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FINAL TEST SERIES for NEET-2023

MM : 720 **Test-7** **Time : 3 Hrs. 20 Mins.**

Topics covered :

Physics : Alternating Current, Electromagnetic Waves, Ray Optics and Optical Instruments, Wave Optics

Chemistry : Haloalkanes and Haloarenes, Alcohols, Phenols and Ethers, Aldehydes, Ketones and Carboxylic Acids

Botany : Strategies for Enhancement in Food Production, Microbes in Human Welfare, Organisms and Populations

Zoology : Human Health and Disease, Strategies for Enhancement of Food Production: Animal Husbandry

Instructions for Paper (ΣXIIVT7β) :

(i) There are two sections in each subject, i.e. Section-A & Section-B. You have to attempt all 35 questions from Section-A & only 10 questions from Section-B out of 15.

(ii) Each question carries 4 marks. For every wrong response 1 mark shall be deducted from the total score. Unanswered / unattempted questions will be given no marks.

(iii) Use blue/black ballpoint pen only to darken the appropriate circle.

(iv) Mark should be dark and completely fill the circle.

(v) Dark only one circle for each entry.

(vi) Dark the circle in the space provided only.

(vii) Rough work must not be done on the Answer sheet and do not use white-fluid or any other rubbing material on the Answer sheet. (ΣXIIVT7β)

PHYSICS

Choose the correct answer :

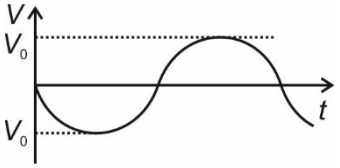
SECTION - A

1. A complex current wave is given by $i = (8 + 12 \sin 100\pi t)$ A. Its average value over one time period is given as

   (1) 14 A (2) 10 A

   (3) 8 A (4) Zero

2. The voltage across a capacitor is represented as shown in figure. Which one of the following curves in the given options will represent the corresponding current?



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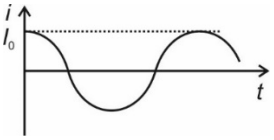

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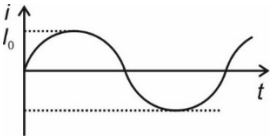

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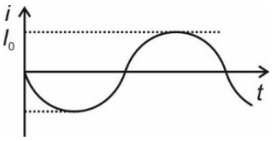

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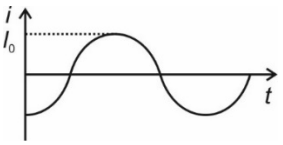


3. Among the following set of values of resistance (R), inductance (L) and capacitance (C), the quality factor is minimum for

(1) $R = 4\ \Omega$, $L = 1\ \mu H$, $C = 64\ \mu F$

(2) $R = 4\ \Omega$, $L = 1\ \mu H$, $C = 1\ \mu F$

(3) $R = 8\ \Omega$, $L = 1\ \mu H$, $C = 64\ \mu F$

(4) $R = 8\ \Omega$, $L = 1\ \mu H$, $C = 1\ \mu F$

4. The self-inductance of the motor of an electric fan is 12 H. In order to impart maximum power at 60 Hz it should be connected to the capacitance of

(1) 30 μF (2) 70 μF

(3) 0.587 μF (4) 28.6 μF

5. An alternating voltage $V = 60 \sin 50t + 80 \cos 50t$ is applied to a resistor of resistance 10 Ω. The r.m.s value of current through the resistor is

(1) $5\sqrt{2}$ A (2) 10 A

(3) $\frac{5}{\sqrt{2}}$ A (4) $10\sqrt{2}$A

6. An ac source rated 50 V (rms) supplies a current of 10 A (rms) to a circuit. The average power delivered by the source

(1) Must be 500 W

(2) Must be less than 500 W

(3) May be greater than 500 W

(4) May be less than 500 W

7. An LC oscillation circuit contains inductance $L = 0.25\ \mu H$ and capacitance $C = 0.01\ \mu F$. The wavelength of electromagnetic wave generated nearly is

(1) 188 m (2) 30 m

(3) 60 m (4) 94 m

8. Which among the following is true for gamma rays?

(1) They show fluorescence

(2) They are used in cancer therapy

(3) They have a high penetrating power

(4) All of the above

9. The electric current in the circuit is given by $i = i_0\left(\frac{t}{\tau}\right)^{\frac{3}{2}}$ for some time. The r.m.s. current for the period $t = 0$ to $t = \tau$ will be

(1) $\frac{i_0}{\sqrt{2}}$ (2) $\frac{i_0}{2}$

(3) $\frac{i_0}{\sqrt{3}}$ (4) $\frac{i_0}{3}$

10. An AC voltage source of variable angular frequency ω and fixed amplitude V is connected in series with an inductor of inductance L and bulb of resistance R. When ω is increased

(1) The bulb glow dimmer

(2) The bulb glow brighter

(3) Total impedance of circuit decrease

(4) Total impedance of circuit unchanged

11. The charge on a parallel plate capacitor varies as $q = q_0 \sin 2\pi ft$. The plates are very large and close to each other (area = A, separation = d) Neglecting the edge effects. The displacement current through the capacitor will be

(1) $I_d = 2\pi f q_0 \cos 2\pi ft$

(2) $I_d = -2\pi f q_0 \sin 2\pi ft$

(3) $I_d = -2\pi f q_0 \cos 2\pi ft$

(4) $I_d = 2\pi f q_0 \sin 2\pi ft$

12. About 10% of the power of 100 W light bulb is converted to visible radiation. The average intensity of visible radiation at a distance of 1 m from bulb is (nearly)

(1) $0.5\ \frac{W}{m^2}$ (2) $0.4\ \frac{W}{m^2}$

(3) $0.6\ \frac{W}{m^2}$ (4) $0.8\ \frac{W}{m^2}$

13. The refractive indices of a glass prism for red, yellow and violet colours are, 1.690, 1.695 and 1.705 respectively. The dispersive power of the glass will be (nearly)

(1) 0.0215 (2) 0.0115

(3) 0.0155 (4) 0.0415

14. Light emitted from a distant star is observed at frequency 5500 MHz for the star stationary with respect to us. If the star is approaching us with speed 3×10^5 m/s, then the observed frequency will be

(1) 5505.5 Hz (2) 5505.5 MHz

(3) 5500.5 MHz (4) 5505.5 kHz

15. In YDSE, the spacing between the slits is 0.03 mm and wavelength of light used is λ. If the angular width of a fringe formed on a distant screen is 1°, then value of λ is

(1) 5233 Å (2) 5000 Å

(3) 5500 Å (4) 6500 Å

16. A bulb is 1 m below the surface of a pond. If the critical angle is 45°, then the maximum area of surface of water from which light will come out

(1) 3.14 m^2 (2) 6.28 m^2

(3) 4.71 m^2 (4) 1.57 m^2

17. The focal length of the objective and eyepiece of an astronomical telescope are 50 cm and 5 cm respectively. The magnifying power of this telescope when image is formed at near point will be

(1) 14 (2) 14.4

(3) 10 (4) 12

18. Choose the correct statement(s) among the following.

(1) Shining of air bubble in water is due to TIR

(2) Shining of diamond is increased if it is dipped in a transparent oil

(3) Blue colour has longer wavelength than red, therefore blue colour is scattered more strongly

(4) Both (1) and (3)

19. When the angle of incidence is 53° on the surface of glass slab, it is found that the reflected ray is completely polarised. The velocity of light in the glass is

(1) 2.25×10^8 m/s (2) 2×10^8 m/s

(3) 1.5×10^8 m/s (4) $\sqrt{3} \times 10^8$ m/s

20. In Young's double slit experiment, the fringe width is found to be 0.6 mm. If the whole apparatus is immersed in a liquid having refractive index 1.5, without disturbing the geometrical arrangement, then the new fringe width will be

(1) 0.6 mm (2) 0.9 mm

(3) 0.4 mm (4) 0.3 mm

21. A lens of focal length 40 cm in air is placed in a liquid of refractive index μ and it is found that its focal length becomes 60 cm. If refractive index of the material of lens is 1.5 then refractive index of liquid (μ) will be

(1) 1.5 (2) 1.8

(3) 1.7 (4) 1.125

22. An ideal inductor of inductance 25 μH is connected to an a.c. source of 220 V, 50 Hz. The inductive reactance will be

(1) 2π mΩ (2) 5π mΩ

(3) 2.5π mΩ (4) 10π mΩ

23. An ideal inductor is connected in a series L-C-R circuit having inductor of Inductance of 50 μH and AC source is of 220 V and 50 Hz, the capacitance of capacitor if circuit behaves like a purely resistive circuit will be

(1) 0.2 F (2) 1 mF

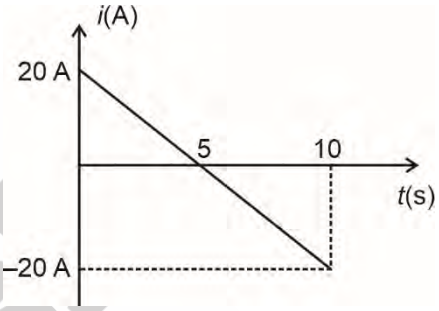
(3) 20 mF (4) 2 mF

24. In an L-C-R series circuit X_L = 10 Ω, X_C = 6 Ω, R = 3 Ω then the power factor of the circuit will be (symbols have usual meaning)

(1) 53° (2) 60°

(3) 37° (4) 30°

25. The rms value of current for the current (i) versus time (t) curve given below will be



(1) $\frac{20}{\sqrt{3}}$ A (2) 20 A

(3) $20\sqrt{2}$ A (4) $\frac{20}{\sqrt{2}}$ A

26. The Ampere-Maxwell law is given by the equation (where symbols have usual meaning)

(1) $\oint \vec{B} \cdot \vec{dl} = \mu_0 i_c + \mu_0 \varepsilon_0 \frac{d\phi_E}{dt}$

(2) $\oint \vec{B} \cdot \vec{dl} = \mu_0 \frac{d\phi_E}{dt} + \mu_0 \varepsilon_0 i_c$

(3) $\oint \vec{B} \cdot \vec{dl} = \mu_0 i_c - \mu_0 \varepsilon_0 \frac{d\phi_E}{dt}$

(4) $\oint \vec{B} \cdot \vec{dl} = \mu_0 \frac{d\phi_E}{dt} - \mu_0 \varepsilon_0 i_c$

27. The infrared waves are produced by

(1) Accelerated motion of charge in conducting wire

(2) Hot bodies and molecules

(3) Special vacuum tube

(4) Special lamps and very hot bodies

28. E.M. waves used for medical application among the following are

(A) Microwave (B) X-rays

(C) γ-rays (D) UV rays

(1) A and C only (2) B and D only

(3) B and C only (4) A and D only

29. A light ray is travelling in a medium of refractive index 1.5. The distance travelled by the wavefront in this medium in 2 s will be
(1) 4×10^8 m (2) 2×10^8 m
(3) 6×10^8 m (4) 8×10^8 m

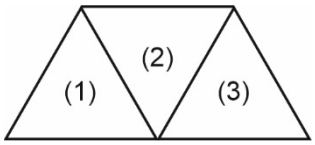
30. An unpolarised light ray having intensity I_0. It passes through polarizer and analyser one by one. If the angle between polarizer and analyser axis is 30° then intensity of light after passing through analyser will be
(1) $I_0\frac{\sqrt{3}}{4}$ (2) $\frac{I_0}{8}$
(3) $\frac{3I_0}{8}$ (4) I_0

31. There are two mediums A and B of refractive index 1.5 and 2 respectively. If wavefront of light ray travels 20 m in medium B, then the distance travelled by wavefront in medium A in same time will be
(1) 15 m (2) 20 m
(3) 26.66 m (4) 21 m

32. In a YDSE it is found that the distance between n^{th} and $(n-1)^{th}$ fringe is 0.3 mm. If distance between the slit is 0.1 mm then separation between slit and screen will be (wavelength of light is given by 500 nm)
(1) 1 m (2) 2 m
(3) 0.06 m (4) 0.6 m

33. If an object is placed at the centre of a glass sphere of refractive index μ, and radius R, then the location of image when a person is observing from outside (air) will be
(1) At the centre of sphere
(2) At distance μR in air
(3) At distance $\frac{\mu}{R}$ in air
(4) At distance $\frac{2\mu}{R}$ in air

34. The minimum deviation for an equilateral prism is δ_m. Refractive index of the material of prism is μ. If we place three similar prisms as shown in the diagram given below then minimum deviation for this arrangement will be



(1) $3\,\delta_m$ (2) δ_m
(3) $\delta_m/2$ (4) $2\,\delta_m$

35. A ray of light passes through an equilateral prism having refractive index $\sqrt{2}$, if the angle of incidence is 45° then angle of emergence of light will be
(1) 90° (2) 45°
(3) 30° (4) 60°

SECTION - B

36. A capacitor of capacity C is given charge Q and then connected to the coil of inductance L by closing the switch. The maximum current flowing in the circuit at any later time will be
(1) $\frac{Q}{\sqrt{LC}}$ (2) $\frac{Q}{2\sqrt{LC}}$
(3) $\frac{2Q}{\sqrt{LC}}$ (4) $\frac{2Q}{\pi\sqrt{LC}}$

37. A charged capacitor is discharged through a resistance R with time constant τ. If both resistor and capacitor are now connected in series across an AC source of angular frequency $\omega = \frac{1}{2\tau}$. The impedance of the circuit will be
(1) R (2) $\sqrt{3}R$
(3) $\sqrt{5}R$ (4) $\sqrt{2}R$

38. The amplitude of magnetic field in a region carried by an electromagnetic wave is 0.2 μT. The intensity of the wave is nearly
(1) 2.4 W/m^2
(2) 4.8 W/m^2
(3) 1.2 W/m^2
(4) 3.6 W/m^2

39. The radiation pressure on any surface (choose the correct option)
(1) Is dependent on wavelength of light used only
(2) Is independent of frequency and nature of surface
(3) Independent on the nature of source from which light is coming and on nature of surface on which it is falling
(4) Is dependent on nature of surface and intensity of light used

40. Voltage and current in an ac circuit are given by $V = 10 \sin(100\,\pi t - \pi/6)$ and $I = 4 \sin(100\,\pi t + \pi/6)$. The average power loss in the circuit will be
(1) 5 W (2) 8 W
(3) 10 W (4) Zero

41. If the power factor in an AC circuit changes from $\frac{1}{2}$ to $\frac{1}{4}$, then by what percent impedance will change (approximately) if resistance remains constant?

