromate to form a product (Y) with molecular formula C_3H_6O . (Y) does not form a shining silver mirror on warming with ammoniacal $AgNO_3$. (Y) when treated with an aqueous solution of $NH_2CONHNH_2$, HCl and sodium acetate to give a product (Z). The structure of (Z) is
- (A) $CH_3CH_2CH = NNHCONH_2$
 (B) $(CH_3)_2C = NNHCONH_2$
 (C) $(CH_3)_2C = NCONHNH_2$
 (D) $CH_3CH_2CH = NCONHNH_2$
61. The condensation product of benzaldehyde and acetone is
- (A) $C_6H_5CH=C(CH_3)_2$
 (B) $C_6H_5CH_2-C(=O)-CH=CH_2$
 (C) $C_6H_5-C(=O)-CH=CH-CH_3$
 (D) $C_6H_5-CH=CH-C(=O)-CH_3$
62. Which of the following statements is incorrect ?
- (A) $FeCl_3$ is used in the detection of phenols
 (B) Fehling solution is used in the detection of glucose
 (C) Tollens' reagent is used in the detection of unsaturation
 (D) $NaHSO_3$ is used in the detection of carbonyl compounds
63. Arrange the following compounds in increasing order of their reactivity in nucleophilic addition reactions. Ethanal, Propanal, Propanone, Butanone
- (A) Butanone < Propanone < Propanal < Ethanal
 (B) Propanone < Butanone < Ethanal > Propanal
 (C) Propanal < Ethanal < Propanone < Butanone
 (D) Ethanal < Propanal < Propanone < Butanone
64. $R-CH=CH-CHO + NH_2-C(=O)-NHNH_2 \xrightarrow{H^+} X$
 (X) in the above reaction is
- (A) $R-CH=CH-\overset{OH}{\underset{|}{CH}}-NH_2CONHNH_2$
 (B) $R-CH=CH-CH=N-NH-C(=O)-NH_2$
 (C) $R-CH=NH_2CONH_2$
 (D) $R-CH=CH-\overset{OH}{\underset{|}{CH}}-NH_2COCH=NHNH_2$
65. Which of the following compounds will give a coloured crystalline compound with  ?
- (A) CH_3COCl (B) $CH_3COOC_2H_5$
 (C) CH_3COCH_3 (D) CH_3CONH_2
66. The product of hydrolysis of ozonide of 1-butene are
- (A) ethanal only
 (B) ethanal and methanal
 (C) propanal and methanal
 (D) methanal only
67. Identify reactant (X) in the given reaction sequence
- $$CH_3COCH_3 + X \rightarrow (CH_3)_3C-OMg-Cl \xrightarrow{H_2O} (CH_3)_3C-OH + Mg \begin{matrix} \swarrow OH \\ \searrow Cl \end{matrix}$$
- (A) CH_3MgCl (B) $CH_3COCl + Mg$
 (C) $MgCl_2$ (D) CH_3CH_2MgCl
68. Which of the following compounds will undergo Cannizzaro reaction ?
- (A) CH_3CHO (B) CH_3COCH_3
 (C) C_6H_5CHO (D) $C_6H_5CH_2CHO$

Space for Rough Work

69. Study the following sequence of reactions and identify the product (Y).



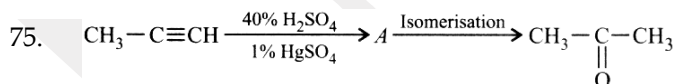
- (A) $\text{CH}_2=\text{CH}-\underset{\text{OH}}{\text{CH}}-\text{COOH}$
- (B) $\text{CH}_3-\overset{\text{CN}}{\underset{\text{OH}}{\text{C}}}-\text{COOH}$
- (C) $\text{CH}_3\text{CH}_2-\underset{\text{OH}}{\text{CH}}-\text{COOH}$
- (D) $\text{CH}_2=\text{CH}-\underset{\text{CN}}{\text{CH}}-\text{COOH}$
70. Benzoyl chloride on reduction with $\text{H}_2/\text{Pd}-\text{BaSO}_4$ produces
- (A) benzoic acid (B) benzyl alcohol
(C) benzoyl sulphate (D) benzaldehyde
71. Identify (X), (Y) and (Z) in the given reaction



