

Dated :
28-04-2023

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Test Series HMC-8(HP & HR), HMC-9(19-25), HMC-15(01)

MM : 720

Test - 07

Time : 3 hrs. 20 min.

PHYSICS : MAGNETISM, EMI, AC, RAY OPTICS, WAVE OPTICS

CHEMISTRY : ALCOHOLS, PHENOLS AND ETHERS, ALDEHYDES, KETONES AND CARBOXYLIC ACID, AMINES, BIOMOLECULES, POLYMERS

ZOOLOGY : HUMAN HEALTH AND DISEASES, IMMUNE SYSTEM, STRATEGIES FOR ENHANCEMENT IN FOOD PRODUCTION

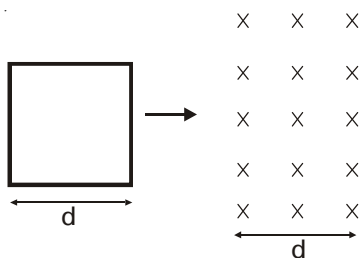
BOTANY : REPRODUCTION IN FLOWERING PLANT, REPRODUCTION IN ORGANISM, MORPHOLOGY OF FLOWERING PLANTS

PHYSICS : SECTION-A

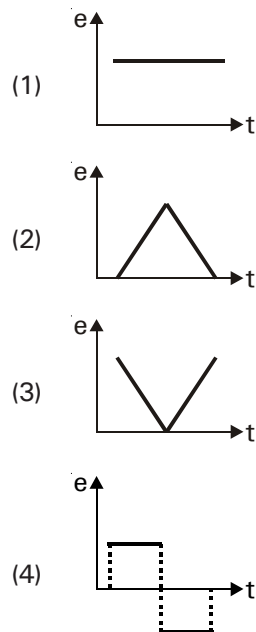
All questions are compulsory in section A

1. A convex lens of focal length 40 cm is in contact with a concave lens of focal length 25 cm. The power of combination is
 - (1) - 1.5 D
 - (2) - 6.5 D
 - (3) + 6.5 D
 - (4) + 6.67 D
2. A ray reflected successively from two plane mirrors inclined at a certain angle undergoes a deviation of 240° . Then the number of images observable of an object placed between the mirrors is
 - (1) 3
 - (2) 5
 - (3) 7
 - (4) 9
3. In an ac circuit containing capacitance only
 - (1) e.m.f. is ahead of current by $\pi / 2$
 - (2) current is ahead of e.m.f. by $\pi / 2$
 - (3) current lags behind e.m.f. by π
 - (4) current is ahead of e.m.f. by π
4. 'n' coherent waves of intensity I_0 each superimpose constructively at a point. The intensity at the point is
 - (1) nI_0
 - (2) $\frac{I_0}{n}$
 - (3) n^2I_0
 - (4) none of these
5. A diffraction pattern is obtained using a beam of yellow light. What happens if the yellow light is replaced by red light?
 - (1) No change
 - (2) Diffraction band becomes narrower
 - (3) Diffraction bands becomes broader
 - (4) Diffraction bands disappear
6. A solenoid having 20 turns per centimeter carries a current of 2 A. Then magnetising force inside the solenoid is
 - (1) 4000 A/m
 - (2) 20 A/m
 - (3) 2000 A/m
 - (4) 40 A/m
7. Current in ampere in an ac circuit is given as $I = (3 + 4 \sin \omega t)$. The rms value of this current is
 - (1) 5 ampere
 - (2) $\sqrt{17}$ ampere
 - (3) $\frac{5}{\sqrt{2}}$ ampere
 - (4) 4 ampere
8. A plane mirror produces a magnification of _____ for a real object placed in front of it.
 - (1) -1
 - (2) +1
 - (3) Zero
 - (4) Between 0 & $+\infty$
9. A short object placed in front of a concave mirror produces an image with a lateral magnification -2. If the same object is placed longitudinally (parallel to principal axis), the magnification produced is
 - (1) -2
 - (2) +2
 - (3) -4
 - (4) +4

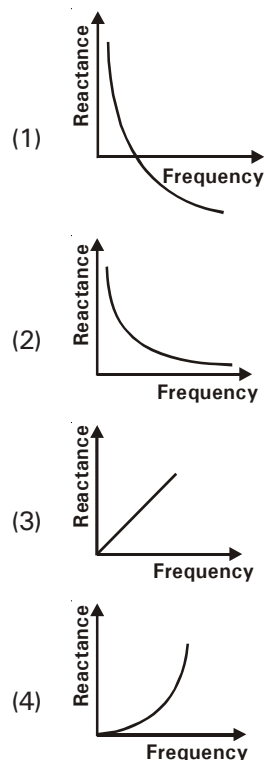
10.



A conducting loop is moved across a uniform magnetic field as shown in figure with a constant speed. Which of the following graphs represents variation of induced emf with time in the coil?



11. Which of the following plots may represent the reactance of a series L-C combination?



12. In the formation of primary rainbow, the sunlight rays emerge from the rain-drop after

- (1) one internal reflection and one refraction
- (2) one internal reflection and two refractions
- (3) two internal reflections and one refraction
- (4) two internal reflections and two refractions

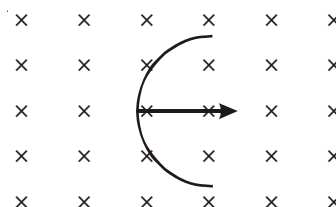
13. An under water swimmer is at a depth of 12 m below the surface of water. A bird is at a height of 18 m from the surface of water, directly above his eyes. For the swimmer the bird appears to be at a distance from the surface of water equal to (Refractive Index of water is $4/3$)

- (1) 24 m
- (2) 12 m
- (3) 18 m
- (4) 9 m

14. A telescope, consisting of an objective of focal length 60 cm and a single eye lens of focal length 5 cm is focussed on a distant object in such a way that parallel rays come out from the eye lens. If the object subtends an angle 2° at the objective, the angular width of the image

- (1) 10°
- (2) 24°
- (3) 50°
- (4) $1/6^\circ$

15. A straight wire of length L is bent into a semicircle. It is moved in a uniform magnetic field with speed ' v ' with diameter perpendicular to the field. Induced emf between ends of the wire is

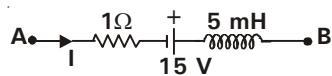


- (1) BLv
- (2) $2BLv$
- (3) $2pBLv$
- (4) $(2/p)BLv$

16. A compound microscope has an eye piece of focal length 5 cm and an objective of focal length 4 cm. If an object is kept at a distance of 5 cm from the objective and final image is formed at least distance of distinct vision, then the magnification is

- (1) 16
- (2) 20
- (3) 10
- (4) 24

17. The network shown in the figure is part of a complete circuit. If at a certain instant, the current I is 10A and it is decreasing at a rate of $2 \times 10^3 \text{ As}^{-1}$ then $V_B - V_A$ equals



- (1) 20 V
(2) 15 V
(3) 10 V
(4) 5 V
18. The refractive index of water is $4/3$ and that of glass is $5/3$. What will be the critical angle for the ray of light entering water from the glass

- (1) $\sin^{-1} \frac{4}{5}$
(2) $\sin^{-1} \frac{5}{4}$
(3) $\sin^{-1} \frac{1}{2}$
(4) $\sin^{-1} \frac{2}{1}$

19. The condition for observing Fraunhofer diffraction from a single slit is that the light wavefront incident on slit should be

- (1) Cylindrical
(2) Spherical
(3) Elliptical
(4) Plane

20. With the decrease of current in the primary coil from 2 ampere to zero value in 0.1 second, the e.m.f. generated in the secondary coil is 100 volt. The mutual inductance of the two coils is

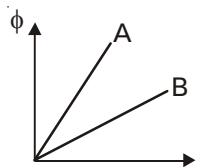
- (1) 1.25 henry
(2) 2.5 henry
(3) 5.0 henry
(4) 10.0 henry

21. **Assertion** : For a pure capacitor connected to an AC source, the energy stored in capacitor is maximum when current in circuit is zero.

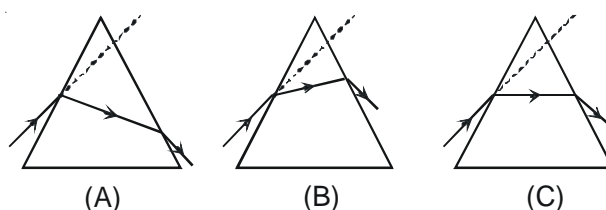
Reason : For a capacitor connected to AC supply, current and voltage have a phase difference of 90° .