(1) Increase by 200%

(2) Decrease by 200%

(3) Increase by 100%

(4) Decrease by 100%

42. Electromagnetic radiation with intensity 50 W/cm^2 is incident on totally reflecting surface normally. If the surface has area of 0.05 m^2, Then the average force due to the radiation pressure, on it is

(1) 8.3×10^{-5} N

(2) 16.6×10^{-5} N

(3) 1.2×10^{-7} N

(4) 12.4×10^{-7} N

43. Maxwell's equation describes the fundamental law of

(1) Electricity only

(2) Magnetism only

(3) Mechanics only

(4) Electricity and magnetism both

44. Choose the incorrect statement

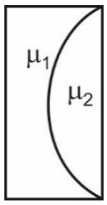
(1) In Rayleigh scattering, amount of scattering is inversely proportional to fourth power of wavelength

(2) Secondary rainbow is fainter than primary rainbow

(3) Light of red colour is scattered most in atmosphere

(4) In reflecting telescope, parabolic mirror can be used as an objective to remove the spherical aberration

45. A plano concave lens fits into a plano convex lens. Their plane surfaces are parallel to each other as shown in the figure. If $\mu_1 = 1.4$, $\mu_2 = 1.6$ and radius of curvature $R = 20$ cm, then the focal length of the combination is



(1) –100 cm

(2) 50 cm

(3) + 100 cm

(4) – 50 cm

46. The slit width of a single slit diffraction such that n^{th} maxima of double slit interference pattern is obtained within central maxima of the diffraction pattern is (d is distance between slits for YDSE arrangement and screen distance D and light used are same for both arrangements)

(1) $\frac{2d}{n^2}$ (2) $2d$

(3) nd (4) $\frac{2d}{n}$

47. The angle of polarisation for a medium is 53°. The critical angle for this medium will be

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

(3) $\cos^{-1}\left(\frac{3}{4}\right)$ (4) $\sin^{-1}\left(\frac{4}{5}\right)$

48. Water drop in glass behaves as

(1) Converging lens

(2) Diverging lens

(3) Rectangular glass slab

(4) Plane mirror

49. For a normal eye, the distance between retina and the cornea-eyelens is $\frac{5}{3}$ cm approximately. If the cornea of eye provides a converging power of 40 D and converging power of eye lens behind the cornea is 21 D. To see the distant object the power of lens required to the person is

(1) +1 D

(2) –1 D

(3) +2 D

(4) –2 D

50. For light diverging from a point source, choose the correct option(s)

(1) Wave front is cylindrical

(2) Wave front is spherical

(3) Intensity increases in proportional to the square of distance from point source

(4) Both (2) and (3)

CHEMISTRY

SECTION-A

51. Among the following weakest nucleophile in vapour phase is

(1) F^- (2) Cl^-

(3) Br^- (4) I^-

52. **Statement I:** S_N2 reactions of optically active halides are accompanied by inversion of configuration.

Statement II: In case of optically active alkyl halides, S_N1 reactions are accompanied by racemisation.

In the light of above statements, choose the most appropriate answer from the options given below.

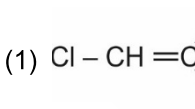
(1) Statement I is correct but statement II is incorrect

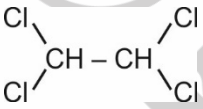
(2) Statement I is incorrect but statement II is correct

(3) Both statement I and statement II are correct

(4) Both statement I and statement II are incorrect

53. Which of the following is called westrosol?

(1) 

(2) 

(3) $Cl - CH_2 - CH_2 - Cl$ (4) $Cl - CH = CH - Cl$

54. When ethyl magnesium chloride reacts with phenol, the product obtained is

(1) Benzene (2) Ethane

(3) Ethylbenzene (4) Ethanol

55. Select the incorrect statement regarding E_2 elimination reaction?

(1) It is a single step bimolecular reaction

(2) The two leaving groups align in the same plane at 180° to each other

(3) The reaction passes through an alkene like transition state

(4) Polar protic solvent are most suitable for this reaction

56. The correct reactivity order of halogen acids towards ethers is

(1) HCl > HBr > HI (2) HI > HBr > HCl

(3) HCl > HI > HBr (4) HI > HCl > HBr

57. Alkyl iodide are generally prepared by

(1) Swarts reaction (2) Sandmeyer reaction

(3) Gatterman reaction (4) Finkelstein reaction

58. Terminal gem dihalides on hydrolysis gives

(1) Ketones

(2) Aldehydes

(3) Carboxylic acids

(4) Halohydrins

59. The order of E_1 elimination for alkyl halide is

(1) 1° > 2° > 3° (2) 3° > 1° > 2°

(3) 2° > 3° > 1° (4) 3° > 2° > 1°

60. The correct order of boiling point is

(1) Methoxymethane > Propane > Ethanol

(2) Methoxymethane > Ethanol > Propane

(3) Ethanol > Propane > Methoxymethane

(4) Ethanol > Methoxymethane > Propane

61. Butan-1-ol will not react with

(1) Na (2) PCl_5

(3) H_2SO_4 (4) NaOH

62. Most acidic compound among the following is

(1) p-Cresol (2) o-Cresol

(3) m-Cresol (4) Ethanol

63. Acetylation of salicylic acid produces

(1) Salol

(2) Aspirin

(3) Oil of winter green

(4) Paracetamol

64. The most suitable reaction for the preparation of t-butylethyl ether is

(1) $C_2H_5ONa + (CH_3)_3CCl \rightarrow$

(2) $C_2H_5ONa + (CH_3)_3CBr \rightarrow$

(3) $(CH_3)_3CONa + CH_3Br \rightarrow$

(4) $(CH_3)_3CONa + CH_3CH_2Br \rightarrow$

65. Chloroform is slowly oxidised by air in the presence of light to an extremely poisonous gas A. A is

(1) CCl_4 (2) $COCl_2$

(3) CH_3CHCl_2 (4) CCl_3CHO

66. Which among the following is an optically active molecule?

(1) $CH_2 = C = C = CH - Br$

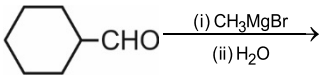
(2) $ClCH = C = CHCl$

(3) $Cl_2C = C = CHCl$

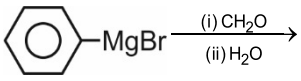
(4) $Cl_2C = C = C = CCl_2$

67. In which of the following reactions, 3° alcohol is obtained as major product?

(1) $HCOOCH_3 \xrightarrow[(ii)\ H_2O]{(i)\ CH_3MgBr(excess)}$

(2)  $\xrightarrow[(ii)\ H_2O]{(i)\ CH_3MgBr}$

(3) $CH_3COOC_2H_5 \xrightarrow[(ii)\ H_2O]{(i)\ CH_3MgBr(excess)}$

(4)  $\xrightarrow[(ii)\ H_2O]{(i)\ CH_2O}$

68. When phenetole reacts with conc. HI (One equivalent), the major products formed are

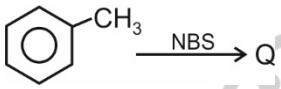
(1) Iodobenzene and ethanol

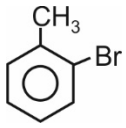
(2) Phenol and iodoethane

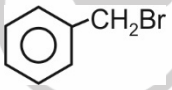
(3) Phenol and iodomethane

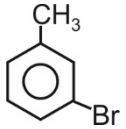
(4) Iodobenzene and methanol

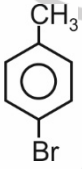
69. The major product (Q) in the following reaction is



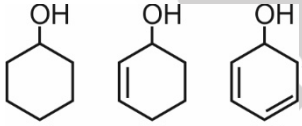
(1) 

(2) 

(3) 

(4) 

70. The correct order of ease of dehydration in acidic medium for the following alcohols is

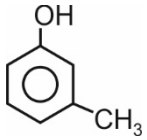


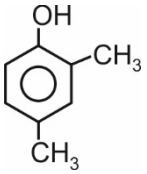
(I) (II) (III)

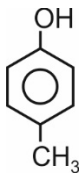
(1) III > II > I (2) II > III > I

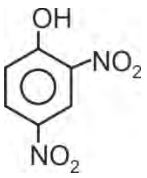
(3) I > II > III (4) II > I > III

71. Which of the following compound evolves CO_2 on treatment with $NaHCO_3$?

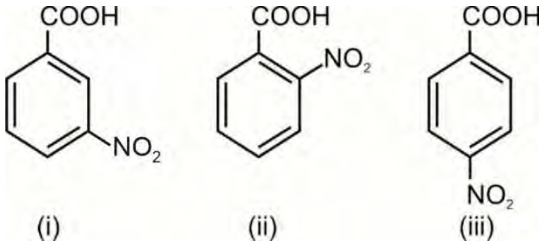
(1) 

(2) 

(3) 

(4) 

72. Consider the following compounds



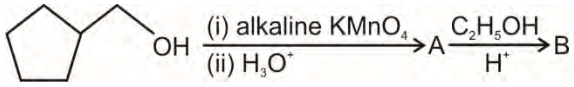
(i) (ii) (iii)

The correct acidity order is

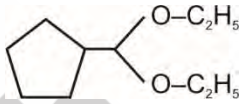
(1) (ii) > (i) > (iii) (2) (iii) > (ii) > (i)

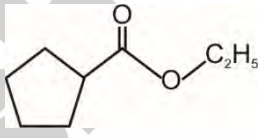
(3) (ii) > (iii) > (i) (4) (i) > (iii) > (ii)

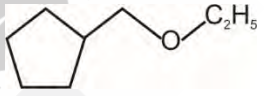
73. Consider the following reaction sequence

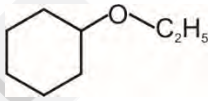


Product B is

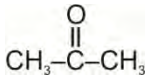
(1) 

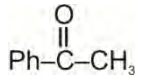
(2) 

(3) 

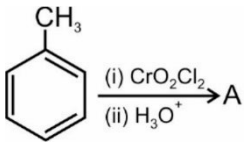
(4) 

74. The compound which will react fastest with $NaHSO_3$ is

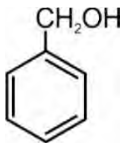
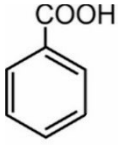
(1)  (2) CH_3CHO

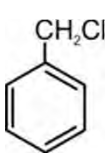
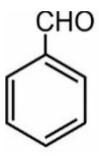
(3) PhCHO (4) 

75. Consider the following reaction sequence



Major product A is

(1)  (2) 

(3)  (4) 

76. **Statement I:** Zymase converts glucose to ethyl alcohol.

Statement II: Invertase converts glucose to fructose.

In the light of above statements, choose the most appropriate answer from the options given below.