- | | X | Y | Z |
|-----|------------------------------------|-------------------------|-------------------------|
| (A) | HCHO | CH_3CHO | KOH |
| (B) | CH_3CHO | CH_3CHO | NaOH |
| (C) | $\text{CH}_3\text{CH}_2\text{OH}$ | HCHO | H_2SO_4 |
| (D) | $\text{CH}_3\text{CH}_2\text{CHO}$ | HCHO | Dry ether |
72. Propanal on treatment with dilute sodium hydroxide gives
- (A) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CHO}$
(B) $\text{CH}_3\text{CH}_2\text{CH}(\text{OH})\text{CH}_2\text{CH}_2\text{CHO}$
(C) $\text{CH}_3\text{CH}_2\text{CH}(\text{OH})\text{CH}(\text{CH}_3)\text{CHO}$
(D) $\text{CH}_3\text{CH}_2\text{COOH}$

73. What is the product formed on reaction of benzaldehyde with conc. KOH solution?

- (A) $\text{KO}-\text{C}_6\text{H}_5\text{CHO}$
(B) $\text{C}_6\text{H}_5\text{COOK} + \text{C}_6\text{H}_5\text{CH}_2\text{OH}$
(C) $\text{KO}-\text{C}_6\text{H}_5\text{COOK} + \text{KOC}_6\text{H}_5\text{OK}$
(D) $\text{C}_6\text{H}_5\text{COOK} + \text{C}_6\text{H}_5\text{OK}$
74. What is the test to differentiate between pentan-2-one and pentan-3-one?
- (A) Iodoform test (B) Benedict's test
(C) Fehling's test (D) Aldol condensation test



Structure of A and type of isomerism in the above reaction are

- (A) Prop-1-en-2-ol, metamerism
(B) Prop-1-en-1-ol, tautomerism
(C) Prop-2-en-2-ol, geometrical isomerism
(D) Prop-1-en-2-ol, tautomerism
76. Various products formed on oxidation of 2,5-dimethylhexan-3-one are
- (i) $\text{CH}_3-\underset{\text{CH}_3}{\text{CH}}-\text{COOH}$
- (ii) $\text{CH}_3-\underset{\text{CH}_3}{\text{CH}}-\text{CH}_2-\text{COOH}$
- (iii) CH_3COOH
- (iv) HCOOH
- (A) (i) and (iii)
(B) (i), (ii) and (iii)
(C) (i), (ii), (iii) and (iv)
(D) (iii) and (iv)

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77. Alkene (X)(C₅H₁₀) on ozonolysis gives a mixture of two compounds (Y) and (Z). Compound (Y) gives positive Fehling's test and iodoform test. Compound (Z) does not give Fehling's test but give iodoform test. Compounds (X), (Y) and (Z) are

X	Y	Z
(A) C ₆ H ₅ COCH ₃	CH ₃ CHO	CH ₃ COCH ₃
(B) CH ₃ -CH=C-CH ₃ CH ₃	CH ₃ CHO	CH ₃ COCH ₃
(C) CH ₃ CH ₂ CH=CH ₂	CH ₃ CH ₂ CHO	HCHO
(D) CH ₃ -CH=CH-CH ₃	CH ₃ CHO	CH ₃ CHO

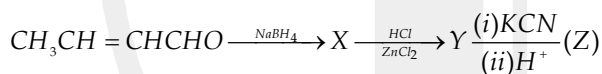
78. The best oxidising agent for oxidation of CH₃-CH=CH-CHO to CH₃-CH=CH-COOH is

(A) Baeyer's reagent (B) Tollen's reagent
(C) Schiff's reagent (D) Acidified dichromate

79. Which of the following statements is not correct ?

(A) Aldehydes and ketones are functional isomers.
(B) Formaldehyde reacts with ammonia to form hexamethylenetetramine.
(C) LiAlH₄ converts ketones into *sec*-alcohols.
(D) Ethanal and propanal can be distinguished by iodoform test.

80. The end product (Z) in the given sequence of reaction is



- (A) CH₃CH=CHCH₂COOH
(B) CH₃CH₂CH₂COOH
(C) CH₃CH=CHCOOH
(D) CH₃CH(Cl)CH₂COOH

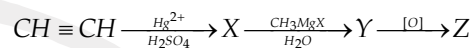
81. What are the correct steps to convert acetaldehyde to acetone ?

