

PACE - IIT & MEDICAL

MUMBAI | AKOLA | DELHI & NCR | KOLKATA | LUCKNOW | NASHIK | GOA | BOKARO | DURGAPUR | DUBAI

[Duration: 3 Hrs.]

MEDICAL AITS TEST-06

[Date: February 24, 2018]

[For NEET / AIIMS 2018 Aspirants]

Total Marks: 720

INSTRUCTIONS

1. The test is of 3 hours duration and Test Booklet consists of 180 questions. Each question carries 4 marks. For each correct response the candidate will get 4 marks. For each incorrect response, one mark will be deducted. The maximum marks are 720.
2. Use Blue/Black Ball Point Pen only for writing particulars on this page/markings responses.
3. On completion of the test, the candidate must handover the Answer Sheet to the invigilator in the Room / Hall. The candidates are allowed to take away this Test Booklet with them.
4. No candidate, without permission of the Superintendent or Invigilator, would leave his / her seat.
5. Use of Electronic / Manual Calculator is prohibited.
6. No part of the Test Booklet and Answer Sheet shall be detached under any circumstances.

SYLLABUS OF MEDICAL AITS TEST-06

Subject	Topics
Physics	Moving charges & Magnetism, Magnetism and Matter, Electromagnetic Induction, Alternating current, Electromagnetic Waves
Chemistry	Organic Chemistry – (Some Basic principles & Techniques), Hydrocarbons, Environmental Chemistry
Botany	Principles of Inheritance and Variation, Molecular basis of Inheritance, Strategies for Enhancement in Food production
Zoology	Evolution : Theories & Evidences, Human Health and Disease (Basic concept of immunology, Vaccines, Pathogens, Parasites, Cancer and AIDS, Adolescence and drug / alcohol abuse)

➔ MEDICAL HEAD OFFICE ◀

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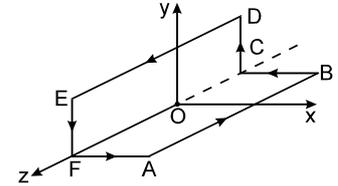
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PHYSICS

1. An electron (charge $-e$, mass ' m ') is revolving around a fixed proton in circular path of radius ' r '. The magnetic field at the centre due to electron is:

- [1] 0 [2] $\frac{\mu_0 e^2}{8\pi r^2 \sqrt{\pi m \epsilon_0} r}$ [3] $\frac{\mu_0 e}{8\pi r \sqrt{\pi m \epsilon_0} r}$ [4] $\frac{\mu_0 e}{4\pi r^2 \sqrt{\pi m \epsilon_0} r}$

2. In the figure shown ABCDEFA is a square loop of side, but is folded in two equal parts so that half of it lies in xz plane and the other half lies in the yz plane. The origin 'O' is centre of the frame also. The loop carries current ' i '. The magnetic field at the centre is:

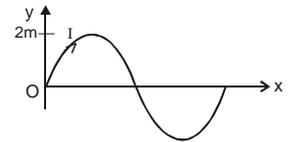


- [1] $\frac{\mu_0 i}{2\sqrt{2} \pi \ell} (\hat{i} - \hat{j})$ [2] $\frac{\mu_0 i}{4 \pi \ell} (-\hat{i} + \hat{j})$ [3] $\frac{\sqrt{2} \mu_0 i}{\pi \ell} (\hat{i} + \hat{j})$ [4] $\frac{\mu_0 i}{\sqrt{2} \pi \ell} (\hat{i} + \hat{j})$

3. The magnetic lines of force due to a straight current carrying wire will be

- [1] circular for finite length of wire [2] circular for semi-infinite wire
[3] circular for infinite wire [4] all of the above

4. A current carrying conductor is in the form of a sine curve as shown, which carries current I . If the equation of this curve is $Y = 2\sin\left(\frac{\pi x}{L}\right)$ and a uniform magnetic field B exists in space. Choose the incorrect statement

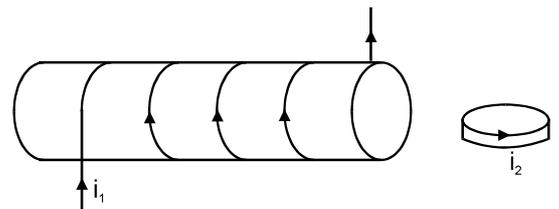


- [1] Force on wire is BIL if field is along Z axis [2] Force on wire is $2BIL$ if field is along Y axis
[3] Force on wire is zero if field is along X axis
[4] Force on wire is BIL if field is in the XY plane making an angle 30° with X -axis.