- (1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

22. The graph shows variation of magnetic flux ϕ linked with coils A and B with currents (I) flowing through them. Which relation regarding their self inductances L_A and L_B is true?

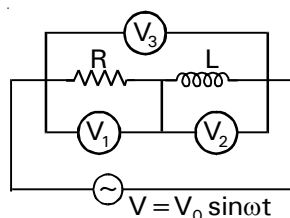


- (1) $L_A < L_B$
(2) $L_A > L_B$
(3) $L_A = L_B$
(4) cannot say
23. The figures represent three cases of a ray passing through a prism. The case corresponding to minimum deviation is



- (1) A
(2) B
(3) C
(4) None of these
24. 110 volts ac is applied across a series circuit having resistance 11Ω and impedance 22Ω . The power consumed is
- (1) 366 W
(2) 550 W
(3) 1100 W
(4) 275 W
25. The angle of minimum deviation for a prism is 40° and the angle of the prism is 60° . The angle of incidence in this position will be
- (1) 30°
(2) 60°
(3) 50°
(4) 100°

- 26.



A resistance and an ideal inductor are connected in an A.C. circuit as shown. If x , y & z are the reading of voltmeters V_1 , V_2 and V_3 respectively, then

- (1) $z = x + y$
(2) $z > x + y$
(3) $z < x + y$
(4) any of the above is possible

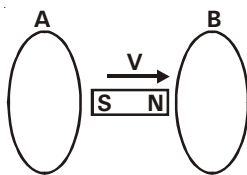
27. Unpolarised light of intensity I_0 passes through three coaxial polaroids such that transmission axis of last is crossed with the first. If the transmission axis of the middle polaroid is equally inclined with the two polaroids, then the intensity of emergent light is

- (1) $\frac{I_0}{4}$
- (2) $\frac{I_0}{8}$
- (3) $\frac{3I_0}{32}$
- (4) $\frac{3I_0}{16}$

28. Calculate the true angle of dip at a place, where the tangent of angle of dip in a plane inclined at an angle 60° to magnetic meridian is 2

- (1) 0°
- (2) 30°
- (3) 45°
- (4) 60°

29. A, B are two conducting circular loops with their planes parallel and a magnet is moved in between them. Then



- (1) The loops will experience no force upon each other
 - (2) The loops will repel each other
 - (3) The loops will attract each other
 - (4) Both the loops move toward left with same velocity
30. Two coherent light sources S_1 and S_2 ($\lambda = 6000 \text{ \AA}$) are 1mm apart from each other. The screen is placed at a distance of 25 cm from the sources. The width of the fringes on the screen should be
- (1) 0.015 cm
 - (2) 0.025 cm
 - (3) 0.010 cm
 - (4) 0.030 cm
31. An ideal transformer has 100 turns in the primary and 250 turns in the secondary. The peak value of the ac in primary is 28 V. The r.m.s. secondary voltage is nearest to
- (1) 50 V
 - (2) 70 V
 - (3) 100 V
 - (4) 40 V

32. A slit of size 0.15 cm is placed at 2.1 m from a screen. On illuminated it by a light of wavelength $5 \times 10^{-5} \text{ cm}$. The width of central maximum will be

- (1) 70 mm
- (2) 0.14 mm
- (3) 1.4 mm
- (4) 1.4 cm

33. An a.c. source has voltage in S.I. units given by $v = 120 \sin(100\pi t) \cos(100\pi t)$

The maximum voltage and frequency are

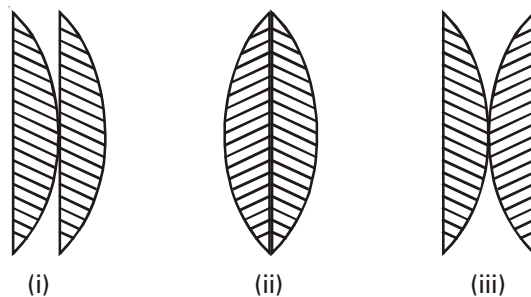
- (1) 120V, 100 Hz
- (2) $\frac{120}{\sqrt{2}}$ V, 100 Hz
- (3) 60V, 200 Hz
- (4) 60V, 100 Hz

34. A magnetic dipole of magnetic moment 'M' is rotated through 180° in a uniform magnetic field B, the work done may be

- a. zero
- b. 3MB
- c. -2MB
- d. 0.75MB

- (1) both a & d
- (2) a, b & c
- (3) a, c & d
- (4) b, c & d

- 35.



Two plano-convex lenses, each of focal length 'f', are placed as shown in figure. The ratio of the focal lengths of the combinations (i), (ii) and (iii) respectively is

- (1) 1 : 2 : 3
- (2) 1 : 1 : 1
- (3) 1 : 2 : 1
- (4) 3 : 2 : 1

PHYSICS : SECTION-B

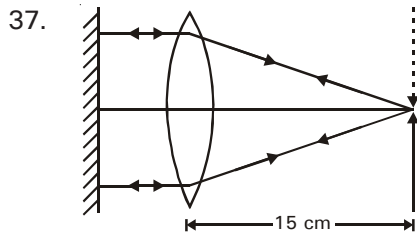
This section has 15 questions, attempt any 10 questions of them.

36. A boy stands straight in front of a mirror at a distance of 30 cm away from it. He sees his erect

image whose height is $\frac{1}{5}$ th of his real height. The

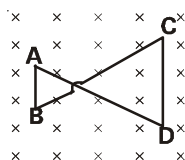
mirror he is using is

- (1) Plane mirror
- (2) Convex mirror
- (3) Concave mirror
- (4) Plano-convex mirror



A plane mirror is placed behind a convex lens on an optical bench. If the image of a pin placed at 15 cm from the lens coincides with the pin, then focal length of the lens is

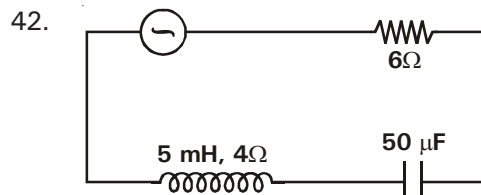
- (1) 7.5 cm
 - (2) 10 cm
 - (3) 15 cm
 - (4) 30 cm
38. Let m_1 and m_2 be the linear magnifications for two positions of the lens in the 'Displacement Method' to determine its focal length. If $m_1 = -3/4$, then value of m_2 is
- (1) $4/3$
 - (2) $-4/3$
 - (3) $-1/4$
 - (4) $-1/3$
39. A conducting wire frame is placed in a magnetic field which is directed into the paper. The magnetic field is increasing at a constant rate. The directions of induced currents in wires are



- (1) B to A and D to C
 - (2) A to B and C to D
 - (3) A to B and D to C
 - (4) zero
40. **Assertion** : Critical angle is minimum for violet colour in visible spectrum of light.
Reason : Refractive index is minimum for violet light.
- (1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
 - (2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
 - (3) Assertion is true statement but Reason is false
 - (4) Assertion is false

41. In LCR circuit the capacitance is changed from C to $4C$. For the same resonant frequency, the inductance should be changed from L to

- (1) $2L$
- (2) $\frac{L}{2}$
- (3) $\frac{L}{4}$
- (4) $4L$



In the circuit shown below, the ac source has voltage $V = 20\cos(\omega t)$ volts with $\omega = 2000$ rad/sec. the amplitude of current will be nearest to