(A) CH₃MgBr, H₂O, Oxidation
(B) Oxidation, Ca(OH)₂, Heat
(C) Reduction, KCN, Hydrolysis
(D) Oxidation, C₂H₅ONa, Heat

82. Hydrocarbons are formed when aldehydes and ketones are reacted with amalgamated zinc and conc. HCl. The reaction is called

(A) Cannizzaro reaction
(B) Clemmensen reduction
(C) Rosenmund reduction
(D) Wolff-Kishner reduction

83. In the following sequence of reaction, the final product (Z) is

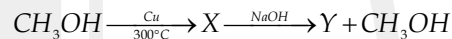


(A) ethanal (B) propan-2-ol
(C) propanone (D) propan-1-ol

84. The order of reactivity of CH₃CHO, CH₃COC₂H₅ and CH₃COCH₃ is

(A) CH₃CHO > CH₃COCH₃ > CH₃COC₂H₅
(B) C₂H₅COCH₃ > CH₃COCH₃ > CH₃CHO
(C) CH₃COCH₃ > CH₃CHO > C₂H₅COCH₃
(D) CH₃COCH₃ > C₂H₅COCH₃ > CH₃CHO

85. The final product (Y) in the following sequence of chemical reaction is



(A) an alkene
(B) a carboxylic acid
(C) an aldehyde
(D) sodium salt of carboxylic acid

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

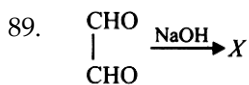
(A) FCH₂CHO (B) ClCH₂CHO
(C) BrCH₂CHO (D) ICH₂CHO

87. Which of the following carbonyl compounds is most polar ?

(A) C₂H₅-C(=O)-C₂H₅ (B) CH₃-C(=O)-CH₃
(C) CH₃-C(=O)-H (D) H-C(=O)-H

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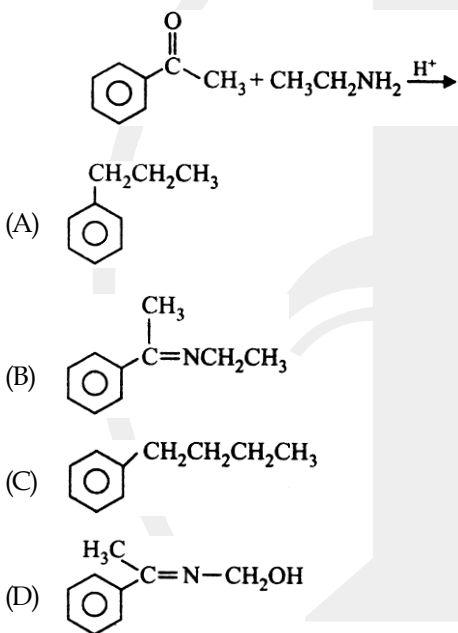
88. Which of the following aldehydes will show Cannizzaro reaction ?
 (A) HCHO (B) C₆H₅CHO
 (C) (CH₃)₃CCHO (D) All of these



The product (X) will be

- (A) $\begin{array}{c} \text{CH}_2\text{ONa} \\ | \\ \text{COONa} \end{array}$ (B) $\begin{array}{c} \text{COOH} \\ | \\ \text{COOH} \end{array}$
 (C) $\begin{array}{c} \text{CH}_2\text{OH} \\ | \\ \text{COONa} \end{array}$ (D) $\begin{array}{c} \text{CH}_2\text{OH} \\ | \\ \text{CH}_2\text{OH} \end{array}$

90. Find the product of the given reaction.



[ZOOLOGY]

91. Which of the following phyla contains most primitive multicellular animals?
 (A) protozoa (B) porifera
 (C) coelentrata (D) minor phyla

92. Which of the following includes glassy sponges?
 (A) Calcarea (B) Hexactinellida
 (C) Demospongia (D) None of the above
93. Radially symmetrical lower invertebrates (Radiata).
 (A) Porifera (B) Cnidaria
 (C) Platyhelminthes (D) Annelida
94. Hydra belongs to the class
 (A) Anthozoa (B) Hydrozoa
 (C) Scyphozoa (D) Sporozoa
95. Which of the following is also known as *organ pipe coral*?
 (A) *Clavularia* (B) *Tubipora*
 (C) *Campanularia* (D) *Sertularia*
96. Which of the following is not a class of platyhelminthes?
 (A) Cestoda (B) Eucestoda
 (C) Turbellaria (D) Trematoda
97. Which of the following classes of platyhelminthes is exclusively endoparasitic?
 (A) Trematoda (B) Cestoda
 (C) Turbellaria (D) All of the above
98. In which of the following classes suckers are absent?
 (A) Cestoda (B) Eucestoda
 (C) Turbellaria (D) Trematoda
99. The number of classes in phylum Nematoda are
 (A) Two (B) Three
 (C) Four (D) Only one
100. The term 'phasmids' means
 (A) Pharynx
 (B) Body segments
 (C) Caudal sensory organs
 (D) Worms
101. Which of the following is common to all sponges?
 (A) Incurrent canal (B) Radial canal
 (C) Prosopyl (D) Paragastric cavity
102. Paragastric cavity is present in
 (A) *Leucosolenia* only
 (B) Marine sponges
 (C) Fresh water sponges
 (D) All sponges