5. A long hollow tube is carrying an electric current along its length distributed uniformly on its circumference. The magnetic field :

- [1] increases linearly from the axis of the surface [2] is constant inside the tube
[3] is zero only on the axis [4] is zero just out-side the tube.

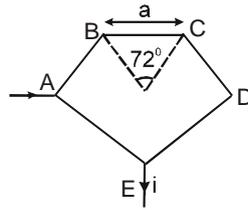
6. The diagram shows a solenoid and a loop such that the solenoid's axis lies in the plane of the loop. Both the solenoid and the loop carry constant currents in the directions as shown in the diagram. If the system is released from rest, the loop



- [1] move towards the solenoid, rotates clockwise
[2] move towards the solenoid, rotates anticlockwise
[3] move away the solenoid, rotates clockwise [4] move away the solenoid, rotates anticlockwise

SPACE FOR ROUGH WORK

7. Magnetic field strength at the centre of regular pentagon made of a conducting wire of uniform cross section area as shown in figure is :



[1] $\frac{5\mu_0 i}{4\pi a} \left[2 \sin \frac{72^\circ}{2} \right]$

[2] 0

[3] Not zero if current 'i' leaves D point instead of E

[4] Not Zero if the current 'i' leaves point D instead of point E

8. Consider a non conducting ring of radius 'r' and mass 'm', which has a total charge 'q' distributed uniformly on it. The ring is rotated about an axis passing through its centre and parallel to the plane of ring with an angular speed ω . Then the magnetic moment of the ring is given by:

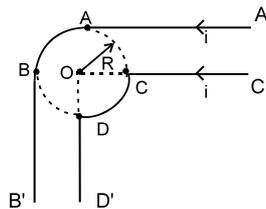
[1] $\frac{q\omega r^2}{4}$

[2] $q \omega r^2$

[3] $2 q \omega r^2$

[4] none of these

9. All straight wires are very long. Both AB and CD are arcs of the same circle, both subtending right angles at the centre O. Then the magnetic field at O is :



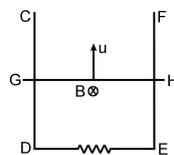
[1] $\frac{\mu_0 i}{4\pi R}$

[2] $\frac{\mu_0 i}{4\pi R} \sqrt{2}$

[3] $\frac{\mu_0 i}{2\pi R}$

[4] $\frac{\mu_0 i}{2\pi R} (\pi + 1)$

10. In the figure shown section CDEF is fixed in the vertical plane. CD & EF are smooth and resistanceless. A rod GH of mass 'm' can move vertically up without losing contact with the fixed arrangement. There is a uniform magnetic field B in the horizontal direction. The total heat produced by the time it goes to highest point in the circuit will be:



[1] $\frac{1}{2} \mu u^2$

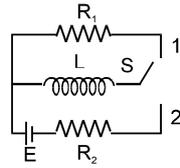
[2] greater than $\frac{1}{2} \mu u^2$

[3] less than $\frac{1}{2} \mu u^2$

[4] zero

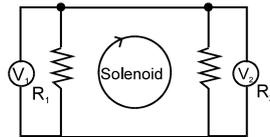
SPACE FOR ROUGH WORK

11. In the circuit shown switch S is connected to position 2 for a long time and then joined to position 1. The total heat produced in resistance R_1 is :



- [1] $\frac{LE^2}{2R_2^2}$ [2] $\frac{LE^2}{2R_1^2}$ [3] $\frac{LE^2}{2R_1R_2}$ [4] $\frac{LE^2(R_1+R_2)^2}{2R_1^2R_2^2}$

12. The current through the solenoid is changing in such way that flux through it is given by $\phi = \epsilon t$. Then the reading of the two ac voltmeters V_1 and V_2 differ by :



- [1] zero [2] ϵ [3] $\left| \frac{\epsilon(R_1 - R_2)}{R_1 + R_2} \right|$ [4] $\frac{\epsilon R_1 R_2}{R_1 + R_2}$

13. A uniform but time varying magnetic field $B = C - Kt$, where K & C are positive constants and t is time, is applied perpendicular to the plane of a circular loop of radius 'a' and resistance R . The total charge that will pass through any point of the loop by the time B becomes zero is :