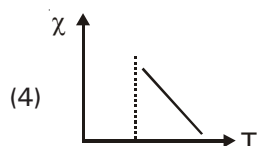
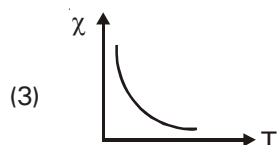
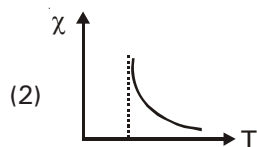
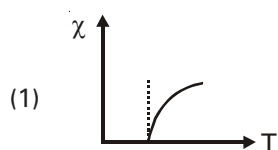
- (1) 2A
 - (2) 3.3A
 - (3) $\frac{2}{\sqrt{5}}$ A
 - (4) $\sqrt{5}$ A
43. The flux linked with a coil at any instant t is given by

$$\phi = 10t^2 - 50t + 250$$

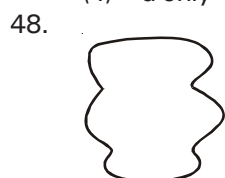
The induced emf at $t = 3$ s is

- (1) -190 V
 - (2) -10 V
 - (3) 10 V
 - (4) 190 V
44. The ratio of thickness of two glass slabs P and Q is 5 : 3. If light takes equal time in passing through them, then refractive index of P with respect to Q will be
- (1) 5 : 3
 - (2) 3 : 5
 - (3) $\sqrt{5} : \sqrt{3}$
 - (4) $\sqrt{3} : \sqrt{5}$
45. The potential difference V and the current i flowing through an instrument in an ac circuit of frequency f are $V = (5\cos \omega t)$ volts & $i = (2 \sin \omega t)$ ampere. The power dissipated in the instrument is
- (1) zero
 - (2) 10 W
 - (3) 5 W
 - (4) 2.5 W

46. The variation of magnetic susceptibility (χ) with the temperature above Curie temperature of a ferromagnetic material is best represented in



47. Which statement is correct w.r.t. wavefront?
- It is defined as a surface of constant phase
 - Speed with which it moves outwards from the source is the speed of the wave
 - Energy of the wave travels in a direction perpendicular to the wavefront
- both a & b
 - both b & c
 - a, b & c
 - a only



As a result of change in the magnetic flux linked to the closed loop as shown in the figure, an emf V is induced in the loop. Work done in taking a charge Q once round the loop is

- QV
 - $2QV$
 - $QV/2$
 - zero
49. The dispersive powers of glasses of lenses used in a convergent achromatic pair are in the ratio 5 : 3. If the focal length of the concave lens is 15 cm, then the nature and focal length of the other lens would be
- convex, 9 cm
 - concave, 9 cm
 - convex, 25 cm
 - concave, 25 cm

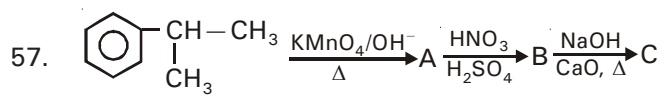
50. The number of turns in the coil of an A.C. generator is 5000 and the area of the coil is 0.25 m^2 . The coil is rotated at the rate of 100 turns per second in a magnetic field of $0.2 \frac{\text{weber}}{\text{m}^2}$. The peak value of the e.m.f. generated is nearly

- 786 KV
- 440 KV
- 220 KV
- 157.1 KV

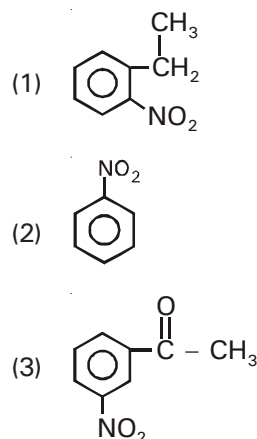
CHEMISTRY : SECTION-A

All questions are compulsory in section A

51. Treatment of phenol with which of the following reagents give violet colour ?
- ZnCl_2
 - neutral FeCl_3
 - Na_2CO_3
 - NaHCO_3
52. The number of possible products formed on reaction of propanal with acetaldehyde in the presence of dilute NaOH is
- 3
 - 2
 - 4
 - 1
53. Identify the electrophile and nucleophile of Reimer Tiemann reaction respectively.
- PhOH , CHCl_3
 - PhO^- , $:\text{CCl}_2$
 - $:\text{CCl}_2$, PhO^-
 - PhOH , $^-\text{CCl}_3$
54. The compound that will give yellow ppt. with alkaline solution of I_2 is
- $\text{CH}_3\text{COCH}_2\text{CH}_3$
 - $(\text{CH}_3)_3\text{C}-\text{OH}$
 - CH_3COCl
 - Both (1) & (3)
55. Which of the following is a condensation polymer?
- Polyvinyl chloride
 - Teflon
 - Melamine
 - PAN
56. Phenol is less acidic than _____.
- ethanol
 - o*-nitrophenol
 - o*-methylphenol
 - o*-methoxyphenol



In the above reaction, C is



(4) None of these

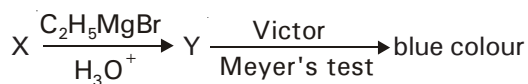
58. Which of the following is most reactive towards electrophilic substitution?

- (1) Phenyl benzoate
- (2) aniline
- (3) phenol
- (4) benzoic acid

59. Match the reactions given in Column I with the suitable reagents given in Column II.

Column I (Reactions)	Column II (Reagents)
(i) Benzoic acid → Benzophenone	(a) LiAlH_4
(ii) Benzaldehyde → 1-Phenylethanol	(b) DIBAL-H
(iii) Cyclohexanone → Cyclohexanol	(c) MnO , 573K
(iv) Phenyl benzoate → Benzaldehyde	(d) CH_3MgBr
(1) i-c, ii-a, iii-b, iv-a	
(2) i-d, ii-a, iii-b, iv-c	
(3) i-c, ii-d, iii-a, iv-b	
(4) i-b, ii-c, iii-d, iv-a	

60. Consider the following reaction sequence and identify X.

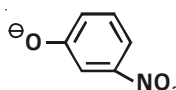


- (1) CH_3COOH
- (2) HCHO
- (3) $\text{CH}_3\text{CH}_2\text{CHO}$
- (4) $\text{CH}_3-\overset{\text{O}}{\parallel}{\text{C}}-\text{CH}_3$

61. The formation of aspirin involves

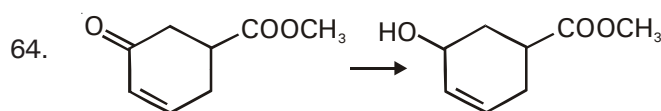
- (1) acetylation of salicylic acid
- (2) acetylation of phenol
- (3) benzylation of salicylic acid
- (4) benzylation of phenol

62. Which of the following species can act as the strongest base?

- (1) ^-OH
- (2) ^-OR
- (3) $^-\text{O C}_6\text{H}_5$
- (4) 

63. Ethanol mixed with methanol is called denatured alcohol. Which of the following is true regarding denatured alcohol?

- (1) In the body, methanol is oxidised first to methanal and then to methanoic acid which may cause blindness and death.
- (2) A methanol poisoned patient is treated by giving intravenous infusions of diluted ethanol
- (3) The enzyme responsible for oxidation of aldehyde to acid is swamped allowing time for kidneys to excrete methanol.
- (4) all of the above are true



The given conversion can be carried out using

- (1) H_2/Ni
- (2) $\text{LiAlH}_4 / \text{H}_2\text{O}^+$
- (3) $\text{NaBH}_4/\text{H}_3\text{O}^+$
- (4) Any of these

65. Which of the following will give a silver mirror with Tollen's reagent?

- (1) CH_3CHO
- (2) $\text{C}_6\text{H}_5\text{CHO}$
- (3) $\text{CH}_3-\overset{\text{O}}{\parallel}{\text{C}}-\text{CH}_2\text{OH}$
- (4) all of these

66. Natural rubber is a linear polymer of _____

- (1) cis isoprene
- (2) trans isoprene
- (3) buna - N
- (4) none of these

67. What is the order of boiling points

- (1) $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH} < \text{CH}_3\text{CH}_2\text{CHO} < \text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3 < \text{CH}_3\text{COCH}_3$
- (2) $\text{CH}_3\text{COCH}_3 < \text{CH}_3\text{CH}_2\text{CH}_2\text{OH} < \text{CH}_3\text{CH}_2\text{CHO} < \text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$
- (3) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3 < \text{CH}_3\text{CH}_2\text{CHO} < \text{CH}_3\text{COCH}_3 < \text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$
- (4) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3 < \text{CH}_3\text{CH}_2\text{CHO} = \text{CH}_3\text{COCH}_3 < \text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$

68. Nucleic acids are the polymers of

- (1) Nucleosides
- (2) Nucleotides
- (3) Bases
- (4) Sugars

69. Sucrose (cane sugar) is a disaccharide. One molecule of sucrose on hydrolysis gives _____.

- (1) 2 molecules of glucose
- (2) 2 molecules of glucose + 1 molecule of fructose
- (3) 1 molecule of glucose + 1 molecule of fructose
- (4) 2 molecules of fructose

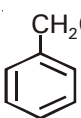
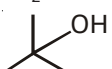
70. Amongst the following, the strongest base in aqueous medium is

- (1) CH_3NH_2
- (2) NCCH_2NH_2
- (3) $(\text{CH}_3)_2\text{NH}$
- (4) $\text{C}_6\text{H}_5\text{NHCH}_3$

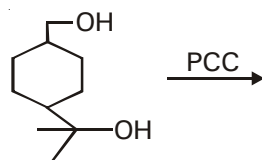
71. Which of the following is not for thermoplastic polymers?