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103. Largest sponge is
 (A) *Olynthus* (B) *Hippospongia*
 (C) *Spongia* (D) *Spheclospongia*
104. Which is absent in sponges?
 (A) Sexual reproduction
 (B) Cellular differentiation
 (C) Body plan
 (D) Appendages
105. Sponges belong to class calcarea occur in
 (A) Fresh water
 (B) Shallow sea water
 (C) Deep sea water
 (D) Some marine, other fresh water
106. Sponges are
 (A) Pelagic (B) Nekton
 (C) Sessile (D) Plankton
107. Difference between sponges and other metazoa is
 (A) Sponges possess cellular level of organization
 (B) Sponges do not have cell division
 (C) Sponges do not have division of labour
 (D) Sponges do not contain blood
108. Sponges are more advanced than protozoa because
 (A) They have gastric cavity
 (B) Division of labour among the cells
 (C) They have locomotory organs
 (D) They show regeneration
109. Match the column I with column II and select the correct code given below
- | Column I | Column II |
|------------------|---------------------------------------|
| (A) Myocytes | (I) Flagellated, used in feeding |
| (B) Choanocytes | (II) Blunt pseudopodium totipotent |
| (C) Thesocytes | (III) Contractile, works as sphincter |
| (D) Archaeocytes | (IV) Rounded, reserve food material |
- Codes:**
- | (a) | (b) | (c) | (d) |
|---------|-----|-----|-----|
| (A) III | I | IV | II |
| (B) I | III | IV | II |
| (C) IV | II | I | III |
| (D) II | IV | III | I |
110. What is aquiferous system in sponges
 (A) Digestive system
 (B) Canal system
 (C) Respiratory system
 (D) Reproductive system
111. In sponges transportation of food to nonfeeding cells is done by
 (A) Collar cells (B) Osculum
 (C) Spicules (D) Amoebocytes
112. How do sponges distribute nutrients from choanocytes to rest of the cells
 (A) Mesoglea act as distribution system
 (B) Through amoebocytes
 (C) Through cell to cell diffusion
 (D) Both (B) and (C)
113. Corallite is
 (A) Animal (B) Individual
 (C) A coelenterata (D) Skeleton of a solitary coral
114. Alternation of generation as seen in *Obelia* is termed as
 (A) Metamerism (B) Dimorphism
 (C) Metagenesis (D) Metamorphosis
115. Which one of the following is coelenterate
 (A) Sea pen (B) Sea urchin
 (C) Sea horse (D) Sea cucumber
116. Coelenterates are
 (A) Urotelic (B) Uricotelic
 (C) Ammonotelic (D) None
117. *Obelia* is
 (A) Sedentary (B) Attached but capable of locomotion
 (C) Motile (D) Free floating
118. Excretion of nitrogenous waste in *Hydra* takes place through
 (A) Nephridia (B) Nematocytes
 (C) Flame cells (D) General body surface
119. The incorrect statement for *Hydra* is
 (A) Cnidocil receives mechanical stimulus
 (B) Largest nematocytes is penetrant
 (C) Action of nematocyst depends upon enzyme
 (D) Functional nematocysts are found in both cellular layers