- [1] $C \pi a^2 / RK$ [2] $K \pi a^2 / R$ [3] $C \pi a^2 / R$ [4] none of these

14. A closed circuit consists of a resistor R , inductor of inductance L and a source of emf E are connected in series. If the inductance of the coil is abruptly decreased to $L/4$ (by removing its magnetic core), the new current immediately after this moment is : (before decreasing the inductance the circuit is in steady state)

- [1] zero [2] E/R [3] $4 \frac{E}{R}$ [4] $\frac{E}{4R}$

15. A uniform magnetic field exists in region given by $\vec{B} = 3\hat{i} + 4\hat{j} + 5\hat{k}$. A rod of length 5 m is placed along y -axis is moved along x -axis with constant speed 1 m/sec. Then induced e.m.f. in the rod will be:

- [1] zero [2] 25 volt [3] 20 volt [4] 15 volt

16. Induced emf produced in a coil rotating about diameter a with constant angular velocity and axis (diameter) perpendicular to a uniform magnetic field will be maximum when the angle between the plane of coil & direction of magnetic field is:

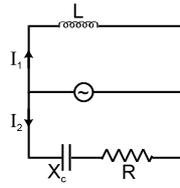
- [1] 0° [2] 90° [3] 45° [4] none

17. A loop of area 1 m^2 is placed in the magnetic field $B = 2 \text{ T}$ such that plane of the loop is parallel to the magnetic field. If the loop is rotated by 180° the amount of charge passed through any point of the loop if its resistance is 10Ω is:

- [1] 0.4 C [2] 0.2 C [3] 0.8 C [4] 0

SPACE FOR ROUGH WORK

25. In the given circuit assuming inductor and source to be ideal, the phase difference between current I_1 and I_2 :



- [1] $\tan^{-1}\left(\frac{X_c}{R}\right) - \frac{\pi}{2}$ [2] $\tan^{-1}\left(\frac{X_c}{R}\right)$ [3] $\tan^{-1}\left(\frac{X_c}{R}\right) + \frac{\pi}{2}$ [4] $\frac{\pi}{2}$

26. A compass needle whose magnetic moment is $60 \text{ amp} \times m^2$ pointing geographical north at a certain place, where the horizontal component of earth's magnetic field is $40 \mu \text{ Wb}/m^2$, experiences a torque $1.2 \times 10^{-3} \text{ N} \times m$. What is the declination at this place

- [1] 30° [2] 45° [3] 60° [4] 25°

27. Due to a small magnet intensity at a distance x in the end on position is 9 Gauss. What will be the intensity at a distance $\frac{x}{2}$ on broad side on position

- [1] 9 Gauss [2] 4 Gauss [3] 36 Gauss [4] 4.5 Gauss

28. The needle of a deflection galvanometer shows a deflection of 60° due to a short bar magnet at a certain distance in tan A position. If the distance is doubled, the deflection is

- [1] $\sin^{-1}\left(\frac{\sqrt{3}}{8}\right)$ [2] $\cos^{-1}\left(\frac{\sqrt{3}}{8}\right)$ [3] $\tan^{-1}\left(\frac{\sqrt{3}}{8}\right)$ [4] $\cot^{-1}\left(\frac{\sqrt{3}}{8}\right)$

29. The area of hysteresis loop of a material is equivalent to 250 joule. When 10 kg material is magnetised by an alternating field of 50 Hz then energy lost in one hour will be if the density of material is $7.5 \text{ gm}/\text{cm}^3$

- [1] $6 \times 10^4 \text{ J}$ [2] $6 \times 10^4 \text{ erg}$ [3] $3 \times 10^2 \text{ J}$ [4] $3 \times 10^2 \text{ erg}$

30. A tangent galvanometer shows a deflection 45° when 10 mA current pass through it. If the horizontal component of the earth's field is $3.6 \times 10^{-5} \text{ T}$ and radius of the coil is 10 cm. The number of turns in the coil is

- [1] 5700 turns [2] 57 turns [3] 570 turns [4] 5.7 turns

31. A magnet is parallel to a uniform magnetic field. If it is rotated by 60° , the work done is 0.8 J. How much work is done in moving it 30° further

- [1] $0.8 \times 10^7 \text{ ergs}$ [2] 0.4 J [3] 8 J [4] 0.8 ergs

32. The magnet of vibration magnetometer is heated so as to reduce its magnetic moment by 36%. By doing this the periodic time of the magnetometer will

- [1] Increases by 36% [2] Increases by 25% [3] Decreases by 25% [4] Decreases by 64%