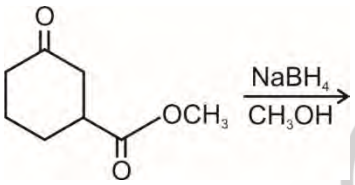
(1) Statement I is correct but statement II is incorrect

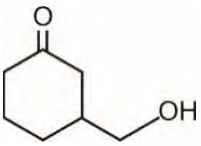
(2) Statement I is incorrect but statement II is correct

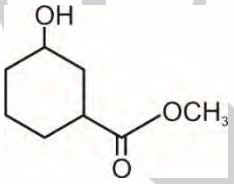
(3) Both statement I and statement II are correct

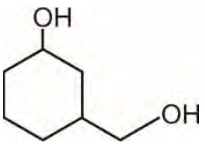
(4) Both statement I and statement II are incorrect

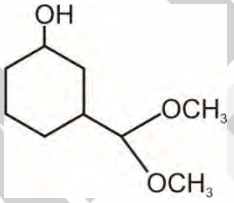
77. Major product of the given reaction is



(1) 

(2) 

(3) 

(4) 

78. Major product (P) of the given reaction is

$CH_3CH_2CH_2COOH \xrightarrow[(ii)\ H_2O]{(i)\ Br_2/red\ P}$ P (Major)

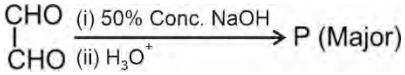
(1) $CH_3\underset{\underset{Br}{|}}{C}HCH_2COOH$

(2) $CH_3CH_2CH_2CH_2Br$

(3) $CH_3CH_2\underset{\underset{Br}{|}}{C}HCOOH$

(4) $CH_3CH_2CH_2COBr$

79. Consider the following reaction



Product P is

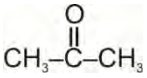
(1) 

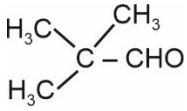
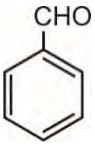
(2) 

(3) 

(4) 

80. Consider the following compounds

(i) CH_3CHO (ii) 

(iii)  (iv) 

The compound(s) which will not give aldol condensation reaction is/are

(1) (i), (iii) and (iv) only (2) (iii) and (iv) only

(3) (iv) only (4) (ii) and (iv) only

81. **Statement I:** Vinyl alcohol and acetaldehyde are tautomers.

Statement II: Carbonyl compounds with α-Hydrogen may show tautomerism.

In the light of above statements, choose the most appropriate answer from the options given below.

(1) Statement I is correct but statement II is incorrect

(2) Statement I is incorrect but statement II is correct

(3) Both statement I and statement II are correct

(4) Both statement I and statement II are incorrect

82. Match List I with List II and choose the correct option.

	List I (Alcohol)		**List II (Classification)**
a.	C_2H_5OH	(i)	Tertiary alcohol
b.	$CH_3CHOHCH_3$	(ii)	Allylic alcohol
c.	CH_2CHCH_2OH	(iii)	Saturated primary alcohol
d.	$(CH_3)_3COH$	(iv)	Secondary alcohol

(1) a(ii), b(iv), c(iii), d(i)

(2) a(iii), b(iv), c(ii), d(i)

(3) a(iii), b(ii), c(iv), d(i)

(4) a(iii), b(ii), c(i), d(iv)

83. **Assertion (A):** Acetaldehyde and acetone can be distinguished by ammoniacal silver nitrate solution.

Reason (R): Acetaldehyde gives a bright silver mirror on reaction with Tollens' reagent.

In the light of above statements, choose the most appropriate answer from the options given below.

(1) (A) is correct but (R) is not correct

(2) (A) is not correct but (R) is correct

(3) Both (A) and (R) are correct and (R) is the correct explanation of (A)

(4) Both (A) and (R) are correct but (R) is not the correct explanation of (A)

84. **Assertion (A):** Acetic acid exist as dimer in benzene.

Reason (R): Acetic acid forms hydrogen bonding in benzene.

In the light of above statements, choose the most appropriate answer from the options given below.

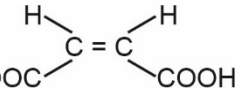
(1) (A) is correct but (R) is not correct

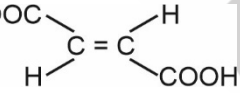
(2) (A) is not correct but (R) is correct

(3) Both (A) and (R) are correct and (R) is the correct explanation of (A)

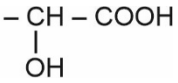
(4) Both (A) and (R) are correct but (R) is not the correct explanation of (A)

85. Fumaric acid is

(1) 

(2) 

(3) $HOOC - CH_2 - CH_2 - COOH$

(4) 

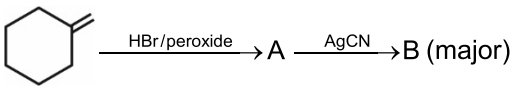
SECTION-B

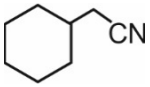
86. The total number of isomers that can be obtained (including stereoisomers) on dibromination of propane is

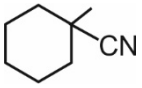
(1) 8 (2) 4

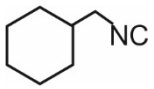
(3) 6 (4) 5

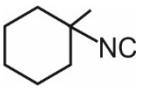
87. The compound (B) in the given reaction sequence is

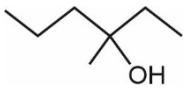


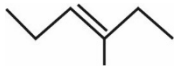
(1) 

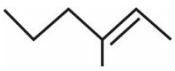
(2) 

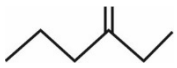
(3) 

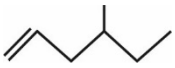
(4) 

88. Which among the following is not a product of dehydration of 

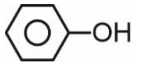
(1) 

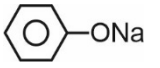
(2) 

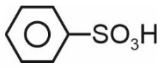
(3) 

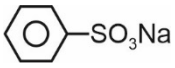
(4) 

89. 
compound 'B' is

(1) 

(2) 

(3) 

(4) 

90. Compound that cannot get oxidised easily by acidic $K_2Cr_2O_7$

(1) $(CH_3)_3COH$ (2) CH_3CHO

(3) CH_3OH (4) $CH_3CH(OH)CH_3$

91. **Statement (I):** Methanol and ethanol can be distinguished by I_2 in presence of KOH.

Statement (II): Ethanol gives yellow ppt with I_2 in presence of KOH.

In the light of above statements, choose the most appropriate answer from the options given below.

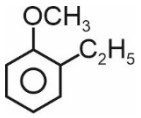
(1) Statement (I) is correct but statement (II) is incorrect

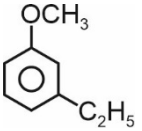
(2) Statement (I) is incorrect but statement (II) is correct

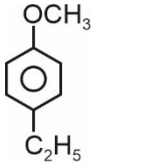
(3) Both statement (I) and statement (II) are correct

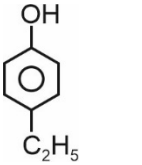
(4) Both statement (I) and statement (II) are incorrect

92. Structure of p-Ethylanisole is

(1) 

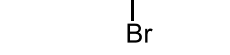
(2) 

(3) 

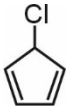
(4) 

93. Compound from class of vinyl halide is

(1) $HC \equiv C - Br$ (2) $CH_2 = CH - CH_2Cl$

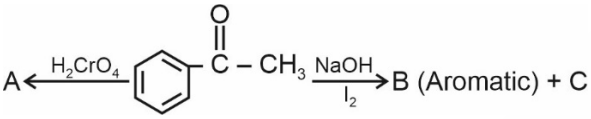
(3) $CH_3 - CH_2Cl$ (4) 

94. Which among the following will give white precipitate with $AgNO_3$ with maximum ease?

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

95. Most suitable reagent for conversion of alcohol into corresponding alkyl halide with maximum purity is

(1) $SOCl_2$ (2) PCl_3
(3) PCl_5 (4) $HCl/ZnCl_2$

96. 

Correct statement(s) for A, B and C are

(a) A can be converted to B on reaction with NaOH

(b) C is yellow coloured gas.

(c) A gives meta bromo product on reaction with Br_2 in presence of $FeBr_3$

(1) (b) only
(2) (a) and (b) only
(3) (a) and (c) only
(4) (a), (b) and (c)

97. Which among the following can get decarboxylated most easily

(1) $CH_3CH_2CH_2COOH$
(2) $CH_3CH(CH_3)-COOH$
(3) $CH_3CH(Cl)-CH_2-COOH$
(4) $CH_3-C(=O)-CH_2-COOH$

98. Number of optically active products forms in following reaction are

$$CH_3CHO + HCN \xrightarrow[(ii)\ H^+]{(i)\ OH^-}$$

(1) 2 (2) 1
(3) 0 (4) 4

99. **Statement I:** Reaction of benzaldehyde with mixture of nitric acid and sulphuric acid will give p-nitro benzaldehyde as major product.

Statement II: –CHO is activating and ortho-para directing group for electrophilic aromatic substitution reaction.

In the light of above statements, choose the most appropriate answer from the options given below.

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

100. $CH_3-C(=O^{18})-OC_2H_5 + H_2O^{18} \xrightarrow{H^+}$ products formed in reaction above will be

(1) $CH_3-C(=O)-O^{18}H + C_2H_5O^{18}H$
(2) $CH_3-C(=O^{18})-OH + C_2H_5O^{18}H$
(3) $CH_3-C(=O^{18})-O^{18}H + C_2H_5OH$
(4) $CH_3-C(=O)-OH + C_2H_5OH$

BOTANY

SECTION - A

101. The capacity to generate a whole plant from any cell/explant is called

(1) Resistance
(2) Totipotency
(3) Fertility
(4) Fecundity

102. During which of the given decades, green revolution occurred in India?

(1) 1950s (2) 1960s
(3) 1940s (4) 1920s

103. A plant is infected with virus. Through tissue culture, which part(s) of this plant can be used to recover healthy plant?

(1) Apical and axillary meristem
(2) Cells of cortex
(3) Pith
(4) Phloem parenchyma

104. Select the **odd** one w.r.t. techniques employed during cross-hybridisation among the selected parents for plant breeding.
(1) Germplasm collection (2) Emasculation
(3) Bagging (4) Rebagging

105. Pusa Sem 2, a variety of __(i)__ is developed to make it resistant against __(ii)__.
Select the **correct** option for (i) and (ii) respectively.
(1) Okra and Shoot borer
(2) Bhindi and Aphids
(3) *Brassica* and Fruit borer
(4) Flat bean and Jassids

106. Select the most appropriate reason w.r.t. construction of biogas plants often in rural areas.
(1) Biogas is used for cooking
(2) Cattles are used for variety of purposes
(3) Cattle dung is available in large quantities in rural areas
(4) Biogas is used for lighting

107. Preparation of some fermented beverages requires the process of distillation. It is done for
(1) Preventing them from denaturation
(2) Increasing alcohol percentage in them
(3) Improving the flavour of the beverages
(4) Destroying the microbes present in alcohol

108. The fermented preparation of rice and black gram is used for idli formation. This fermentation is done by a/an
(1) Protozoan (2) Fungus
(3) Alga (4) Bacterium

109. Which among the following components of biogas is/are inflammable?
(a) CH_4 (b) CO_2
(c) N_2
(1) (b) and (c) (2) (a) and (c)
(3) Only (b) (4) Only (a)

110. Microbe which grows anaerobically on cellulosic material and produces major component of biogas is
(1) *Methanobacterium* (2) *Streptococcus*
(3) *Leuconostoc* (4) *Lactobacillus*

111. Antibiotics cannot be used to treat
(1) Leprosy (2) Plague
(3) Small pox (4) Diphtheria

112. Select the **correct** option w.r.t. percentage composition of CO_2 in biogas.
(1) 30-40% (2) 1-2%
(3) 50-70% (4) 10%

113. Regarding distillation and ethanol percentage, choose the **odd** one out.
(1) Wine (2) Whisky
(3) Brandy (4) Rum

114. Select the **correct** sequence w.r.t. levels of ecological organisation
(1) Organisms → Ecosystem → Community → Biosphere
(2) Organisms → Population → Community → Biome
(3) Population → Landscape → Community → Organisms
(4) Community → Biome → Population → Biosphere

115. Fleming, Chain and Florey were awarded the Nobel prize in 1945 for the discovery of
(1) Synthetic clot buster
(2) An immunosuppressive agent
(3) Antibiotic penicillin
(4) Bioactive molecule streptomycin

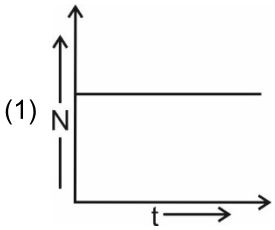
116. Which of the given organisms can tolerate and thrive in a wide range of temperature?
(1) Birds (2) Polar bear
(3) Lizards (4) *Abies*

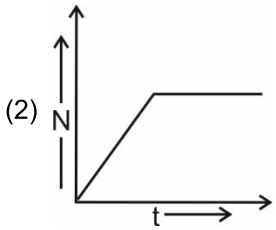
117. On commercial basis, all of the following are produced by using bacteria, **except**
(1) Butyric acid (2) Citric acid
(3) Lactic acid (4) Acetic acid