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120. All old cells of *Hydra* are replaced in
 (A) 15 days (B) 30 days
 (C) 45 days (D) 60 days
121. The function of lasso during discharge of nematocyst is
 (A) Trigger the stimulus
 (B) Prevent the detachment of nematocyst from nematoblast
 (C) Inject the toxin in the body of prey
 (D) Press and squeeze out the thread tube
122. Which animal has been placed in wrong habitat
 (A) *Hydra*-Fresh water
 (B) *Physalia*-Marine
 (C) *Adamsia*-Sea water
 (D) *Aurelia*-Fresh water
123. Mesogloea of *Hydra* is made up of
 (A) Carbohydrates (mucopolysaccharides)
 (B) Mucin proteins only
 (C) Fatty acids
 (D) Adipocytes
124. A number of buds have developed on *Hydra* then the
 (A) Oldest bud is towards oral region
 (B) Oldest bud is towards aboral region
 (C) Oldest bud will produce male reproductive organ
 (D) Oldest bud will form ovary
125. The sense organs of platyhelminthes are
 (A) Chemoreceptors (B) Photoreceptors
 (C) Tangoreceptors (D) All of the above
126. Parasitic animals have well developed
 (A) Respiratory system
 (B) Reproductive system
 (C) Digestive system
 (D) Nervous system
127. *Taenia* possess
 (A) A single bilobed ovary
 (B) Two ovaries
 (C) A single ovary
 (D) A pair of ovarioles
128. Liver fluke is
 (A) Digenetic
 (B) Monogenetic
 (C) Digenetic and pathogenic
 (D) Digenetic and non pathogenic
129. Number of lips in *Ascaris* are
 (A) One (B) Three
 (C) Four (D) Two
130. The muscle layers in the body wall of *Ascaris* comprises
 (A) Circular muscles only
 (B) Longitudinal muscles only
 (C) Outer longitudinal and inner circular muscles
 (D) Outer circular and inner longitudinal muscles
131. The most common parasitic nematode of man is
 (A) *Enterobius* (B) *Rhabditis*
 (C) *Trichina* (D) All of the above
132. The body organization in nematodes is
 (A) Cell-tissue grade (B) Organ-system grade
 (C) Cellular grade (D) Tissue grade
133. Nutrition of *Ascaris* is
 (A) Holozoic (B) Parasitic
 (C) Saprozoic (D) Both (B) and (C)
134. Phylum nematode includes
 (A) Round worms and tape worms
 (B) Hook worms, tape worms and round worms
 (C) Filarial worms, round worms and hook worms
 (D) All of the above
135. Which of the following are the first animals to have straight and complete alimentary canal
 (A) Platyhelminthes (B) Arthropods
 (C) Nematodes (D) Mammals

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[BOTANY]

136. As per Whittaker's classification, an organism possessing eukaryotic cell structure, multicellular organisation, with a cell wall and nuclear membrane showing heterotrophic nutrition can be placed under the kingdom
(A) Monera (B) Protista
(C) Plantae (D) Fungi
137. In five kingdom system of classification of RH Whittaker, how many kingdoms contain eukaryotes?
(A) Four kingdoms (B) One kingdom
(C) Two kingdoms (D) Three kingdoms
138. In Whittaker's system of classification, prokaryotes are placed in the kingdom
(A) Protista (B) Monera
(C) Plantae (D) Animalia
139. Two kingdoms constantly figured in all biological classification are
(A) Planate and Animalia
(B) Monera and Animalia
(C) Protista and Animalia
(D) Protista and Plantae
140. Fin rot of fish is caused by
(A) *Aeromonas* (B) *Pseudomonas*
(C) *Branchiomyces* (D) *Xenopsylla*
141. A peculiar odour that prevails in marshy areas and cowsheds is on account of a gas produced by
(A) mycoplasma (B) archaeobacteria
(C) slime moulds (D) cyanobacteria
142. Which of the following is a Gram negative bacterium?
(A) *Escherichia coli*
(B) *Bacillus subtilis*
(C) *Streptomyces coelicolor*
(D) *Ampycolatopsis orientalis*
143. The main difference between Gram positive and Gram negative bacteria is
(A) cell membrane (B) cell wall
(C) ribosome (D) mitochondria
144. Which of the following bacteria fixes nitrogen without any plant association?
(A) *Rhizobium* (B) *Nostoc*
(C) *Anabaena* (D) *Azotobacter*
145. Which of the following is a symbiotic nitrogen-fixer?
(A) *Glomus* (B) *Azotobacter*
(C) *Frankia* (D) *Azolla*
146. Free-living, aerobic, non-photosynthetic, nitrogen-fixing bacterium is
(A) *Azotobacter* (B) *E.coli*
(C) *Nostoc* (D) *Salmonella*
147. Nitrifying bacteria are able to
(A) convert atmospheric nitrogen into soluble forms
(B) convert ammonia to nitrate
(C) ammonia to nitrogen
(D) nitrate to nitrogen
148. Bacterium which reduces nitrates in soil to nitrogen is
(A) *Nitrosomonas* (B) *Pseudomonas*
(C) *Rhizobium* (D) *Clostridium*
149. Which one of the following does not belong to kingdom-Monera?
(A) Mycoplasma (B) Archaeobacteria
(C) Slime mould (D) Eubacteria
150. Crown gall disease in plants is caused by
(A) T_i-plasmid (B) P_i-plasmid
(C) mycoplasma (D) virus
151. Which of the following does not belong to the kingdom-Protista?
(A) Chrysophytes (B) Euglenoids
(C) Ascomycetes (D) Dinoflagellates
152. Which of the following is a flagellated protozoan?
(A) *Amoeba* (B) *Entamoeba*
(C) *Plasmodium* (D) *Trypanosoma*
153. The slime moulds are characterised by the presence of
(A) elaters (B) pseudoelaters
(C) capillitium (D) capitulum
154. When a freshwater protozoan, possessing a contractile vacuole, is placed in a glass containing marine water, the vacuole will?
(A) Increase in number (B) Disappear
(C) Increase in size (D) Decrease in size
155. In which animal, dimorphic nucleus is found?
(A) *Amoeba* (B) *Trypanosoma gambiense*
(C) *Plasmodium vivax* (D) *Paramecium caudatum*