33. The ratio of magnetic moments of two bar magnet is 13 : 5. These magnets are held together in a vibration magnetometer are allowed to oscillate in earth's magnetic field with like poles together 15 oscillation per minute are made. What will be the frequency of oscillation of system if unlike poles are together

- [1] 10 oscillations/min [2] 15 oscillations/min [3] 12 oscillations/min [4] $\frac{75}{13}$ oscillations/min

SPACE FOR ROUGH WORK

34. The electromagnetic waves do not transport -
 [1] energy [2] charge [3] momentum [4] information
35. In an electromagnetic wave the average energy density is associated with -
 [1] electric field only [2] magnetic field only
 [3] equally with electric and magnetic fields [4] average energy density is zero
36. In an electromagnetic wave the average energy density associated with magnetic field will be
 [1] $\frac{1}{2}LI^2$ [2] $\frac{B^2}{2\mu_0}$ [3] $\frac{1}{2}\mu_0B^2$ [4] $\frac{1}{2}\frac{\mu_0}{B^2}$
37. In the above problem, the energy density associated with the electric field will be -
 [1] $\frac{1}{2}CV^2$ [2] $\frac{1}{2}\frac{q^2}{C}$ [3] $\frac{1}{2}\frac{\epsilon^2}{E}$ [4] $\frac{1}{2}\epsilon_0E^2$
38. If there were no atmosphere, the average temperature on earth surface would be -
 [1] lower [2] higher [3] same [4] 0°C
39. The AM range of radio waves have frequency -
 [1] less than 30 MHz [2] more than 30 MHz
 [3] less than 20000Hz [4] more than 20000Hz
40. A plane electromagnetic wave of frequency 40 MHz travels in free space in the X-direction. At some point and at some instant, the electric field \vec{E} has its maximum value of 750 N/C in Y-direction. The wavelength of the wave is -
 [1] 3.5 m [2] 5.5 m [3] 7.5 m [4] 9.5 m

ASSERTION-REASON TYPE QUESTIONS

Directions (Q. Nos. 41-45): These questions consist of two statements each linked as Assertion and Reason. While answering these questions you are required to choose any one of the following four responses.

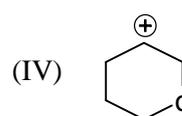
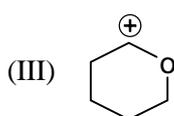
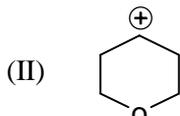
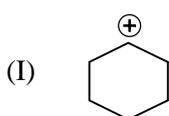
- [1] If both the assertion and the reason are true and the reason is the correct explanation of the assertion.
 [2] If both the assertion and reason are true but the reason is not a correct explanation of the assertion.
 [3] If the assertion is true but the reason is false.
 [4] If both the assertion and reason are false.
41. **A:** Cyclotron does not accelerate electron.
R: Mass of the electron is very small.
42. **A:** If an electron, while coming vertically from outerspace, enter the earth's magnetic field, it is deflected towards west.
R: Electron has negative charge.

SPACE FOR ROUGH WORK

43. **A:** The permeability of a ferromagnetic material is independent of the magnetic field.
R: Permeability of a material is a constant quantity.
44. **A:** Only a change in magnetic flux will maintain an induced current the coil.
R: The presence of large magnetic flux through a coil maintains a current in the coil if the circuit is continuous.
45. **A:** In series LCR circuit resonance can take place.
R: Resonance takes place if inductance and capacitive reactances are equal and opposite.

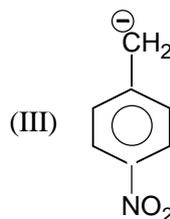
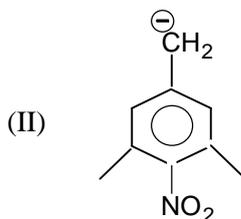
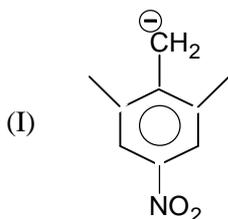
CHEMISTRY

46. Correct order of stability of following species is



- [1] I > II > III > IV [2] I < II < III < IV [3] I > II > IV > III [4] III > I > II > IV

47. Correct order of stability of following species is

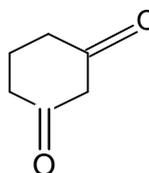


- [1] I > II > III [2] III > I > II [3] III > II > I [4] I > III > IV

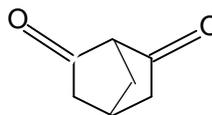
48. Which one of the following compounds would you expect to be the strongest carbon acid?