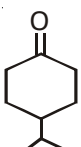
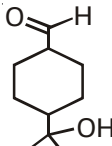
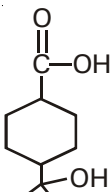
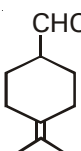
- (1) Thermoplastics are linear polymers
- (2) They soften and melt on heating
- (3) Molten polymer can be remoulded into any shape
- (4) They have cross-linkages which break on heating

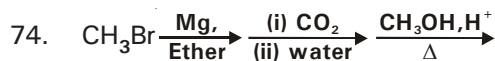
72. Which of the following can give immediate turbidity with Lucas reagent?

- (1) 
- (2) $\text{CH}_2=\text{CH}-\text{CH}_2-\text{OH}$
- (3) 
- (4) All of these

73. The product in the following reaction is



- (1) 
- (2) 
- (3) 
- (4) 



The final product of the above sequence of reactions is

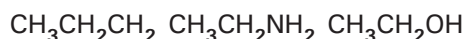
- (1) An ester
- (2) An acid
- (3) An alcohol
- (4) Ketone

75. **Statement-I** : Vitamin D can be stored in our body.

Statement-II : Vitamin D is fat soluble vitamin.

- (1) Both statement-I and statement-II are correct
- (2) Both statement-I and statement-II are incorrect
- (3) Statement-I is correct but statement-II is incorrect
- (4) Statement-I is incorrect but statement-II is correct

76. Arrange the following compounds in increasing order of dipole moment



- (1) $\text{CH}_3\text{CH}_2\text{CH}_3 < \text{CH}_3\text{CH}_2\text{NH}_2 < \text{CH}_3\text{CH}_2\text{OH}$
- (2) $\text{CH}_3\text{CH}_2\text{CH}_3 < \text{CH}_3\text{CH}_2\text{NH}_2 \approx \text{CH}_3\text{CH}_2\text{OH}$
- (3) $\text{CH}_3\text{CH}_2\text{CH}_3 < \text{CH}_3\text{CH}_2\text{OH} < \text{CH}_3\text{CH}_2\text{NH}_2$
- (4) $\text{CH}_3\text{CH}_2\text{OH} < \text{CH}_3\text{CH}_2\text{NH}_2 < \text{CH}_3\text{CH}_2\text{CH}_3$

77. Which of the following species are involved in the carbylamine test?

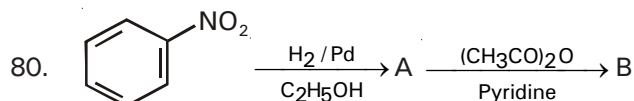
- (1) $\text{R}-\text{CN}$
- (2) CHCl_3
- (3) COCl_2
- (4) $\text{NaNO}_2 + \text{HCl}$

78. Which polymer has chiral monomer?

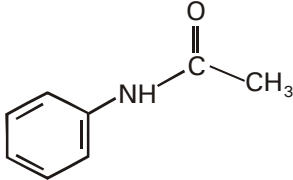
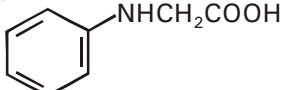
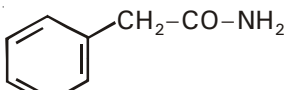
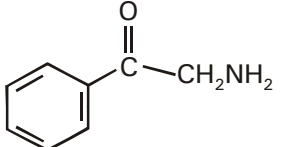
- (1) Neoprene
- (2) Buna-N
- (3) PHBV
- (4) PAN

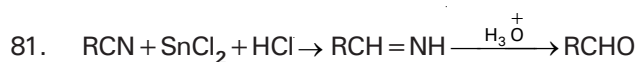
79. Which of the following will not give HVZ reaction?

- (1) $\text{C}_2\text{H}_5-\underset{\text{OH}}{\text{CH}}-\text{COOH}$
- (2) $(\text{CH}_3)_3\text{CCOOH}$
- (3) $\text{C}_2\text{H}_5-\text{CH}_2-\text{COOH}$
- (4) $(\text{CH}_3)_2\text{CHCOOH}$



Major product B is ?

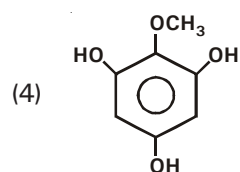
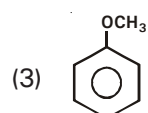
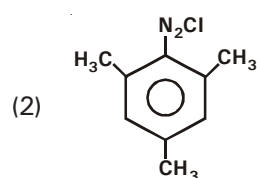
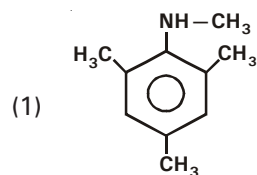
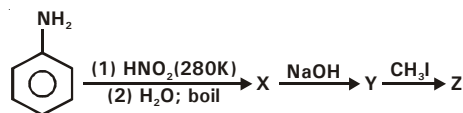
- (1) 
- (2) 
- (3) 
- (4) 



The above reaction is

- (1) Rosenmund reduction
(2) Etard reaction
(3) Stephen reaction
(4) Gattermann Koch reaction

82. Identify 'Z' in the reaction given below

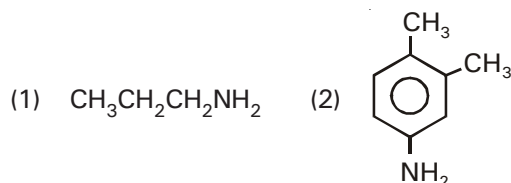


83. **Assertion** : Phenol and benzoic acid can be distinguished by Na_2CO_3

Reason : Benzoic acid is stronger acid than phenol, hence reacts with Na_2CO_3

- (1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

84. Which of the compounds would give nitrogen when treated with HNO_2 at room temperature?



(3) $\text{CH}_3\text{CH}_2\text{CONHCH}_3$ (4) Both 1 and 2

85. The correct order of K_a of the following acids

- I. $\text{CH}_3\text{CH}_2\text{OH}$ II. CH_3COOH
III. ClCH_2COOH IV. FCH_2COOH

- V. $\text{C}_6\text{H}_5\text{CH}_2\text{COOH}$
(1) $\text{IV} > \text{III} > \text{V} > \text{II} > \text{I}$
(2) $\text{V} > \text{IV} > \text{III} > \text{II} > \text{I}$
(3) $\text{II} > \text{I} > \text{V} > \text{III} > \text{IV}$
(4) $\text{IV} > \text{III} > \text{II} > \text{V} > \text{I}$

CHEMISTRY : SECTION-B

This section has 15 questions, attempt any 10 questions of them.

86. Lysine, $\text{H}_2\text{N}-(\text{CH}_2)_4-\underset{\text{NH}_2}{\text{CH}}-\text{COOH}$ is

- a. α -Amino acid
b. Basic amino acid
c. Amino acid synthesised in body
d. β -Amino acid

- (1) a & b
(2) b & c
(3) b & d
(4) a & d

87. The difference in the densities of low density (LDP) and high density polymers (HDP) is due to the fact that

- (1) LDP are highly branched structures while HDP consists of closely packed linear molecules
(2) LDP are linear chains while HDP are branched chains of polythene
(3) Both LDP and HDP are unbranched linear chains with different lengths
(4) At high temperature, the density of polymer is reduced

88. Arrange the following compounds in increasing order of their reactivity in nucleophilic addition reaction.

- i. Benzaldehyde ii. p-Tolualdehyde
iii. p-Nitrobenzaldehyde iv. Acetophenone

- (1) $i < ii < iii < iv$
(2) $iv < ii < i < iii$
(3) $iv < iii < ii < i$
(4) $iii < i < ii < iv$

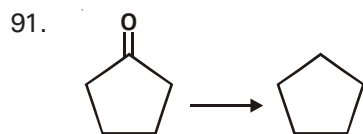
89. Gabriel's phthalimide synthesis is used for the preparation of

- (1) primary aromatic amine
(2) primary aliphatic amine
(3) secondary amine
(4) tertiary amine

90. **Assertion** : Aniline gives white ppt. of 2,4,6-tribromophenol on reaction with Br_2/H_2O .