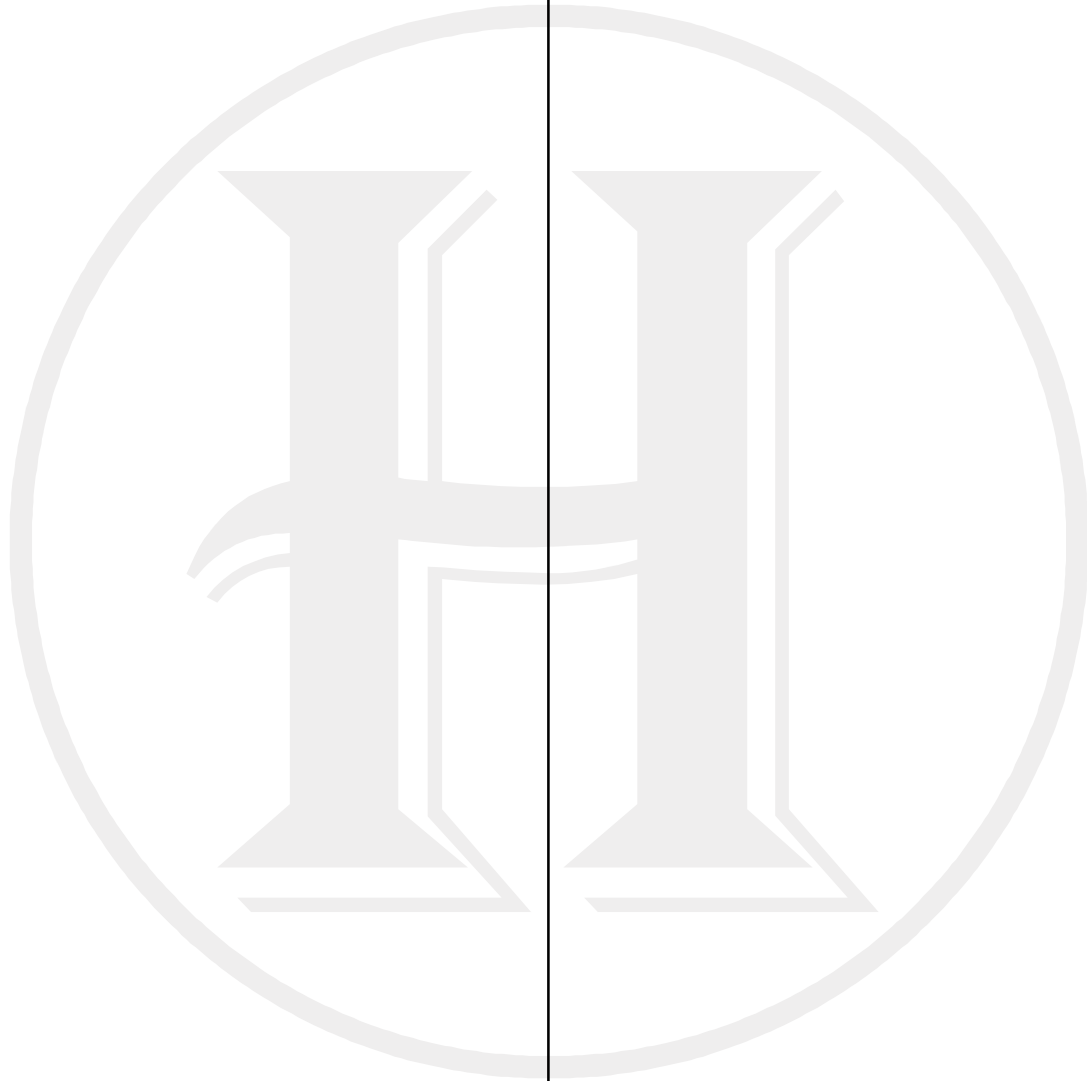
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156. *Plasmodium* is an
 (A) endoparasite
 (B) ectoparasite
 (C) intercellular parasite
 (D) Both (A) and (C)
157. Amoeba is a/an
 (A) unicellular animal
 (B) octacellular animal
 (C) multicellular animal
 (D) All of these
158. Which of the following does not apply to Ascomycetes?
 (A) Mycelium coenocytic and aseptate
 (B) Commonly known as sac fungi
 (C) Sexual spores called ascospores are produced endogenously
 (D) They are saprophytic, decomposers, parasitic or coprophilous
159. Which of the following is an unicellular sac-fungus?
 (A) *Claviceps* (B) *Saccharomyces*
 (C) *Penicillium* (D) *Neurospora*
160. Cellulose is the major component of cell wall of
 (A) *Pythium* (B) *Xanthomonas*
 (C) *Pseudomonas* (D) *Saccharomyces*
161. Lichen is the pioneer vegetation on which succession?
 (A) Hydrosere (B) Lithosere
 (C) Psammosere (D) Xerosere
162. Protein coat of a virus enclosing nucleic acid is called
 (A) plasmid (B) capsid
 (C) vector (D) genome
163. The genetic material of rabies virus is
 (A) double-stranded RNA
 (B) single-stranded RNA
 (C) double-stranded DNA
 (D) single-stranded DNA
164. Helical contractile sheath occurs in
 (A) bacteria (B) bacteriophage
 (C) retroviruses (D) fungi
165. Which of the following processes need bacteriophage?
 (A) Transduction (B) Translation
 (C) Transformation (D) Conjugation
166. Auxin was first isolated from
 (A) fungus (B) apple
 (C) sperm DNA (D) human urine
167. Apical dominance is caused by
 (A) auxin (B) cytokinin
 (C) ethylene (D) gibberellin
168. Leaf abscission is caused by
 (A) ABA (B) cytokinin
 (C) auxin (D) gibberellin