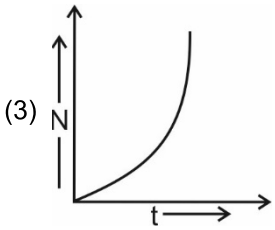
118. If 6 individuals in a laboratory population of 24 *Drosophila* died in one week. What will be the mortality rate per *Drosophila* per week?
(1) 0.4 (2) 0.25
(3) 0.1 (4) 0.18

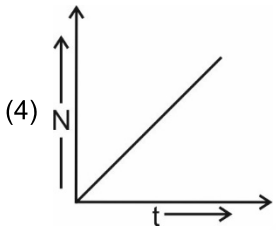
119. The bioactive molecule that is used to suppress the immunity in organ-transplant patients produced by the organism belongs to the class
(1) Phaeophyceae
(2) Ascomycetes
(3) Rhodophyceae
(4) Deuteromycetes

120. Which of the following curves represents exponential growth pattern of population growth?

(1) 

(2) 

(3) 

(4) 

121. During sewage treatment, the major part of activated sludge is pumped into
(1) Settling tank
(2) Aeration tank
(3) Anaerobic sludge digesters
(4) Natural water bodies

122. Select the **incorrect** statement w.r.t. somatic hybridisation.
(1) It is fusion of protoplast of two plants belonging to same variety
(2) Cells are first treated with pectinase and cellulase
(3) Naked protoplasts are fused by electrofusion or chemofusion
(4) PEG or sodium nitrate are used during chemofusion of protoplast

123. Which of the following benefits is not shown by plant in mycorrhizal association?
(1) Supplement of readymade food from fungal component
(2) Resistance to root-borne pathogens
(3) Tolerance to salinity
(4) Increase in plant growth and development

124. The microbial biocontrol agent whose toxin genes are introduced in cotton plants to control butterfly caterpillars
(1) Has chitinous cell wall and lacks sexual reproduction
(2) Forms asexual spores
(3) Shows symbiotic association with cotton plants
(4) Also employed in N_2-fixation in rice fields

125. Which of the following biomes can have both lowest temperature and least precipitation?
(1) Coniferous forest
(2) Arctic and Alpine tundra
(3) Hot desert
(4) Temperate forest

126. Select the **incorrect** statement w.r.t 'Methanogens'.
(1) Grow on a polysaccharide in the absence of oxygen
(2) Produce large amount of CH_4 along with CO_2 and H_2
(3) Promotes the growth of bacteria and fungi present in sludge in anaerobic sludge digester
(4) Are present in rumen of cattle

127. Occurrence of which of the following is **not** true for desert biome?
(1) Xerophyte plants (2) Deep rooted shrubs
(3) Small trees (4) Maximum leaching

128. Consider the following statements and choose the option for **incorrect** ones.
(a) Populations evolve to maximise their reproductive fitness in the habitat in which they live.
(b) Population of any species in nature has unlimited resources to permit exponential growth.
(c) Logistic growth model of a population is not considered to be more realistic in the natural ecosystem.
(d) The value of intrinsic rate of natural increase of a population does not depend upon the birth rate and death rate in that population.
(e) In a graph for population growth curve, the line of carrying capacity is shown perpendicular to the population density axis.
(1) (b), (d) and (e)
(2) (a) and (e)
(3) (b), (c) and (d)
(4) Only (b) and (c)

129. The tiger census in our national parks and tiger reserves is often based on
(1) Pug marks and fecal pellets
(2) Culture density
(3) Their hunting habits
(4) Measuring percent cover

130. Which one of the given characteristics of soil does **not** determine its water-holding capacity?
(1) Soil composition (2) Grain size
(3) pH (4) Aggregation

131. The red algae that extend to the greatest depth in sea absorb mostly
(1) Yellow wavelengths (2) Green wavelengths
(3) Red wavelengths (4) Ultraviolet radiations

132. Read the following statements and choose the **correct** option.

Assertion: MacArthur showed that five closely related species of warblers living on the same tree were able to avoid competition and co-exist.

Reason: The five closely related species of warblers considered by MacArthur in his experiment had behavioural differences in their foraging activities.

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

133. Select the **incorrect** statements from the following
(a) Majority of animals are conformers.
(b) None of the mammals are stenothermal.
(c) All vertebrates are regulators.
(d) In humming birds, thermoregulation is energetically expensive process.
(1) (a) and (b) (2) (b) and (d)
(3) (b) and (c) (4) (a) and (c)

134. Most spectacular and evolutionarily fascinating case of mutualism in nature is seen in
(1) Lichens
(2) Plant-animal relationships
(3) Mycorrhiza
(4) Rhizobium-leguminous root interactions

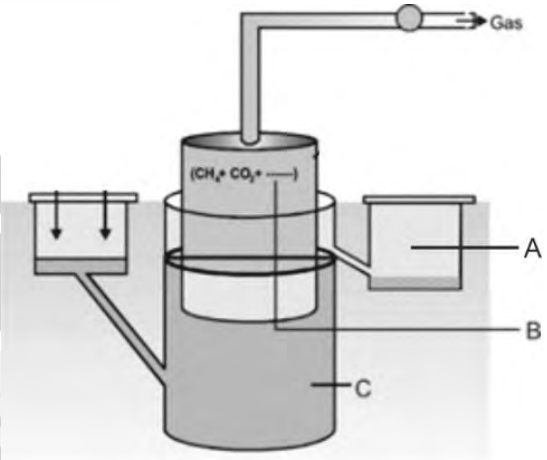
135. Kangaroo rat in North American deserts is capable of meeting all of its water requirements
(1) From fleshy leaves of desert plants
(2) Through its internal fat oxidation
(3) Consuming the flesh of other animals
(4) Absorbing the dew present on the plants during nights.

SECTION - B

136. The root of any breeding programme is
(1) Selection of parents
(2) Genetic variability
(3) Cross-hybridisation
(4) Selection of superior recombinants

137. In mung bean, resistance to powdery mildew was induced by
(1) Hybridisation
(2) Introduction of resistant gene from wild variety
(3) Mutation
(4) Growing the plants in fungi rich soil

138. Identify the parts A, B and C w.r.t biogas plant and select the **correct** option.



	A	B	C
(1)	Gas holder	N_2	Digester
(2)	Sludge	H_2, H_2S	Digester
(3)	Digester	N_2O_2	Gas-holder
(4)	Dung + water	H_2S	Sludge

139. The disease, black rot of crucifers occurs due to a
(1) Bacterium (2) Virus
(3) Protozoan (4) Fungus

140. Bacterium which convert milk into curd is
(1) Heterotrophic
(2) Parasitic
(3) Autotrophic
(4) Chemosynthetic

141. The biofertilizer that can evolve oxygen is

(1) *Rhizobium* (2) *Glomus*

(3) *Azospirillum* (4) *Nostoc*

142. In logistic growth, a population growing in a habitat with limited resources shows initially a __A__, followed by phase of __B__ then __C__ and finally an __D__.

Select **correct** option and make the sentence a correct sense.

	A	B	C	D
(1)	Lag phase	Acceleration	Deceleration	Asymptote
(2)	Acceleration	Deceleration	Asymptote	Lag phase
(3)	Lag phase	Deceleration	Acceleration	Asymptote
(4)	Asymptote	Acceleration	Deceleration	Lag phase

143. During which of the following processes, the greenhouse gas is **not** released?

(1) Production of biogas by microbes

(2) Anaerobic sludge digestion in sewage treatment

(3) Nitrogen fixation by cyanobacteria

(4) Fermentation of dough for the formation of bread

144. In triangular age pyramid,

(1) Numbers of pre-reproductive individuals > Numbers of reproductive individuals

(2) Numbers of pre-reproductive individuals = Numbers of reproductive individuals

(3) Numbers of pre-reproductive individuals < Numbers of reproductive individuals

(4) Numbers of pre-reproductive individuals < Numbers of post reproductive individuals

145. Read the following statements and choose the option which is **true** for them.

Statement-1: Competition will occur only when resources present in the environment are limiting.

Statement-2: In general, herbivores and plants appear to be more adversely affected by competition than carnivores.

(1) Both the statements are correct

(2) Both the statements are incorrect

(3) Only statement-1 is correct

(4) Only statement-2 is correct

146. Match the column I with II and select the **correct** option.

Column I	Column II
a. Meristem	(i) Plants genetically identical to the original plant produced during tissue culture
b. Somaclone	(ii) High auxin concentration and rapid cell division
c. Domestication	(iii) Purposeful manipulation of plant species
d. Plant breeding	(iv) Bringing species under human management

(1) a(ii), b(i), c(iv), d(iii) (2) a(i), b(ii), c(iii), d(iv)

(3) a(ii), b(iv), c(iii), d(i) (4) a(iv), b(iii), c(i), d(ii)

147. Which of the following is **not** true w.r.t. adaptation shown by parasites?

(1) Presence of adhesive organs

(2) Loss of all sense organs

(3) Loss of digestive system

(4) High reproductive capacity

148. Read the following statements and select the option which is **true** for them.

Statement A : Dragonflies are useful to get rid of aphids.

Statement B : The majority of baculoviruses used as biocontrol agents are in the genus *Nucleopolyhedrovirus.*

(1) Only statement A is correct

(2) Only statement B is correct

(3) Both the statements A and B are correct

(4) Both the statements A and B are incorrect

149. In which of the following population interactions only one species gets benefited?

(a) Protocooperation (b) Commensalism

(c) Predation (d) Parasitism

(1) All (a), (b), (c) and (d)

(2) Only (b) and (c)

(3) Only (b), (c) and (d)

(4) Only (b)

150. A gene responsible for dwarfing in rice, dee-geo-woo-gen, was reported in

(1) Taiwan (2) Philippines

(3) India (4) Australia

ZOOLOGY

SECTION - A

151. Each antibody molecule is made up of light and heavy chains and is represented as
(1) $H_1 L_1$ (2) $H_2 L_2$
(3) $H_1 L_2$ (4) $H_2 L_1$

152. All of the following diseases could be completely cured if detected early and treated properly, **except**
(1) Diphtheria (2) Typhoid
(3) Common cold (4) AIDS

153. Select the **incorrect** symptom w.r.t. pneumonia.
(1) Lips turn gray to bluish in colour
(2) Cough and headache
(3) Diarrhoea
(4) Fever

154. Select the **mismatched** pair w.r.t diseases and one of their diagnostic tests.
(1) Typhoid – Widal test
(2) Cancer – MRI
(3) AIDS – ELISA
(4) Amoebic dysentery – CT brain

155. Symptoms of ascariasis include
(a) Anemia
(b) Blockage of the intestinal passage
(c) Fever
(d) Muscular pain
Choose the **correct** option.
(1) a and b only (2) a, b and d only
(3) a, b, c and d (4) b only

156. Constipation, abdominal pain and cramps, stools with excess mucous and blood clots are symptoms of disease caused by
(1) *Ascaris*
(2) *Entamoeba*
(3) *Wuchereria*
(4) *Plasmodium*

157. In malaria, the rupture of RBCs is associated with the release of a toxic substance termed
(1) Haemoglobin (2) Haemozoin
(3) Haemocyanin (4) Antitoxin

158. Gross deformities of genital organs due to inflammation caused by a helminth are seen in
(1) Amoebic dysentery (2) Filariasis
(3) Diabetes (4) HIV infection

159. All of the following are components of cellular barrier of innate immunity, **except**
(1) Macrophages (2) Natural killer cells
(3) Monocytes (4) B-lymphocytes

160. Which of the following is not obtained from leaves of the below given plant?

(1) Hashish (2) Ganja
(3) Coke (4) Charas

161. The period between _____ years of age is termed as adolescence period.
Choose the option which fills the blank **correctly**.
(1) 10 – 12 (2) 8 – 12
(3) 12 – 18 (4) 22 – 30

162. All of the following are side-effects of the use of anabolic steroid in males, **except**
(1) Mood swings
(2) Acne
(3) Increase in size of the testicles
(4) Decreased sperm production

163. ___A___ is commonly called 'crack' and has a ___B___ action on central nervous system. Excessive dosage of it causes ___C___.
Choose the **correct** option for A, B and C.

	A	B	C
(1)	Heroin	Stimulating	Euphoria
(2)	Amphetamine	Depressing	Hallucinations
(3)	Cocaine	Stimulating	Hallucinations
(4)	Benzodiazepine	Stimulating	Euphoria

164. Vaccine produced using genetic engineering or recombinant DNA technique is/has
(1) BCG
(2) Lower availability for immunisation
(3) Hepatitis B vaccine
(4) Used for passive immunisation

165. The site of differentiation of immature lymphocytes into antigen-sensitive lymphocytes is
(1) Tonsils (2) Thymus
(3) Lymph nodes (4) Spleen

166. The **incorrect** statement w.r.t smoking is
(1) Tobacco contains a large number of harmful chemical substances including nicotine, an alkaloid.
(2) Nicotine stimulates adrenal glands to release adrenaline and noradrenaline.
(3) Smoking decreases carbon monoxide (CO) content in blood and increases concentration of haembound oxygen.
(4) It is associated with increased incidences of emphysema and gastric ulcer.