Reason : The reaction of conversion of aniline to 2,4,6-tribromophenol is electrophilic addition reaction

- (1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false



The reagents which cannot be used for the above conversion are

- (1) $HI/Red\ P$
(2) NH_2-NH_2 , KOH , glycol
(3) $Zn-Hg/HCl$
(4) $LiAlH_4$

92. HBr reacts with $CH_2=CH-OCH_3$ under anhydrous conditions at room temperature to give

- (1) CH_3CHO & CH_3Br
(2) $BrCH_2CHO$ & CH_3OH
(3) $BrCH_2-CH_2-OCH_3$
(4) $H_3C-CHBr-OCH_3$

93. Which of the following reagent cannot be used to oxidise primary alcohols to aldehydes?

- (1) CrO_3 in anhydrous medium.
(2) $KMnO_4$ in acidic medium.
(3) Pyridinium chlorochromate.
(4) Heat in the presence of Cu at $573K$

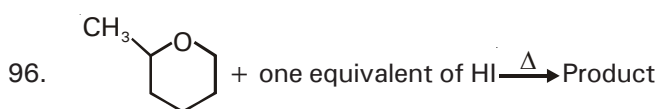
94. **Statement- I** : Esterification reaction is based on nucleophilic nature of alcohol.

Statement- II : Alcohols act as bronsted bases as well as bronsted acids.

- (1) Both statement -I and statement- II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement- II is correct

95. Number of chiral carbons in $\beta-D-(+)$ -Glucose are

- (1) six
(2) three
(3) four
(4) five

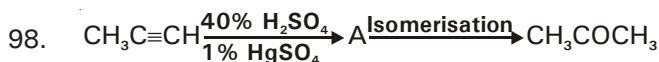


The main organic product in above reaction is

- (1)
(2)
(3)
(4)

97. Which of the following polymer is stored in the liver of animals?

- (1) Amylose
(2) Cellulose
(3) Amylopectin
(4) Glycogen

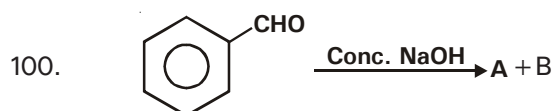


Structure of 'A' and type of isomerism in the above reaction are respectively

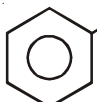
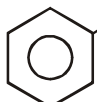
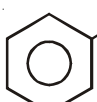
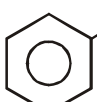
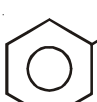
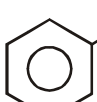
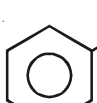

- (1) Prop-1-en-2-ol, metamerism
(2) Prop-1-en-1-ol, tautomerism
(3) Prop-2-en-2-ol, geometrical isomerism
(4) Prop-1-en-2-ol, tautomerism

99. Formaldehyde is used to prepare

- (1) Formalin (40%) solution used to preserve biological specimens
(2) Bakelite
(3) Urea-formaldehyde resins
(4) All of these



A and B is

- (1)  and 
- (2)  and 
- (3)  and 
- (4)  and 

ZOOLOGY : SECTION-A

All questions are compulsory in section A

101. Artificial insemination is better than natural insemination in cattle because

- (1) semen of good bulls can be provided everywhere
- (2) there is no likelihood of contagious diseases
- (3) it is economical
- (4) all the above

102. Which of the following is correct w.r.t. *Entamoeba histolytica*?

- a. Cramps, abdominal pain
 - b. Cramps, stools with excess mucous and blood
 - c. Female *Anopheles* acts as mechanical carrier
 - d. Parasite in large intestine
- (1) a, b, c are correct
 - (2) a, b, d are correct
 - (3) a, c, d are correct
 - (4) a, b, c, d are correct

103. _____ cells themselves do not secrete antibodies but help _____ cells to produce them

- (1) Killer, helper
- (2) Helper, killer
- (3) T, B
- (4) B, T

104. A non infectious, unnatural and unusual reaction to a substance or condition is

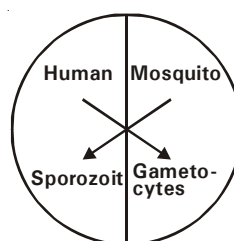
- (1) toxin
- (2) allergy
- (3) infection
- (4) immunity

105. **Assertion** : Lymph nodes serve to trap the micro-organism or other antigen, which happen to get into the lymph & tissue fluid.

Reason : Antigens trapped in lymph nodes are responsible for the formation of lymphocytes and cause immune response

- (1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
- (2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
- (3) Assertion is true statement but Reason is false
- (4) Assertion is false

106. Represented below is the transmission pattern of some disease in human. Which one of the following could be an example?



- (1) Dengue
- (2) Filariasis
- (3) Malaria
- (4) both (2) and (3)

107. Which is the basic principle of vaccination?

- (1) Antibody formation
- (2) Antigen introduction
- (3) Memory
- (4) Stimulation of T-lymphocytes

108. Pathogen cause disease by

- (1) Interfering with normal vital activities
- (2) Multiplying by countering different preventive barriers in body
- (3) Causing morphological and anatomical damage
- (4) All of the above

109. Mary Mallon, a cook by profession spread a disease through the food she prepared. This disease is characterized by

- (1) Fluid accumulation in lungs.
- (2) Nasal congestion and discharge
- (3) Sustained high fever, stomach pain, constipation and headache
- (4) Chill and high fever recurring every 3–4 days

110. Mark the odd one out

- (1) Rearing of aquatic organisms–Aquaculture
- (2) Growing and harvesting prawns–Fishery
- (3) Culturing & harvesting of fishes–Pisciculture
- (4) Egg production–White revolution

111. Hisardale has been developed by crossing
- (1) male of Bikaneri breed with female of Marino breed
 - (2) female of Bikaneri breed with male of Marino breed
 - (3) female of Bikaneri breed with male of Gaddi breed
 - (4) male of Bikaneri breed with female of Gaddi breed

112. Match Column I & Column II

Column I	Column II
a. Physical barrier	(i) Interferons
b. Physiological barrier	(ii) HCl in stomach
c. Cellular barrier	(iii) Skin
d. Cytokine barrier	(iv) Monocytes
(1) a-(iii) b-(ii) c-(iv) d-(i)	
(2) a-(ii) b-(iv) c-(i) d-(iii)	
(3) a-(iii) b-(iv) c-(i) d-(ii)	
(4) a-(iv) b-(ii) c-(iii) d-(ii)	

113. Which component of immune system is responsible for graft rejection?

- (1) HMI
- (2) CMI
- (3) Inflammatory response
- (4) Innate immunity

114. Choose the incorrect option

(1)	A foreign macromolecule that may endanger the body	Antigen
(2)	Filter that removes invaders from the body	Lymph node
(3)	Long-lived cells that help the body respond quickly to previously encountered antigens	Memory cells
(4)	Micromolecules that agglutinate foreign molecules in the blood stream	Antibody

115. Consider the following statement concerning elephantiasis

- a. It is also known as filariasis
- b. The pathogen lives mainly in the lymphatics of the lower limbs
- c. Genital organs and salivary glands are affected resulting in gross deformities
- d. Pathogens are transmitted to a healthy person through the bite by the female mosquito

Which of the above statements are correct?