169. Which of the following hormones does not naturally occur in plants?
 (A) 2,4-D (B) IAA
 (C) GA (D) ABA
170. Name of a gaseous plant hormone is
 (A) IAA (B) gibberellin
 (C) ethylene (D) abscisic acid
171. The plant hormone produced by *Rhizobium* for nodulation is
 (A) IBA (B) NAA
 (C) 2,4-D (D) IAA
172. Cell elongation in internodal regions of the green plants takes place due to
 (A) indole acetic acid (B) cytokinins
 (C) gibberellins (D) ethylene
173. The maximum growth rate occurs in
 (A) stationary phase (B) senescent phase
 (C) lag phase (D) exponential phase

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174. Which plant hormone promotes seed dormancy, bud dormancy and causes stomatal closure?
(A) IAA (B) Abscisic acid
(C) GA₃ (D) Cytokinin
175. Auxin in plant means for
(A) cell elongation (B) fruit ripening
(C) cell division (D) inhibition of root growth
176. The problem of necrosis and gradual senescence, while performing tissue culture can be overcome by
(A) spraying auxins
(B) spraying cytokinins
(C) suspension culture
(D) sub-culture
177. Treatment of seed at low temperature under moist conditions to break its dormancy is called
(A) scarification (B) vernalisation
(C) chelation (D) stratification
178. Which one is short day plant?
(A) *Brassica campestris*
(B) *Raphanus sativus*
(C) *Glycine max*
(D) *Papaver somniferum*
179. Coiling of garden pea tendrils around any support is an example of
(A) thigmotaxis (B) thigmonasty
(C) thigmotropism (D) thermotaxis
180. Response of plant due to reversible turgor change in pulvinus is
(A) nyctinastic (B) seismonastic
(C) heptonastic (D) photonastic

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