167. Match column I with column II and choose the **correct** option.

Column I		Column II
(a) Antibodies	(i)	Cell-mediated immunity
(b) T-cells	(ii)	Humoral immunity
(c) Monocytes	(iii)	Phagocytosis

(1) a(i), b(iii), c(ii)
(2) a(iii), b(ii), c(i)
(3) a(iii), b(i), c(ii)
(4) a(ii), b(i), c(iii)

168. All of the following are common causes, which motivate youngsters towards drug and alcohol use, **except**
(1) Need for adventure and excitement
(2) Experimentation
(3) Education and counselling
(4) Curiosity

169. How many of the following diseases spread by faeco-oral route?

Amoebiasis, Filariasis, Ascariasis, Chikungunya, Malaria

(1) Two (2) Three
(3) Four (4) Five

170. Mature infective stages of *Plasmodium* are housed in salivary glands of a , whereas its gametocytes develop in b

Here 'a' and 'b' are

	a	b
(1)	Mosquito	Humans
(2)	Humans	Human's liver
(3)	Mosquito	Mosquito's intestine
(4)	Humans	Mosquito

171. Bees are pollinators of many of our crop species such as
a. Sunflower
b. Wheat
c. *Brassica*
Select the **correct** option.
(1) a and b only
(2) a and c only
(3) b and c only
(4) a, b and c

172. The **incorrect** match among the following options is

(1)	Antigen-Antibody interaction	–	ELISA
(2)	Withdrawal syndrome	–	Anxiety and shakiness
(3)	IgM	–	Associated with allergy
(4)	Diphtheria	–	Bacterial disorder

173. Choose the correct set of marine edible fishes.
(1) *Catla*, Sardine, Mackerel
(2) Sardine, Common carp, *Rohu*
(3) Mackerel, *Hilsa*, Common carp
(4) Pomfrets, Mackerel, Sardine

174. Which of the following is not **true** for successful bee-keeping?
(1) Catching and hiving of swarms
(2) Selection of suitable location for keeping the beehives
(3) Knowledge of habits of bees
(4) To have knowledge of same type of management of beehives during different seasons

175. Mule is the result of
(1) Cross-breeding
(2) Inbreeding
(3) Out-crossing
(4) Interspecific hybridisation

176. Complete the analogy by selecting the **correct** option.
Apiculture : *Apis* :: Pisciculture : ____
(1) Crab (2) Prawn
(3) Fish (4) Silk worm

177. Read the following carefully
(a) Drop in academic performance
(b) Change in sleeping and eating habits
(c) Increased interest in personal hygiene
(d) Better relations with family and friends
How many of the above are not true w.r.t. the common warning signs of drug abuse among youth?
(1) 3 (2) 4
(3) 2 (4) 0

178. Which among the following is a depressant?
(1) Charas
(2) Heroin
(3) Caffeine
(4) Cocaine

179. Preformed antibodies to the tetanus toxin are given to person with deep cuts and bruises soiled with mud because it ensures
(1) Late but long-lasting immune response
(2) Quick immune response
(3) Allergic response
(4) Generation of active immunity

180. Select the **incorrect** statement w.r.t. dairy farm management.
(1) Stringent cleanliness and hygiene of both cattles and the handlers are of paramount importance while milking
(2) Cattles have to be housed well
(3) Selection of breeds having below average yielding potential
(4) Special emphasis on the quality and quantity of the fodder

181. Lysozyme present in saliva destroys certain types of
(1) Bacteria
(2) Fungi
(3) Viruses
(4) Nematodes

182. **Assertion (A):** In artificial insemination, semen is used to inseminate the selected female immediately after the collection of semen or can be frozen and used at later date.
Reason (R): The success rate of crossing mature male and female animals is high through artificial insemination.
In the light of above statements, select the **correct** option.
(1) Both (A) and (R) are true and (R) is the correct explanation of (A)
(2) Both (A) and (R) are true, but (R) is not the correct explanation of (A)
(3) (A) is true, but (R) is false
(4) Both (A) and (R) are false

183. In the lifecycle of *P. vivax*, asexual reproduction takes place in
(1) Liver and RBCs of human host
(2) Mosquito's gut
(3) Lung and WBCs of human host
(4) Mosquito's liver

184. AIDS was first reported in USA in the year
(1) 1961
(2) 1971
(3) 1981
(4) 1991

185. Allergy is due to the release of chemicals like histamine and serotonin secreting from
(1) B-lymphocytes
(2) Neutrophils
(3) T-lymphocytes
(4) Mast cells

SECTION - B

186. How many interchain disulphide bonds are present in an antibody molecule?
(1) 4 (2) 8
(3) 12 (4) 2

187. To quickly reduce the symptoms of allergy, all the following drugs can be used, except
(1) Anti-histamine
(2) Steroids
(3) Heparin
(4) Adrenaline

188. The immunity provided to the foetus by receiving some antibodies from their mother through the placenta during pregnancy is a type of
(1) Natural active immunity
(2) Natural passive immunity
(3) Artificial passive immunity
(4) Auto immunity

189. All of the following are correct w.r.t. cannabinoids, **except**
(1) Obtained from the inflorescences of the plant *Cannabis sativa*
(2) Generally taken by inhalation and oral ingestion
(3) Known for their inhibitory effects on transport of dopamine
(4) The flower tops, leaves and the resins of *Cannabis* plant are used in various combination to produce marijuana, hashish *etc.*

190. Which of the following is an exotic breed of cattle?
(1) Jersey
(2) *Hisardale*
(3) Mule
(4) Leghorn

191. The management of animals for milk and its products for human consumption is
(1) Apiculture
(2) Poultry farming
(3) Fisheries
(4) Dairy farming

192. Select the animal which is not included in livestock.
(1) Goats (2) Leopards
(3) Cows (4) Pigs

193. Amphetamines are normally used as medicine to help patients cope with
(1) AIDS
(2) Malaria
(3) Insomnia
(4) Ascariasis

194. The immune response that is mainly responsible for the rejection of kidney graft is
(1) Humoral immune response
(2) Cell mediated immune response
(3) Auto immune response
(4) Innate immune response

195. A group of animals related by descent and similar in most characters are said to belong to a
(1) Species
(2) Genus
(3) Breed
(4) Variety

196. Ringworm is one of the most common infectious diseases in man caused by all the following, except
(1) *Microsporum*
(2) *Wuchereria*
(3) *Trichophyton*
(4) *Epidermophyton*

197. Mary Mallon, who was a cook by profession was known to be a carrier of disease named
(1) Amoebiasis
(2) Typhoid
(3) Filariasis
(4) Ascariasis

198. Computed tomography uses _____ to generate a three-dimensional image of the internals of an object.

Choose the correct option to fill the blank correctly.

(1) UV-rays

(2) X-rays

(3) Gamma rays

(4) Beta-rays

199. The substances such as α-interferon activates immune system and helps in destroying the tumour, are called

(1) Carcinogens

(2) Immunoglobulins

(3) Biological response modifier

(4) Antigens

200. Diacetylmorphine is a depressant and slows down body functions. Its receptors are present in our

(1) Cardiovascular system only

(2) CNS only

(3) CNS and GI tract

(4) Respiratory tract only

❑ ❑ ❑

11/04/2023

Phase-1
CODE-B

Corporate Office: Aakash Tower, 8, Pusa Road, New Delhi-110005, Ph.011-47623456

FINAL TEST SERIES for NEET-2023

MM : 720 **Test-7** **Time : 3 Hrs. 20 Mins.**

Answers

1.	(3)	41.	(3)	81.	(3)	121.	(3)	161.	(3)
2.	(4)	42.	(2)	82.	(2)	122.	(1)	162.	(3)
3.	(3)	43.	(4)	83.	(3)	123.	(1)	163.	(3)
4.	(3)	44.	(3)	84.	(3)	124.	(2)	164.	(3)
5.	(1)	45.	(3)	85.	(2)	125.	(2)	165.	(2)
6.	(4)	46.	(4)	86.	(4)	126.	(3)	166.	(3)
7.	(4)	47.	(2)	87.	(3)	127.	(4)	167.	(4)
8.	(4)	48.	(2)	88.	(4)	128.	(3)	168.	(3)
9.	(2)	49.	(2)	89.	(2)	129.	(1)	169.	(1)
10.	(1)	50.	(2)	90.	(1)	130.	(3)	170.	(1)
11.	(1)	51.	(4)	91.	(3)	131.	(2)	171.	(2)
12.	(4)	52.	(3)	92.	(3)	132.	(1)	172.	(3)
13.	(1)	53.	(1)	93.	(4)	133.	(3)	173.	(4)
14.	(2)	54.	(2)	94.	(1)	134.	(2)	174.	(4)
15.	(1)	55.	(4)	95.	(1)	135.	(2)	175.	(4)
16.	(1)	56.	(2)	96.	(3)	136.	(2)	176.	(3)
17.	(4)	57.	(4)	97.	(4)	137.	(3)	177.	(3)
18.	(1)	58.	(2)	98.	(1)	138.	(2)	178.	(2)
19.	(1)	59.	(4)	99.	(4)	139.	(1)	179.	(2)
20.	(3)	60.	(4)	100.	(3)	140.	(1)	180.	(3)
21.	(4)	61.	(4)	101.	(2)	141.	(4)	181.	(1)
22.	(3)	62.	(3)	102.	(2)	142.	(1)	182.	(3)
23.	(1)	63.	(2)	103.	(1)	143.	(3)	183.	(1)
24.	(1)	64.	(4)	104.	(1)	144.	(1)	184.	(3)
25.	(1)	65.	(2)	105.	(4)	145.	(4)	185.	(4)
26.	(1)	66.	(2)	106.	(3)	146.	(1)	186.	(1)
27.	(2)	67.	(3)	107.	(2)	147.	(2)	187.	(3)
28.	(3)	68.	(2)	108.	(4)	148.	(2)	188.	(2)
29.	(1)	69.	(2)	109.	(4)	149.	(3)	189.	(3)
30.	(3)	70.	(1)	110.	(1)	150.	(1)	190.	(1)
31.	(3)	71.	(4)	111.	(3)	151.	(2)	191.	(4)
32.	(3)	72.	(3)	112.	(1)	152.	(4)	192.	(2)
33.	(1)	73.	(2)	113.	(1)	153.	(3)	193.	(3)
34.	(2)	74.	(2)	114.	(2)	154.	(4)	194.	(2)
35.	(2)	75.	(4)	115.	(3)	155.	(3)	195.	(3)
36.	(1)	76.	(1)	116.	(1)	156.	(2)	196.	(2)
37.	(3)	77.	(2)	117.	(2)	157.	(2)	197.	(2)
38.	(2)	78.	(3)	118.	(2)	158.	(2)	198.	(2)
39.	(4)	79.	(2)	119.	(4)	159.	(4)	199.	(3)
40.	(3)	80.	(2)	120.	(3)	160.	(3)	200.	(3)

11/04/2023

Phase-1
CODE-B

Corporate Office: Aakash Tower, 8, Pusa Road, New Delhi-110005, Ph.011-47623456

FINAL TEST SERIES for NEET-2023

MM : 720 **Test-7** Time : 3 Hrs. 20 Mins.

Answers and Solutions

PHYSICS

SECTION - A

1. Answer (3)

$$I_{avg} = \frac{\int_0^T (8 + 12\sin 100\pi t)\,dt}{\int dt}$$

$$= \frac{\int_0^T 8dt}{T} + \frac{12}{T}\int_0^T \sin 100\pi t$$

= 8 A

2. Answer (4)

$V = -V_0 \sin \omega t$

$I = -I_0 \sin\left(\omega t + \frac{\pi}{2}\right)$

$I = -I_0 \cos \omega t$

3. Answer (3)

$$Q = \frac{1}{R}\sqrt{\frac{L}{C}}$$

For minimum value of Q, R will be maximum and L is minimum.

4. Answer (3)

$$\omega L = \frac{1}{\omega C}$$

$$4\pi^2 f^2 L = \frac{1}{C}$$

$C = 0.587\ \mu F$

5. Answer (1)

$V = 60 \sin 50t + 80 \cos 50t$

$V = 100 \sin(50t + \phi)$

$I_0 = \frac{100}{10} = 10$ A

$$I_{r.m.s} = \frac{I}{\sqrt{2}}$$

$= 5\sqrt{2}$ A

6. Answer (4)

$P = V_{rms}\, I_{rms} \cos\phi$

7. Answer (4)

$$f = \frac{1}{2\pi\sqrt{LC}}$$

$$\lambda' = \frac{c}{f}$$

$$\lambda = 3\times10^8 \times 2\pi\sqrt{0.01\times0.25\times10^{-12}}$$

$\lambda = 3 \times 10^8 \times 2\pi \times 5 \times 10^{-8}$

$\lambda = 30 \times \pi$

$\lambda \approx 94$ m

8. Answer (4)

All statements are true about γ rays.