[2]

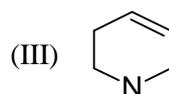
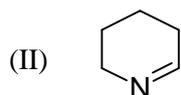
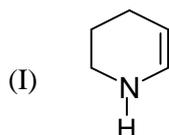


[4]



SPACE FOR ROUGH WORK

49. Correct order of basicity of following compounds is



[1] I > II > III

[2] III > I < II

[3] III > II > I

[4] III < II > I

50. In the reaction of Br₂ in the presence of sodium iodide with ethylene, what products would be found in the reaction mixture?

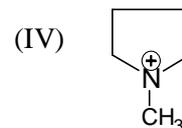
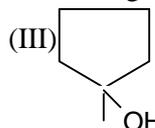
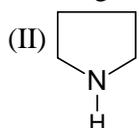
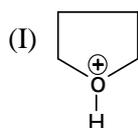
[1] 1,2-dibromoethane only

[2] 1,2-dibromoethane and 1,2-diiodoethane

[3] 1-bromo-2-iodoethane and 1,2-dibromoethane

[4] 1,2-diiodoethane

51. Rank the following in decreasing order of their acidic strength



[1] I > II > III > IV

[2] III > I > IV > II

[3] I > IV > III > II

[4] IV > III > II > I

52. The reagent which is used to distinguish between propene and propyne is

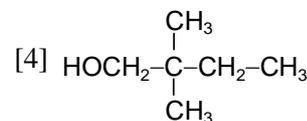
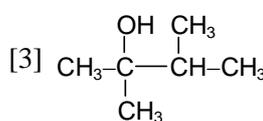
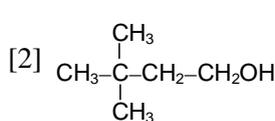
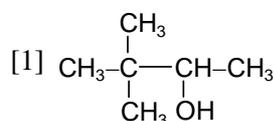
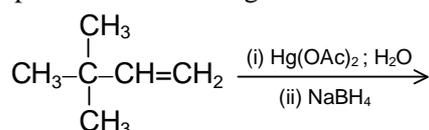
[1] Bromine

[2] Alkaline KMnO₄

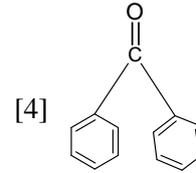
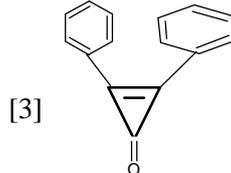
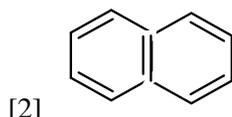
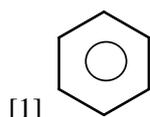
[3] Ammoniacal AgNO₃

[4] Ozone

53. The product of following reaction is

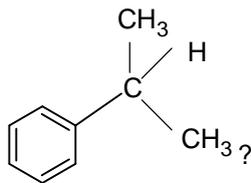


54. Which has maximum dipole moment?



SPACE FOR ROUGH WORK

55. Which of the following aromatic rings have less electron density than



- [1] [2] [3] [4]

56. A is

- [1] [2] [3] [4] All of these

57. The best method for the preparation of chlorobenzene is

- [1] [2] [3] [4]