- (1) a, b, c & d
- (2) a, b & c
- (3) a, b & d
- (4) a, c & d

116. Development of sexual stages in *Plasmodium* is initiated in

- (1) liver of man
- (2) gut of female anopheles
- (3) blood of man
- (4) salivary glands of mosquito

117. Which of the following statements are incorrect?

- a. In passive immunity ready made antibodies are directly given.
 - c. In active immunity living or dead microbes or other proteins are given.
 - c. Active immunity is fast whereas passive immunity is slow.
 - d. Colostrum secreted by mother is an example of active immunity.
- (1) a & c
 - (2) b & d
 - (3) c & d
 - (4) a & d

118. Choose the correct statement

- (1) Purelines are breeds which are always superior to their parents
- (2) A single outcross often helps to restore the fertility and productivity of inbred population
- (3) A species includes only a particular breed and cannot have many breeds
- (4) Mule is a breed of sheep developed in punjab

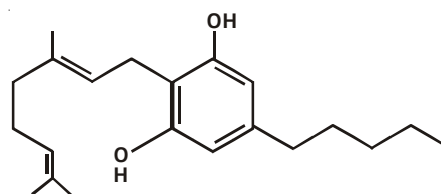
119. Homozygous purelines in cattle can be obtained by mating of

- (1) unrelated individuals of same breed
- (2) individuals of different breed
- (3) individuals of different species
- (4) related individuals of same breed

120. Choose the wrong statement regarding AIDS

- (1) AIDS is an immunodeficiency disease
- (2) A widely used diagnostic test for AIDS is ELISA
- (3) HIV does not spread by mere touch or physical contact
- (4) Viral RNA genome is converted into DNA copy by reverse transcriptase of host cell

121. How many among the following are true for the given structure?



- a. opioid derived from latex of poppy plant
- b. receptors in brain
- c. generally taken by inhalation and oral ingestion
- d. abused by some sportspersons

- (1) Four
- (2) Three
- (3) Two
- (4) One

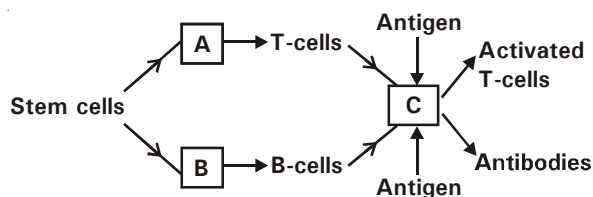
122. People who are at not high risk of getting HIV infection includes
- individuals who have multiple sexual partners
 - malnourished kids
 - individuals who require repeated blood transfusions
 - children born to an HIV infected mother.
123. Diseases are broadly grouped into infectious and non-infectious diseases. In the list given below, identify the infectious diseases.
- Cancer
 - Influenza
 - Allergy
 - Small pox
- i and ii
 - ii and iii
 - iii and iv
 - ii and iv
124. **Statement-I** : Haemozoin, a metabolic waste of *Plasmodium* is toxic to its primary host.
Statement-II : Release of haemozoin causes episodes of chills, rigours and fever in human beings.
- Both statement-I and statement-II are correct
 - Statement-I is incorrect but statement-II is correct
 - Both statement-I and statement-II are incorrect
 - Statement-I is correct but statement-II is incorrect
125. Prophylaxis does not usually include
- vaccination and isolation
 - education and eradication of vectors
 - sanitation
 - use of antibiotics
126. Which of the following sets include hallucinogens?
- Heroin, Caffeine
 - Cannabis, Morphine
 - Datura, LSD
 - Atropa, Opium
127. Given below are 4 statements. Read them and mark the option with correct statement.
- Heroin, commonly called smack is obtained by acetylation of morphine
 - Cocaine is obtained from *Papaver somniferum*
 - Coca alkaloid interferes with transmission of dopamine
 - Morphine is sedative and pain killer
- a, b & d
 - a, c & d
 - a, b & c
 - a, b, c & d
128. Out crossing is the type of _____
- Cross between same breed
 - Cross between different breeds
 - Cross between different species
 - None of the above
129. Classify the following statements as true or false and choose the correct option w.r.t. Bee keeping
- knowledge of bee habits
 - Traditional and labour intensive.
 - management of hives during different seasons
 - selection of suitable location for keeping the beehives
- a-T, b-F, c-T, d-T
 - a-F, b-F, c-T, d-T
 - a-T, b-T, c-F, d-T
 - a-T, b-F, c-T, d-F
130. What is common to PMNL-neutrophils, monocytes in blood and macrophages in tissue
- component of specific immunity
 - can differentiate between pathogens
 - can phagocytose and destroy microbes
 - cause lysis of microbes
131. In MOET, cow is administered FSH like hormone to increase the number of eggs $\xrightarrow{(X)}$ per cycle. Then the fertilized eggs are collected at $\xrightarrow{(Y)}$ celled stage. X & Y are respectively.
- 4-5, 4-8
 - 1-2, 8-16
 - 6-8, 8-10
 - 6-8, 8-32
132. In malignant tumors, the cells proliferate, grow rapidly and move to other parts of the body to form new tumors. This movement is called
- metagenesis
 - metastasis
 - teratogenesis
 - mitosis
133. Which of the following sets of diseases can be treated by antibiotics?
- Cholera and chickenpox
 - Common cold and pneumonia
 - Typhoid and tetanus
 - All of these
134. A correct pair of a plant ; part from which its product is obtained and its product is
- | | | | | |
|-------------------------|---|-----------------|---|----------|
| (1) <i>Papaver</i> | - | Latex of plant | - | Afeem |
| (2) <i>Cannabis</i> | - | Plant resin | - | Caffeine |
| (3) <i>Claviceps</i> | - | Fruiting bodies | - | Ganja |
| (4) <i>Erythroxylum</i> | - | Leaves | - | LSD |
135. Which of the following statement is correct?
- Malignant malaria caused by *Plasmodium falciparum* is the most serious & can be fatal
 - Symptoms of Ascariasis include external bleeding, blockage of the intestinal passage
 - Hot and dry conditions help dermatophytes to grow, in skin folds
 - Plasmodium* enters the RBC as sporozoites

ZOOLOGY : SECTION-B

This section has 15 questions, attempt any 10 questions of them.

136. Improved breed of cattle & chickens is
- Jersey and leghorn
 - Aseel and deoni
 - Tharparkar & bursa
 - Gir & plymoth rock
137. How many among the following are examples of marine and fresh water edible fish respectively?
- Catla, Hilsa, Rohu, Sardine, Mackerel, common carp, pomfret**
- 3,4
 - 5,2
 - 4,3
 - 2,4
138. **Assertion** : Nicotine, the key component of tobacco is a potent carcinogen and stimulant.
- Reason** : Cigarette smoking and chewing tobacco can cause cancer.
- Both Assertion and Reason are true and the reason is the correct explanation of the assertion
 - Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
 - Assertion is true statement but Reason is false
 - Assertion is false
139. Find the odd one out from each and choose the correct option
- Aschelminthes – Filariasis, Ascariasis, diseases Ringworm
 - Bacterial STDs – Syphilis, Gonorrhoea, Trichomoniasis
 - Vector borne diseases – Babesiosis, Dengue, Polio
- Ascariasis, Gonorrhoea, Babesiosis
 - Ringworm, Trichomoniasis, Polio
 - Filariasis, Syphilis, Dengue
 - Ringworm, Trichomoniasis, Polio
140. Which of the following is not a treatment of cancer?
- Biopsy, mammography
 - Radiations, antibodies
 - Vinblastin, surgery
 - α -interferons, vincristine

141. In the diagram given below, A, B & C respectively are



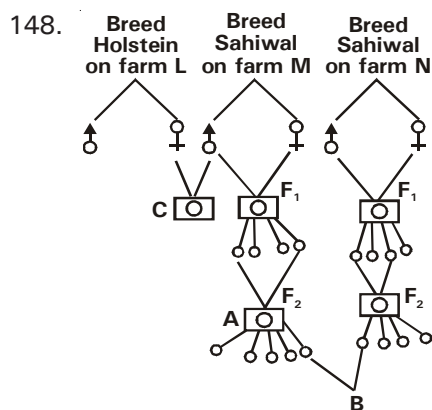
- Bone marrow, thymus & spleen
 - Spleen, Bursa fabricus & lymph node
 - Thymus, Bone marrow & lymph node
 - Thymus, Lymph node & Bone marrow
142. How many of the following statements are correct with respect to acquired immunity?
- It is pathogen specific immunity characterized by memory.
 - Primary response is of high intensity and anamnestic response is of low intensity.
 - Antibody structure can be represented as H_2I_2 or $(HI)_2$.
 - Antibody mediated immunity is also called as cell mediated immunity.
- 4
 - 3
 - 1
 - 2
143. Infection of Rhinovirus can be acquired by
- Inhaling droplets from cough of an infected person
 - Pens, books, cups and doorknobs contaminated by the virus
 - Biting of mosquito
- a, b & c
 - a & b only
 - a & c only
 - b & c only
144. **Statement-I** : The contribution of India and China to the world farm produce is only 25%.
- Statement-II** : Poultry refers to meat of chicken and ducks.
- Both statement-I and statement-II are correct
 - Both statement-I and statement-II are incorrect
 - Statement-I is correct but statement-II is incorrect
 - Statement-I is incorrect but statement-II is correct
145. A 20 years old boy with lack of interest in personal hygiene & unexplained absence from college is found dead. Autopsy reveals respiratory failure to be the cause of his death. It was most probably due to
- discontinuation of nicotine consumption
 - lowered immunity
 - excessive dose of drugs
 - sudden discontinuation of drugs