9. Answer (2)

$$i_{rms} = \sqrt{\frac{\int_0^\tau i^2 dt}{\int_0^\tau dt}}$$

$$= \sqrt{\frac{\frac{i_0^2}{\tau^3}\int_0^{\tau} t^3 dt}{\tau}}$$

$$= \frac{i_0}{\tau^2}\sqrt{\frac{\tau^4}{4}} = \frac{i_0}{2}$$

10. Answer (1)

$P = I^2R$

$P = \frac{V^2}{Z^2}R$

$Z = \sqrt{R^2 + (\omega L)^2}$

On increasing ω, impedance increases and current decreases therefore bulb glow dimmer

11. Answer (1)

$q = q_0 \sin 2\pi ft$

$I_d = \frac{dq}{dt}$

$= q_0\, 2\,\pi\, f \cos 2\,\pi\, ft$

12. Answer (4)

$I = \frac{P}{4\pi r^2}$

$I = \frac{10}{4\pi}$

$\approx 0.8\ \frac{\text{W}}{\text{m}^2}$

13. Answer (1)

Dispersive power $\omega = \frac{\mu_v - \mu_R}{\mu_y - 1}$

$\omega = \frac{1.705 - 1.690}{1.695 - 1} = 0.0215$

14. Answer (2)

$\frac{\Delta\nu}{\nu} = -\frac{v_{rad}}{c}$

$\nu - 5500 = 5500\left(\frac{-(-3\times10^5)}{3\times10^8}\right)$

$\nu - 5500 = 5500(10^{-3})$

$\nu = 5500 + 5.5 = 5505.5$ MHz

15. Answer (1)

Angular width $= \frac{\beta}{D} = \frac{\lambda}{d}$

$1^\circ = \frac{\lambda}{d}$

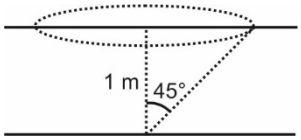
$\lambda = \frac{\pi}{180}\times 0.03\times10^{-3}$

$= 5233$ Å

16. Answer (1)

$r = h\tan C$

$= 1\tan 45^\circ = 1\,\text{m}$



Area $= \pi r^2 = \pi\,\text{m}^2$

17. Answer (4)

Magnifying power when image is formed at near point $M = -\frac{f_0}{f_e}\left[1 + \frac{f_e}{D}\right]$

$= -\frac{50}{5}\left[1 + \frac{5}{25}\right] = -12$

18. Answer (1)

Shining of diamond decreases when it is immersed in oil

Also, $\lambda_{\text{Blue}} < \lambda_{\text{red}}$

Shining of air bubble in water is due to TIR because light rays traveling from denser to rarer medium may lead to TIR.

19. Answer (1)

$\mu = \tan i_p$

$\mu = \tan 53^\circ = \frac{4}{3}$

$\mu = \frac{c}{v}$

$v = \frac{c}{\mu} = \frac{3\times10^8}{\left(\frac{4}{3}\right)} = \frac{9}{4}\times10^8$

$v = 2.25\times10^8$ m/s

20. Answer (3)

$\beta = \frac{\lambda D}{d}$

$\beta' = \frac{\lambda' D}{d}$

$\frac{\beta'}{\beta} = \frac{\lambda'}{\lambda} = \frac{\frac{\lambda}{\mu}}{\lambda} = \frac{1}{\mu}$

$\beta' = \frac{\beta}{\mu} = \frac{0.6\ \text{mm}}{1.5} = 0.4\ \text{mm}$

21. Answer (4)

$\frac{1}{f} = (\mu - 1)\left[\frac{1}{R_1} - \frac{1}{R_2}\right]$

$$\frac{1}{f'}=\left(\frac{\mu}{\mu_L}-1\right)\left[\frac{1}{R_1}-\frac{1}{R_2}\right]$$

$$\frac{60}{40}=\frac{\mu-1}{\frac{\mu-\mu_L}{\mu_L}}=\frac{(\mu-1)\mu_L}{\mu-\mu_L}=\frac{(1.5-1)\mu_L}{1.5-\mu_L}$$

$$\frac{3}{2}=\frac{0.5\mu_L}{1.5-\mu_L}$$

$\mu_L = 4.5 - 3\mu_L$

$4\mu_L = 4.5$

$$\mu=\frac{4.5}{4}=1.125$$

22. Answer (3)

$X_L = 2\pi fL$

$X_L = 2 \times \pi \times 25 \times 50 \times 10^{-6}$

$X_L = 2.5\pi\ m\Omega$

23. Answer (1)

For pure resistive circuit

$$2\pi fL=\frac{1}{2\pi fc}$$

$$C=\frac{1}{4\pi^2 f^2 L}=\frac{1}{4\times(3.14)^2\times(50)^2\times50\times10^{-6}}$$

= 0.2 F

24. Answer (1)

$$\cos\phi=\frac{R}{Z}=\frac{3}{\sqrt{(10-6)^2+3^2}}=\frac{3}{5}$$

$$\cos\phi=\frac{3}{5}$$

= 53°

25. Answer (1)

$i = -4t + 20$

$$i_{rms}=\left(\frac{\int_0^{10}(-4t+20)^2dt}{10}\right)^{1/2}$$

$$i_{rms}=\frac{20}{\sqrt{3}}A$$

26. Answer (1)

Correct equation is $\oint\vec{B}\cdot\vec{dl}=\mu_0 i_c+\mu_0\varepsilon_0\frac{d\phi_E}{dt}$

27. Answer (2)

Infrared waves are produced by hot bodies and molecules.

28. Answer (3)

X ray and γ rays are used in medical application.

29. Answer (1)

$$v=\frac{c}{\mu}$$

$$=\frac{3\times10^8}{1.5}=2\times10^8\ m/s$$

then distance travelled = $2 \times 10^8 \times 2$

$= 4 \times 10^8$ m

30. Answer (3)

$$I=\frac{I_0}{2}\cos^2\phi=\frac{3I_0}{8}$$

31. Answer (3)

$$\frac{d_A}{d_B}=\frac{\mu_B}{\mu_A}$$

$$\frac{d_A}{20}=\frac{2}{1.5}$$

$$d_A=\frac{20\times2}{1.5}=\frac{40}{1.5}$$

d_A = 26.66 m

32. Answer (3)

$$\beta=\frac{\lambda D}{d}$$

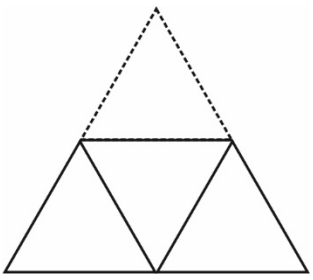
$$3\times10^{-4}=\frac{500\times10^{-9}\times D}{1\times10^{-4}}$$

D = 0.06 m

33. Answer (1)

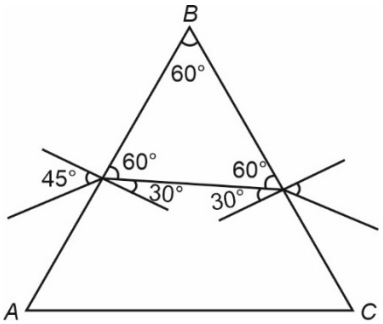
Image will be formed at the centre of sphere.

34. Answer (2)



Minimum deviation will be same since it will be again an equilateral prism.

35. Answer (2)



For refraction at surface *AB*

$\mu_1 \sin i = \mu_2 \sin r$

$\sin 45 = \sqrt{2} \sin r$

$\sin r = \frac{1}{2} = 30°$

For refraction at surface *BC*

$\mu_1 \sin i = \mu_2 \sin r$

$\sqrt{2} \times \sin 30 = \sin r$

$\sin r = \frac{1}{\sqrt{2}} = 45°$

SECTION - B

36. Answer (1)

By conservation of energy

$\frac{1}{2} L I_{max}^2 = \frac{Q^2}{2C}$

$I_{max} = \frac{Q}{\sqrt{LC}}$

37. Answer (3)

$\tau = RC$

$X_C = \frac{1}{\omega C}$

$= 2R$

$Z = \sqrt{R^2 + (2R)^2}$

$= \sqrt{5}R$

38. Answer (2)

$I = \frac{B_0^2 C}{2\mu_0}$

$= \frac{(0.2 \times 10^{-6})^2 \times 3 \times 10^8}{2 \times 4\pi \times 10^{-7}}$

$= 4.8$ W/m^2

39. Answer (4)

Radiation pressure on any surface is dependent on nature of surface and intensity of light used.

40. Answer (3)

$P = V_{r.m.s.} I_{r.m.s.} \cos \phi$

$= \frac{10}{\sqrt{2}} \times \frac{4}{\sqrt{2}} \times \cos\left(\frac{\pi}{3}\right)$

$= \frac{10 \times 4}{2} \times \frac{1}{2} = 10$ W

41. Answer (3)

$\cos\phi = \frac{R}{Z}$

$\frac{1}{2} = \frac{R}{Z_1} \Rightarrow Z_1 = 2R$

$\frac{1}{4} = \frac{R}{Z_2} \Rightarrow Z_2 = 4R$

$\frac{Z_2 - Z_1}{Z_1} = \left(\frac{4R - 2R}{2R}\right) \times 100$

= 100 %

42. Answer (2)

$F = \frac{2I}{c} A$

$= \frac{2 \times 50 \times 10^4 \times 5 \times 10^{-2}}{3 \times 10^8}$

$= \frac{2 \times 5 \times 5}{3} \times 10^{-5} = 16.6 \times 10^{-5}$ N

43. Answer (4)

Maxwell's equation describes the fundamental law of electricity and magnetism both.

44. Answer (3)

Since amount of scattering $\propto \frac{1}{\lambda^4}$

λ_R is largest in visible light, hence it is scattered least.

45. Answer (3)

$\frac{1}{f_1} = (\mu_1 - 1)\left(\frac{1}{R_1} - \frac{1}{R_2}\right)$

$= (\mu_1 - 1)\left(-\frac{1}{R}\right) = \frac{1 - \mu_1}{R}$

$\frac{1}{f_2} = (\mu_2 - 1)\left(\frac{1}{R} - \frac{1}{\infty}\right) = \frac{\mu_2 - 1}{R}$

$\frac{1}{f} = \left(\frac{1}{f_1} + \frac{1}{f_2}\right) = \frac{1 - \mu_1}{R} + \frac{\mu_2 - 1}{R}$

$\frac{1}{f} = \frac{\mu_2 - \mu_1}{R}$

$f = \frac{R}{\mu_2 - \mu_1} = \frac{20}{1.6 - 1.4} = \frac{20}{0.2}$

$f = 100$ cm

46. Answer (4)

$\frac{n\lambda D}{d} = \frac{2\lambda D}{a}$

$\frac{n}{d} = \frac{2}{a}$

$a = \frac{2d}{n}$

47. Answer (2)

$\tan i_p = \mu$

$\mu = \tan 53° = \frac{4}{3}$

$\sin\theta_c = \frac{1}{\mu} = \frac{3}{4}$

$\theta_c = \sin^{-1}\left(\frac{3}{4}\right)$

48. Answer (2)

$\mu_G > \mu_W$ therefore water drop in glass will behave like a diverging lens.

49. Answer (2)

$f = \frac{5}{3}$ cm

$P_{\text{Total}} = \frac{100}{\left(\frac{5}{3}\right)} = 60$ D

$P_{\text{lens}} + P_{\text{cornea}} + P_{\text{eyelens}} = 60$ D

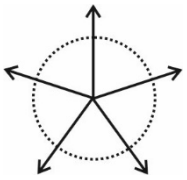
$P_{\text{lens}} + 40 + 21 = 60$

$P_{\text{lens}} = 60 - 61$

$P_{\text{lens}} = -1$ D

50. Answer (2)

Due to point source light propagates in all directions symmetrically and hence wavefront will be spherical



$I \propto \frac{1}{r^2} \Rightarrow$ Intensity decreases inversely proportional with the square of distance from source.

CHEMISTRY

SECTION-A

51. Answer (4)

Nucleophilicity increases with increase in charge density in gas phase.

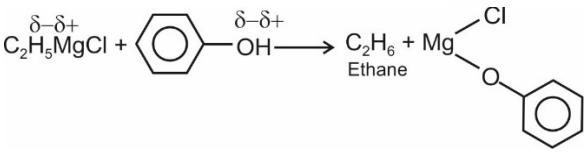
52. Answer (3)

Both statements are correct according to reaction mechanism.

53. Answer (1)

Trichloro ethene is known as westrosol and used as a industrial solvent

54. Answer (2)



55. Answer (4)

E_2 mechanism is suitable in polar aprotic solvent.

56. Answer (2)

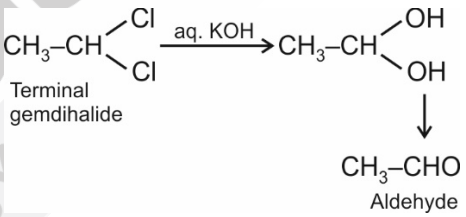
Reactivity of HX towards ether is HI > HBr > HCl.

57. Answer (4)

Finkelstein reaction is

$R - Cl + KI \xrightarrow{\text{acetone}} R - I + KCl$

58. Answer (2)



59. Answer (4)

Order of E_1 elimination for alkyl halide is 3° > 2° > 1°.

60. Answer (4)

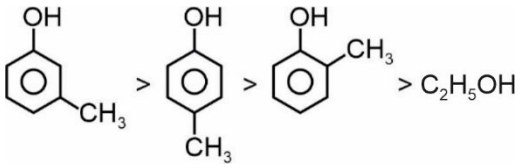
Alcohol has high boiling point due to intermolecular hydrogen bonding.

61. Answer (4)

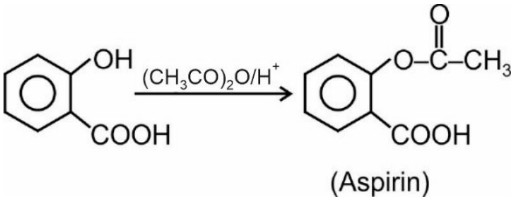
Butoxide ion is a stronger base than OH^- hence acid base reaction will not take place.

62. Answer (3)

Order of acidic strength



63. Answer (2)



(Aspirin)

64. Answer (4)

Tertiary alkoxide is used to obtain tertiary ether.

65. Answer (2)

$$CHCl_3 + \underset{(Air)}{\frac{1}{2}O_2} \xrightarrow{Light} \underset{(Phosgene)\ (A)}{COCl_2} + HCl$$

66. Answer (2)

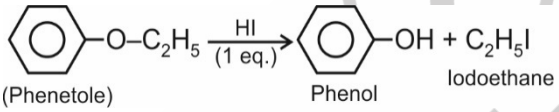
ClCH = C = CHCl is an asymmetric molecule.

67. Answer (3)

$$CH_3COOC_2H_5 \xrightarrow[(ii)\,H_2O]{(i)\,CH_3MgBr(Excess)} CH_3-\underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}}}-OH$$

(3°- Alcohol)

68. Answer (2)



(Phenetole) Phenol Iodoethane

69. Answer (2)

NBS is used for allylic bromination.

70. Answer (1)

As stability of alkene increases ease of dehydration increases.

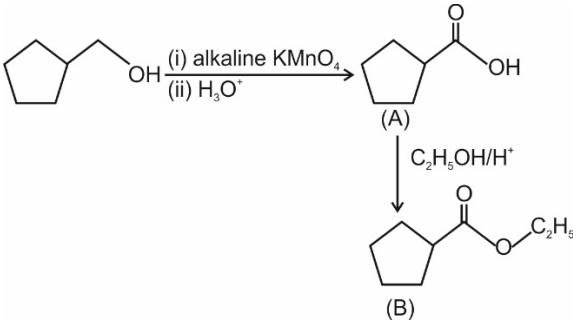
71. Answer (4)

Acids which are more acidic than H_2CO_3 can evolve CO_2 on reaction with $NaHCO_3$.

72. Answer (3)

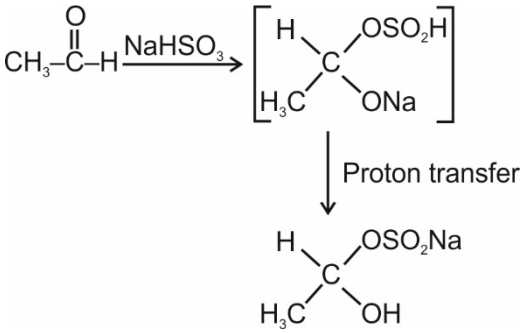
o-nitrobenzoic acid is strongest acid among the given options both because of strong -I effect of NO_2 and ortho-effect. p-nitrobenzoic acid is stronger than m-nitrobenzoic acid because of strong -R effect.

73. Answer (2)

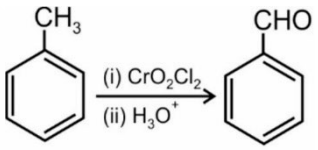


74. Answer (2)

Aliphatic aldehyde reacts fastest in nucleophilic addition reaction



75. Answer (4)



A
(Major)

76. Answer (1)

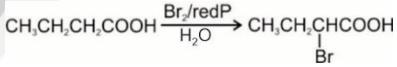
Invertase converts sucrose to glucose and fructose.

77. Answer (2)

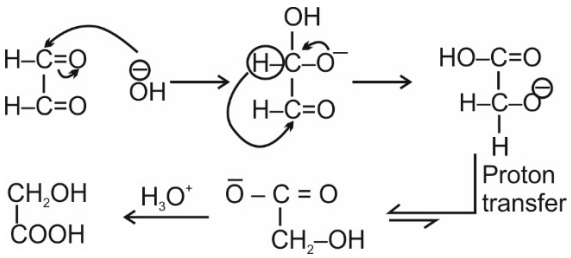
$NaBH_4$ reduces carbonyl compounds but does not react with ester.

78. Answer (3)

HVZ reaction



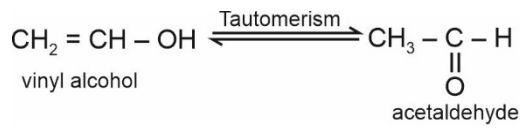
79. Answer (2)



80. Answer (2)

Carbonyl compounds which contain at least 2α hydrogen give aldol condensation reaction.

81. Answer (3)



82. Answer (2)

a.	$CH_3 - CH_2 - OH$	$\rightarrow$	Saturated Primary alcohol
b.	$CH_3 - \underset{\displaystyle OH}{\underset{\vert}{CH}} - CH_3$	$\rightarrow$	Secondary alcohol
c.	$CH_2 = CH - \underset{\displaystyle OH}{\underset{\vert}{CH_2}}$	$\rightarrow$	Allyl alcohol
d.	$CH_3 - \underset{\displaystyle CH_3}{\underset{\vert}{\overset{\displaystyle OH}{\overset{\vert}{C}}}} - CH_3$	$\rightarrow$	Tertiary alcohol

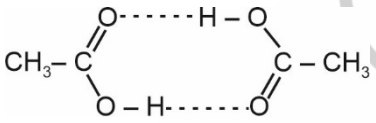
83. Answer (3)

- Acetaldehyde gives positive tollens' test whereas acetone does not.
- $R - CHO + 2\left[Ag(NH_3)2\right]^{+} + 3OH^{-} \longrightarrow$

$$RCOO^{-} + 2Ag + 2H_2O + 4NH_3$$

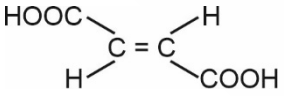
84. Answer (3)

Acetic acid forms dimer in benzene due to intermolecular H-bonding.



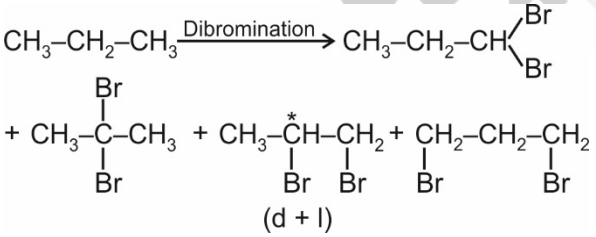
85. Answer (2)

Fumaric acid can be represented as



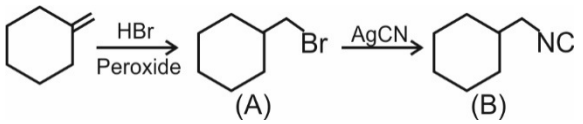
SECTION-B

86. Answer (4)

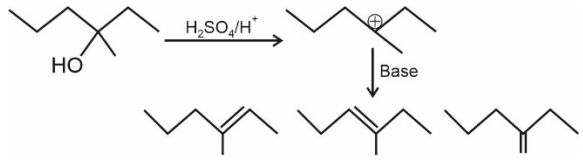


(d + l)

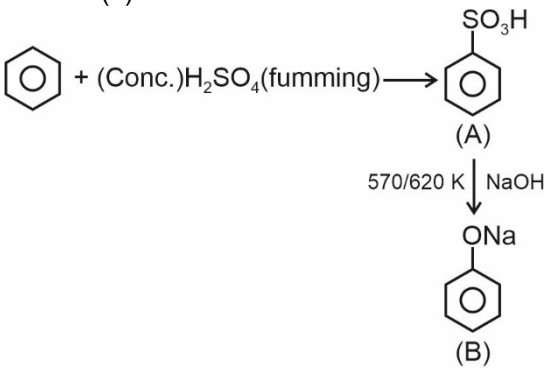
87. Answer (3)



88. Answer (4)



89. Answer (2)



90. Answer (1)

Tertiary alcohol cannot get oxidised easily by $K_2Cr_2O_7$ in acidic medium.

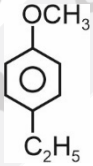
91. Answer (3)

Compounds with $"CH_3 - \underset{\displaystyle OH}{\underset{\vert}{CH}}" -$ or $"CH_3 - \overset{\displaystyle O}{\overset{\Vert}{C}} -$ group gives yellow ppt of CHI_3, on reaction with I_2 in presence of KOH. This reaction is known as iodoform test.

Hence $CH_3 - \underset{\displaystyle OH}{\underset{\vert}{CH_2}}$ and CH_3OH can be distinguished by iodoform test as CH_3CH_2OH will give yellow ppt but CH_3OH will not.

92. Answer (3)

Structure of p-Ethylanisole is



93. Answer (4)

In vinyl halides, halogen is directly attached with sp^2 hybridised carbon.

94. Answer (1)

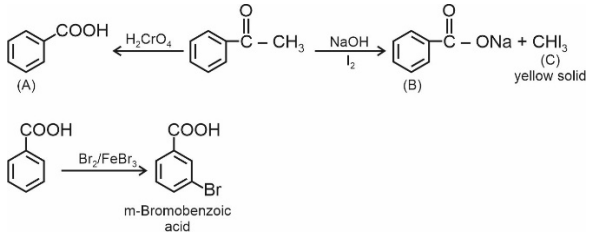
To form white ppt of AgCl, compound need to lose Cl^- ion on removal of Cl^- from  , an aromatic species  will be formed which is most stable, hence  with $AgNO_3$ will give white ppt with maximum ease.

95. Answer (1)

Darzen's process is most suitable for conversion of alcohol into corresponding alkyl halide with maximum purity as all the by product are gaseous and can be removed easily.

$$R - OH + SOCl_2 \xrightarrow{Py} R - Cl + SO_2(g) + HCl(g)$$

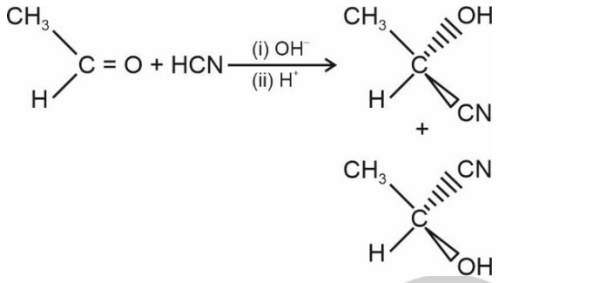
96. Answer (3)



97. Answer (4)

β-keto carboxylic acids goes decarboxylation easily on heating.

98. Answer (1)



Two optically active compounds.

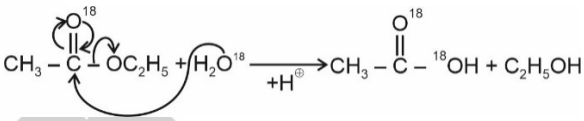
99. Answer (4)

–CHO is deactivating and meta directing group for electrophilic aromatic substitution reaction

Hence,

m-nitrobenzaldehyde will be major product.

100. Answer (3)



BOTANY

SECTION - A

101. Answer (2)

The capacity to generate a whole plant from any cell/explant is called totipotency.

102. Answer (2)

In India, the period of mid-1960s is known for the development of several high-yielding varieties of rice and wheat. This phase is often referred to as the Green revolution.

103. Answer (1)

Apical and axillary meristems remains free from virus even when the plant is infected. Therefore, healthy plants can be grown from these meristems through tissue culture.

104. Answer (1)

Germplasm collection is first step of plant breeding.

Emasculation, bagging and rebagging are used during cross-hybridization.

105. Answer (4)

Pusa Sem 2 is a variety of flat bean resistant to jassids.

106. Answer (3)

Cattle dung is used for the production of biogas which is available in large quantities in rural areas.

107. Answer (2)

The process of distillation increases the percentage of alcohol in the fermented broth.