BOTANY : SECTION-A

All questions are compulsory in section A

146. The drug that functions as depressant of CNS is
- (1) Amphetamine
 - (2) Heroin
 - (3) Cocaine
 - (4) Nicotine

147. Which of the following is applicable to IgM?
- (1) It is the smallest antibody
 - (2) It protects the body surface
 - (3) It is the immunoglobulin prepared by body on first interaction with antigen
 - (4) It can cross the placental barrier



Identify among techniques A, B & C correctly matched to its features

- i-A. there is selection at every step to increase productivity.
 - ii-B. helps to overcome inbreeding depression
 - iii-C. similar technique was used to develop Hisardale in Punjab
 - iv-C. the offspring of such breeds is generally sterile
- (1) i & iii only
 - (2) i, ii, iii
 - (3) ii, iii, iv
 - (4) i & iv
149. Ascariasis is different from Amoebiasis in that
- (1) Ascariasis is an infectious disease whereas Amoebiasis is a nutritional deficiency disease
 - (2) Ascariasis is an air borne disease whereas Amoebiasis spread via contaminated articles
 - (3) Ascariasis is caused by a nematode white Amoebiasis by a bacteria
 - (4) Ascariasis pathogen infects small intestine whereas Amoebiasis pathogen infects large intestine
150. The first commercially available human vaccine produced by genetic engineering is
- (1) polio vaccine
 - (2) leukemia virus vaccine
 - (3) hepatitis B vaccine
 - (4) pneumonia vaccine

151. If the endosperm cell of an angiosperm has 24 chromosomes. Then the number of chromosomes in the gamete would be

- (1) 8
- (2) 16
- (3) 24
- (4) 48

152. Which of the following produces two types of flowers — chasmogamous as well as cleistogamous?

- (1) *Oxalis*, *Commelina*, *Mirabilis*
- (2) *Oxalis*, *Helianthus*, *Hibiscus*
- (3) *Viola*, *Commelina*, *Oxalis*
- (4) *Viola*, *Lathyrus*, *Pisum*

153. Which of the following is correct w.r.t. flower?

- a. Proximal end of filament is attached to the thalamus
- b. The number of stamens are variable in flowers of different species.
- c. Length of stamens are same in flowers of different species

- (1) Both a & c
- (2) Both b & c
- (3) a, b & c
- (4) Both a & b

154. The mode of asexual reproduction in *Chlamydomonas* is

- (1) formation of gametes
- (2) endospore formation
- (3) conjugation
- (4) zoospore formation

155. When sepals or petals in a whorl just touch one another at the margin, without overlapping the aestivation is

- (1) twisted
- (2) vexillary
- (3) valvate
- (4) imbricate

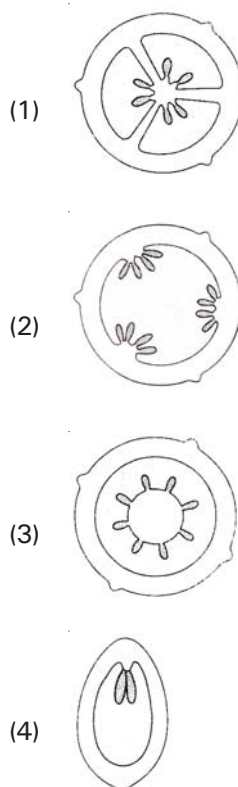
156. Which of the following step prevents contamination of stigma by unwanted pollen during artificial hybridization?

- a. Emasculation
- b. Bagging
- c. Selection of parents
- d. Artificial pollination

- (1) a & b
- (2) b & c
- (3) c & d
- (4) only b

157. Obliquely placed carpels, axile placentation and swollen placenta is characteristic of family
 (1) cucurbitaceae
 (2) solanaceae
 (3) poaceae
 (4) malvaceae
158. In a type of apomixis known as adventive embryony, embryos develop directly from the
 (1) nucellus or integuments
 (2) synergids or antipodals in an embryo sac
 (3) accessory embryo sacs in the ovule
 (4) zygote
159. Identify the incorrect statement
 (1) Gametogenesis is a prefertilization event
 (2) In flowering plants, pollen grains represent male gametophyte
 (3) Flower is a seat of sexual reproduction in all plants
 (4) Site of sporogenesis is stamen and pistil
160. Large number of offsprings are produced by the organisms which show external fertilisation because
 (1) large number of male gametes have chance to fuse with female gametes
 (2) being vulnerable to predators, a few reach maturity
 (3) gametes are released in water, so there are more chances of syngamy
 (4) off springs get better parental care
161. Which of the following statement is incorrect?
 (1) Phyloclade is a stem modification
 (2) Phyllode is seen in Australian Acacia
 (3) Leaf tendrils are present in pea
 (4) Swollen base of leaf is called lamina
162. **Assertion** : Pneumatophores possess lenticels for exchange of gases.
Reason : Plants possessing pneumatophores grow in marshy places.
 (1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
 (2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
 (3) Assertion is true statement but Reason is false
 (4) Assertion is false
163. Which of the following set of plants show the same stem modification as cucumber?
 (1) Pumpkin and watermelon
 (2) Citrus and *Bougainvillea*
 (3) Potato and tomato
 (4) Ginger and turmeric
164. In angiosperms, free nuclear divisions occur during
 (1) embryo formation
 (2) elower formation
 (3) gametes formation
 (4) endosperm formation

165. In the figures, which one is the characteristic placentation of *Dianthus*?



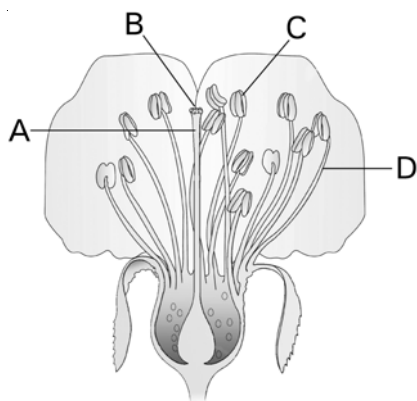
166. Epiblast present in certain monocot embryo represents
 (1) rudimentary leaves
 (2) epicotyl
 (3) scutellum
 (4) rudimentary cotyledon
167. A flower is said to be perfect, when it has
 (1) all the four whorls i.e. calyx, corolla, androecium and gynoecium
 (2) corolla, androecium and gynoecium
 (3) calyx and corolla
 (4) androecium and gynoecium
168. **Statement-I** : Floral formula shows cohesion and adhesion within parts of whorls and between whorls.
Statement-II : In a floral diagram, the side of flower towards mother axis is anterior.
 (1) Both statement-I and statement-II are correct
 (2) Both statement-I and statement-II are incorrect
 (3) Statement-I is correct but statement-II is incorrect
 (4) Statement-I is incorrect but statement-II is correct