108. Answer (4)

The fermented preparation of rice and black gram for dosa and idli is prepared by using bacteria.

109. Answer (4)

CH_4 is highly inflammable gases whereas CO_2 extinguishes fire. N_2 is an inert gas.

110. Answer (1)

Bacteria that grow anaerobically on cellulosic material to produce biogas are collectively called methanogens. One such common bacterium is *Methanobacterium*.

111. Answer (3)

Antibiotics are not used to treat viral diseases.

112. Answer (1)

In biogas, the component of CO_2 is 30-40%.

113. Answer (1)

Wine is prepared without distillation of fermented broth and thus has comparatively less percentage of alcohol

114. Answer (2)

Organisms → Population → Community →

Ecosystem → Landscape → Biome → Biosphere

115. Answer (3)

Fleming, Chain and Florey were awarded the Nobel prize for the discovery of antibiotic penicillin.

116. Answer (1)

Birds are eurythermal while, polar bears, lizards and *Abies* are stenothermal.

117. Answer (2)

Butyric acid, lactic acid and acetic acid are produced by bacteria whereas citric acid is produced by fungus *Aspergillus niger*.

118. Answer (2)

Death rate (Mortality) = $\frac{\Delta N}{N\Delta t} = \frac{6}{24} = 0.25$

individuals per *Drosophila* per week

119. Answer (4)

The immunosuppressive agent cyclosporin A is produced by *Trichoderma polysporum* that is a member of class Deuteromycetes.

120. Answer (3)

J-shaped growth curve is seen in exponential/geometric growth model.

121. Answer (3)

During sewage treatment, the major part of the activated sludge which is formed in settling tank is pumped into large tanks called anaerobic sludge digesters.

122. Answer (1)

Somatic hybridisation is the fusion of protoplast of two plants belonging to different varieties, species and even genera.

123. Answer (1)

Plants having mycorrhizal associations show resistance to root-borne pathogens, tolerance to salinity and draught. In return, the fungus gets food from the plant.

124. Answer (2)

In order to control butterfly caterpillars in cotton crop the toxin genes of bacteria *Bacillus thuringiensis* are introduced in the plant. These bacteria form asexual spores.

125. Answer (2)

Lowest temperature in Arctic and Alpine tundra is less than –10°C and least precipitation is less than 20 cm.

126. Answer (3)

In anaerobic sludge digester, anaerobic methanogenic bacteria, digest the bacteria and fungi present in sludge.

127. Answer (4)

Maximum leaching occurs where rainfall is maximum such biome is tropical rain forest.

128. Answer (3)

No population of any species in nature has unlimited resources to permit exponential growth. Since resources for growth for most animal populations are finite, the logistic growth model is considered a more realistic one. For calculating the value of intrinsic rate of natural increase, we need to know the birth rates and death rates.

129. Answer (1)

Mostly population sizes are estimated indirectly. The tiger census in our national parks and tiger reserves is often based on pug marks and fecal pellets.

130. Answer (3)

pH of soil does not determine its water holding capacity.

131. Answer (2)

Blue-green light penetrates deepest in water and the red algae found in the deepest water absorb mostly green wavelengths.

132. Answer (1)

MacArthur in an experiment showed that five closely related species of warblers living on the same tree were able to avoid competition and co-exist due to behavioural differences in their foraging activities.

133. Answer (3)

Some mammals are stenothermal. Vertebrates such as reptiles are conformers.

134. Answer (2)

The most spectacular and evolutionarily fascinating examples of mutualism are found in plant-animal relationships.

135. Answer (2)

Kangaroo rat in North American deserts is capable of meeting all of its water requirements through its internal fat oxidation where water is released as by-product.

SECTION - B

136. Answer (2)

Genetic variability is the backbone or root of any breeding programme.

137. Answer (3)

In mung bean, resistance to yellow mosaic virus and powdery mildew were induced by mutations.

138. Answer (2)

In the given diagram, A has sludge, B is gas-holder containing a mixture of gases called biogas and C is digester.

139. Answer (1)

Black rot of crucifer is caused by a bacterial species of *Xanthomonas.*

140. Answer (1)

Lactobacillus convert milk into curd. It is heterotrophic.

141. Answer (4)

Nostoc is a cyanobacteria which can fix atmospheric nitrogen and evolve oxygen during photosynthesis.

142. Answer (1)

A population growing in a habitat with limited resources show initially a lag phase, followed by phases of acceleration and deceleration and finally an asymptote, when the population density reaches the carrying capacity.

143. Answer (3)

Cyanobacteria performs oxygenic photosynthesis and during nitrogen fixation they do not evolve carbon dioxide or other greenhouse gases.

144. Answer (1)

A triangular age pyramid shows expanding population. In such a population, number of pre-reproductive individuals is greater than number of reproductive individuals and post reproductive individuals.

145. Answer (4)

Competition can occur even when resources present in the environment are unlimited.

146. Answer (1)

Meristem has high concentration of auxin and rapid rate of cell division.

Somaclones are genetically identical. Plant breeding is purposeful manipulation of plant species.

147. Answer (2)

One of the adaptations shown by parasites is loss of unnecessary sense organs not all sense organs.

148. Answer (2)

Dragonflies are useful to get rid of mosquitoes and ladybird is useful to get rid of aphids.

149. Answer (3)

Commensalism shows '+, 0' relationship whereas predation and parasitism show '+, –' relationship.

150. Answer (1)

The gene responsible for dwarfing in rice, dee-geo-woo-gen, was reported in Taiwan.

ZOOLOGY

SECTION - A

151. Answer (2)

Each monomer of immunoglobin is made up of 2 heavy chains and 2 light chains. Each antibody molecule has four peptide chains, two small, called light chains and two longer, called heavy chains. Hence, an antibody is represented as H_2L_2.

152. Answer (4)

As AIDS has no cure, prevention is the best option. Treatment of AIDS with anti-retroviral drugs is only partially effective. They can only prolong the life but cannot prevent death, which is inevitable.

153. Answer (3)

The symptoms of pneumonia include fever, chills, cough and headache. In severe cases, the lips and finger nails turn gray to bluish in colour.

154. Answer (4)

Computed tomography is used to detect cancer.

155. Answer (3)

Ascaris, an intestinal parasite causes ascariasis. The symptoms of this disease include internal bleeding, muscular pain, fever, anemia and blockage of the intestinal passage.

156. Answer (2)

Ascariasis caused by *Ascaris* is characterised by internal bleeding, muscular pain, fever, anemia and blockage of the intestinal passage.

157. Answer (2)

Haemozoin is responsible for the chill and high fever recurring every three to four days.

158. Answer (2)

The filarial worms cause a slowly developing chronic inflammation of the organs in which they live for many years. Amoebic dysentery is caused by *Entamoeba histolytica*.

159. Answer (4)

B-lymphocytes are associated with acquired immunity.

160. Answer (3)

Cocaine, commonly called coke or crack is obtained from coca plant, *Erythroxylum coca*.

161. Answer (3)

Adolescence is a bridge linking childhood and adulthood.

162. Answer (3)

Acne, mood swings, increased aggressiveness, depression, reduction of size of testicles, decreased sperm production, breast enlargement, premature baldness, enlargement of the prostate gland *etc.* are the side-effects of the use of anabolic steroids in males.

163. Answer (3)

Cocaine, commonly called 'coke' or 'crack' is usually snorted. It has a potent stimulating action on central nervous system, producing a sense of euphoria.

164. Answer (3)

First generation vaccines include attenuated live vaccines and killed/inactivated vaccine. Second generation vaccines are made using surface antigens of the pathogens *e.g.*, Hepatitis B vaccine. Synthetic vaccines are third generation vaccines.

165. Answer (2)

Thymus and bone marrow are primary lymphoid organs where immature lymphocytes differentiate into antigen-sensitive lymphocytes. Tonsils, spleen and lymph nodes are secondary lymphoid organs.

166. Answer (3)

Smoking reduces the concentration of haembound oxygen. This causes oxygen deficiency in the body.

167. Answer (4)

Antibodies are secreted by B-lymphocytes.

Monocytes and neutrophils are phagocytic cells.

168. Answer (3)

Education and counselling help youngsters to face problems and stresses, and to accept disappointments and failure as a part of life.

169. Answer (1)

Filariasis, Malaria	–	through bite of female mosquito vectors
Chikungunya	–	through bite of *Aedes* mosquito

170. Answer (1)

Sexual stages develop in RBCs. Fertilisation and development take place in the mosquito's gut. Sporozoites escape from the gut and migrate to the mosquito's salivary glands.

171. Answer (2)

Bees are pollinators of many of our crop species such as sunflower, pear, *Brassica* and apple.

172. Answer (3)

IgE is mainly concerned during allergy.

173. Answer (4)

Catla, *Rohu* and common carp are freshwater edible fishes.

174. Answer (4)

Bee-keeping is not labour-intensive. It requires some specialised knowledge, which also includes management of beehives during different seasons and handling and collection of honey and of beeswax.

175. Answer (4)

Mule has been developed by crossing male donkey with female horse.

176. Answer (3)

Sericulture is rearing of silk worm.

177. Answer (3)

Lack of interest in personal hygiene and deteriorating relationship with family and friends are also the common warning signs of drug abuse among youth.

178. Answer (2)

Heroin is a depressant and slows down body functions.

179. Answer (2)

In the likelihood of getting infected from tetanus, quick immune response is provided by administering tetanus antitoxin (preformed antibodies to the tetanus).

180. Answer (3)

Milk yield is primarily dependent on the quality of breeds in the farm. Selection of good breeds having high yielding potential, combined with resistance to diseases is very important.

181. Answer (1)

Lysozyme that is present in perspiration, saliva and tears, destroys certain types of bacteria.

182. Answer (3)

The success rate of crossing mature male and female animals is fairly low even through artificial insemination.

183. Answer (1)

P.vivax reproduces asexually in liver cells and RBCs of human host.

184. Answer (3)

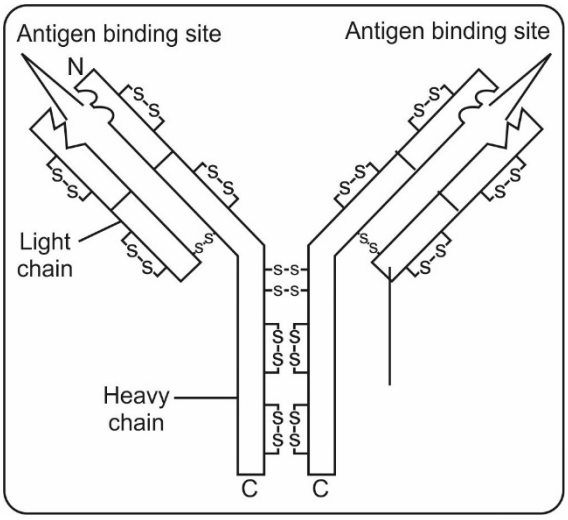
AIDS was first reported in 1981 and in the last twenty five years or so, it has spread all over the world killing more than 25 million persons.

185. Answer (4)

Two types of lymphocytes are present in our blood *i.e.*, B-lymphocytes and T-lymphocytes. B-lymphocytes provide humoral immunity and T-lymphocytes provide cell-mediated immunity.

SECTION - B

186. Answer (1)



187. Answer (3)

Heparin is an anticoagulant secreted by mast cells in our body.

188. Answer (2)

When a preparation of antigenic proteins of pathogen or inactivated/weakened pathogen are introduced into the body, the antibodies are produced against these antigens. This is called active immunisation.

189. Answer (3)

Cannabinoids are known for their effects on cardiovascular systems of the body.

190. Answer (1)

Hisardale is a new breed of sheep developed by the crossing between Bikaneri ewes and Merino rams. Jersey is an improved breed of cattle.

191. Answer (4)

Management of domesticated fowls for food or eggs is poultry farming.

Maintenance of hives of honeybees for the production of honey is called apiculture.

192. Answer (2)

Animal husbandry deals with the care and breeding of livestock like buffaloes, cows, horses, pigs, cattles, sheep, camels, goats *etc.* Leopard is wild animal.

193. Answer (3)

Drugs like barbiturates, amphetamines, benzodiazepines are normally used as medicines to help patients cope with mental illness like depression and insomnia.

194. Answer (2)

Tissue matching, blood group matching are essential before undertaking any graft. The body is able to differentiate self and non-self and the cell-mediated immune response is responsible for the graft rejection.

195. Answer (3)

A group of interbreeding individuals is called species.

196. Answer (2)

Wuchereria causes elephantiasis/filariasis.

197. Answer (2)

Filariasis is transmitted through the bite by the female mosquito vectors to a healthy person.

198. Answer (2)

CT is useful to detect cancers of internal organs.

199. Answer (3)

Cancer causing agents (Physical, chemical or biological) are called carcinogens. Immunoglobulins are antibodies.

200. Answer (3)

Cannabinoids have their effects on cardio vascular system. Diacetyl morphine is heroin/smack.

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