169. Which statement is incorrect regarding double fertilisation?
- (1) One male gamete moves towards egg cell & fuses with its nucleus completing syngamy
 - (2) The other male gamete fuses with two polar nuclei located in central cell to produce a triploid PEN
 - (3) Central cell after triple fusion develops into embryo while zygote develops into endosperm
 - (4) This event is unique to flowering plants
170. The typical floral formula of Fabaceae is
- (1) $\oplus \overline{\text{K}}_{(5)} \text{C}_{(5)} \text{A}_5 \underline{\text{G}}_{(2)}$
 - (2) $\% \overline{\text{K}}_5 \text{C}_{1+(2)+2} \text{A}_{1+(9)} \underline{\text{G}}_{(1)}$
 - (3) $\% \overline{\text{K}}_{(5)} \text{C}_{1+2+(2)} \text{A}_{(9)+1} \underline{\text{G}}_1$
 - (4) $\% \overline{\text{K}}_5 \text{C}_5 \text{A}_{10} \underline{\text{G}}_{(1)}$
171. Choose the correct statement
- (1) Pollination always guarantees the transfer of right type of pollen
 - (2) Compatible pollen belongs to the same species as stigma
 - (3) The cells of antipodals, nucellus and functional megaspore are all haploid
 - (4) *Hibiscus* shows multicarpellary, apocarpus gynoecium
172. A multicellular, filamentous alga exhibits a type of sexual life cycle in which meiotic division occurs after formation of zygote. Adult filament of this alga hasvegetative cells and gametangia
- (1) haploid and diploid
 - (2) diploid and diploid
 - (3) diploid and haploid
 - (4) haploid and haploid
173. Match the following given in column-I with suitable example given in column-II
- | Column-I | Column-II |
|------------------------|-------------|
| i. Keel | a. Pea |
| ii. Aleurone layer | b. Mulberry |
| iii. Incomplete flower | c. Maize |
| iv. Persistent sepal | d. Brinjal |
- (1) i-a, ii-c, iii-b, iv-d
 - (2) i-a, ii-c, iii-d, iv-b
 - (3) i-a, ii-b, iii-c, iv-d
 - (4) i-b, ii-a, iii-d, iv-c
174. How many of the following statements are correct?
- a. Stem tendrils are found in pea
 - b. Spine is a modification of leaf
 - c. Hydrophytes possess pneumatophores
 - d. Rhizome of ginger and corm of *Zaminkand* are underground stem
 - e. Bulbils are flashy buds found in *Agave*
- (1) 3
 - (2) 4
 - (3) 2
 - (4) 1
175. Which is not correctly matched in respect to edible part?
- (1) Mango - mesocarp
 - (2) Lithi - fleshy aril
 - (3) Groundnut - cotyledons & embryo
 - (4) Coconut - endocarp
176. The genetic mechanism which prevents self-pollen from fertilising ovules by inhibiting pollen tube growth in the pistil is called
- (1) dioecy
 - (2) bisexuality
 - (3) inbreeding depression
 - (4) self incompatibility
177. Which of the following adaptation is not needed for abiotic agents of pollination?
- (1) Light and non sticky pollens
 - (2) Feathery stigma
 - (3) Ribbon like pollens covered by mucilage
 - (4) Colourful flower rich in nectar
178. Which is correct w.r.t. asexual reproduction?
- a. A single individual (parent) is capable of producing offspring
 - b. The offsprings that are produced are exact copies of their parent
 - c. Term clone is used to describe morphologically and genetically similar individuals
- (1) a, b & c
 - (2) b & c
 - (3) a & c
 - (4) c only
179. Two lateral small leaf like structure at leaf base are called as
- (1) pulvinus
 - (2) stipule
 - (3) leaf blade
 - (4) ligule
180. Offsets type of stem is found in
- (1) *Pistia*
 - (2) *Eichhornia*
 - (3) *Wolffia*
 - (4) Both (1) and (2)

181. How many of the following flowers of plants have marginal placentation?

Pisum, Datura, Sem, Petunia, Indigofera, Soyabean, Tobacco, Cassia, Tulip, Lupin, Trifolium, Gram, Belladonna

- (1) Seven
 - (2) Eight
 - (3) Nine
 - (4) Ten
182. In the given L.S. of a flower, what do A, B, C & D represent respectively.

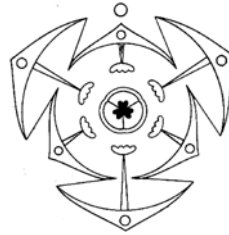


- (1) A–Petal, B–Stamen, C–Sepal, D–Ovule
 - (2) A–Ovary, B–Stigma, C–Petal, D–Filament
 - (3) A–Style, B–Stigma, C–Anther, D–Filament
 - (4) A–Stamen, B–Anther, C–Stigma, D–Style
183. The portion of embryonal axis above the level of cotyledon attachment is
- (1) epicotyl
 - (2) hypocotyl
 - (3) radicle
 - (4) root cap
184. Which of the following is a modification of stem that protect plants from browsing animals?
- (1) Underground stem of turmeric
 - (2) Tendrils of gourds
 - (3) Thorns of *Citrus*
 - (4) Corm of *Colocasia*
185. Persistent nucellus seen in the seeds of black pepper is known as
- (1) pericarp
 - (2) periderm
 - (3) perisperm
 - (4) cotyledon

BOTANY : SECTION-B

This section has 15 questions, attempt any 10 questions of them.

186. Ploidy of the cells of nucellus, MMC, the functional megaspore & female gametophyte is respectively?
- (1) $2n, 2n, n, n$
 - (2) $n, n, 2n, 2n$
 - (3) $2n, n, 2n, n$
 - (4) $2n, 2n, 2n, 2n$
187. Ovule generally differentiate a single megaspore mother cell in which region of the nucellus?
- (1) Chalazal region
 - (2) Micropylar region
 - (3) Middle region
 - (4) Sporogenous region
188. Exalbuminous seeds store food in
- (1) endosperm
 - (2) cotyledons
 - (3) nucellus
 - (4) embryo
189. In monocot radicle and root cap enclosed in an undifferentiated sheath called
- (1) scutellum
 - (2) epiblast
 - (3) coleoptile
 - (4) coleorrhiza
190. **Assertion** : In seed plants, pollen grains produced in anthers have to be transferred to the stigma before it can lead to fertilisation.
- Reason** : In seed plants, pollen grains are the carriers of male gametes and ovule has the egg.
- (1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
 - (2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
 - (3) Assertion is true statement but Reason is false
 - (4) Assertion is false
191. Choose the incorrect option
- (1) Root is covered by a thimble-like structure called root cap
 - (2) Cells of elongation zone are very small, thin-walled and divide repeatedly
 - (3) Root hairs absorb water and minerals from the soil
 - (4) Region of maturation lies proximal to the region of elongation

192. Which of the following is wrong regarding symmetry of flower?
- Flower of Gulmohar can be divided into two halves by only one median vertical plane
 - Flower of *Datura* and Chilli shows radial symmetry
 - Canna* is bilaterally symmetrical flower
 - Flower can be pentamerous, trimerous or tetramerous
193. **Statement-I** : Four wall layers surround the microsporangia.
Statement-II : Pollen grains in angiosperms are shed at 4 celled stage.
- Both statement-I and statement-II are correct
 - Both statement-I and statement-II are incorrect
 - Statement-I is correct but statement-II is incorrect
 - Statement-I is incorrect but statement-II is correct
194. Zoospore formation and conidia is the feature of (respectively)
- Ulothrix* and *Oedogonium*
 - Ulothrix* and *Penicillium*
 - Ectocarpus* and *Spongilla*
 - Aspergillus* and *Ectocarpus*
195. A mustard plant shows
- alternate phyllotaxy
 - diadelphous stamens
 - syncarpous gynoecium
 - marginal placentation
 - presence of replum
- b,c & d
 - a,c & e
 - a & d
 - a,b,c,d & e
196. Identify the family of the following given floral diagram and choose its correct features
- 
- Poaceae, perianth, actinomorphic symmetry, epipetalous
 - Liliaceae, perianth, actinomorphic symmetry, epiphyllous
 - Solanaceae, perianth, zygomorphic symmetry, epipetalous
 - Liliaceae, perianth, zygomorphic symmetry, epiphyllous
197. Which of the following plant is correctly matched with its three characteristic features ?
- Muliathi – Vexillary aestivation, superior ovary, axile placentation
 - Tobacco – Twisted aestivation, superior ovary, actinomorphic symmetry
 - Mustard – Non-endospermic seed, polysepalous, siliquea fruit
 - Onion – Pentamerous flower, superior ovary, capsule fruit
198. The offspring produced through which of the following process are not exactly similar to their parents?
- Parthenogenesis
 - Asexual reproduction
 - Sexual reproduction
 - Grafting
199. The number of megaspore mother cells required to produce 100 embryo sacs are
- 1
 - 25
 - 50
 - 100
200. Which of the following is incorrect?
- Stamens are attached to petals - epipetalous, brinjal
 - Stamens are attached to perianth - epiphyllous, Lily
 - Stamens are united into one bunch - monadelphous, china rose
 - Variation in length of filaments within a flower - polyadelphous, *Citrus*

Space for rough work