58. The major product X is:

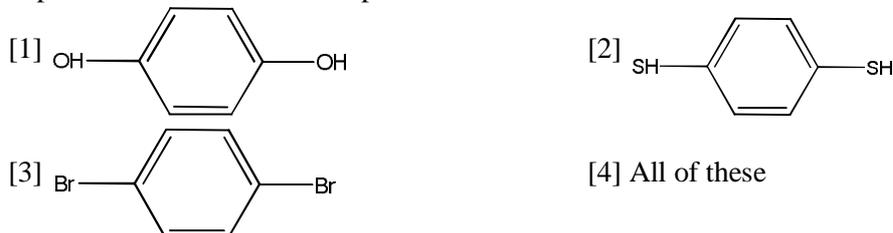
- [1] [2] [3] [4] None is correct

SPACE FOR ROUGH WORK

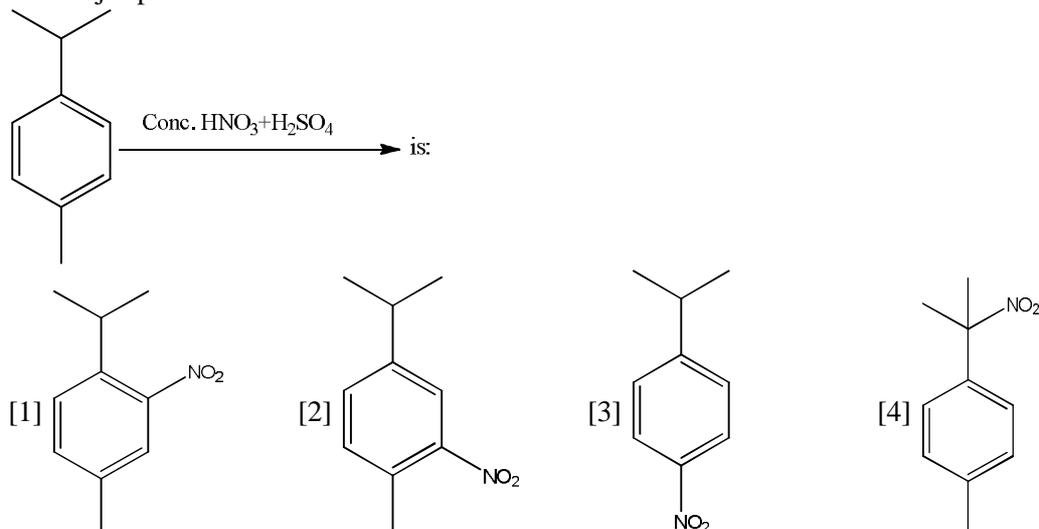
59. Which of the following is not an aromatic compound?



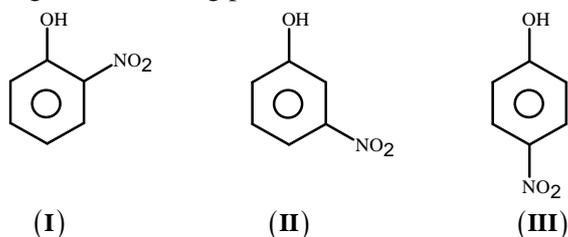
60. Dipole moment of which compound will be zero?



61. The major product formed in the reaction:



62. Arrange the following phenols in order of their increasing acidity.



- [1] I > III > II [2] I > II > III [3] III > I > II [4] III > II > I

63. The correct order of increasing basicity of the given conjugate bases ($R = CH_3$) is

- [1] $R - COO^- < HC \equiv C^- < NH_2^- < R^-$ [2] $R - COO^- < HC \equiv C^- < R^- < NH_2^-$
 [3] $R^- < HC \equiv C^- < R - COO^- < NH_2^-$ [4] $R - COO^- < NH_2^- < HC \equiv C^- < R^-$

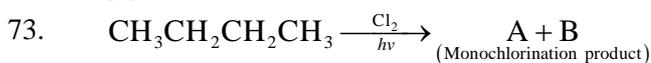
SPACE FOR ROUGH WORK

64. A hydrocarbon of formula C_6H_{10} absorbs only one molecule of H_2 upon catalytic hydrogenation. Upon ozonolysis, the hydrocarbon yields
- $$\begin{array}{c} \text{H} \qquad \qquad \qquad \text{H} \\ | \qquad \qquad \qquad | \\ \text{O}=\text{C}-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{C}=\text{O} \end{array}$$
- The hydrocarbon is
- [1] cyclohexane [2] benzene [3] cyclohexene [4] cyclobutane
65. Most stable carbonium ion is
- [1] $P-\text{NO}_2-\text{C}_6\text{H}_4-\text{CH}_2^{\oplus}$ [2] $\text{C}_6\text{H}_5-\text{CH}_2^{\oplus}$
 [3] $\text{Para}-\text{Cl}-\text{C}_6\text{H}_4-\text{CH}_2^{\oplus}$ [4] $P-\text{CH}_3\text{O}-\text{C}_6\text{H}_4-\text{CH}_2^{\oplus}$
66. Which of following is the least stable resonating structure?
- [1] $\text{CH}_2 = \overset{\oplus}{\text{C}}\text{H} - \overset{\ominus}{\text{C}}\text{H} - \text{NH}_2$ [2] $\overset{\ominus}{\text{C}}\text{H}_2 - \overset{\oplus}{\text{C}}\text{H} - \text{CH} = \text{CH} - \text{NH}_2$
 [3] $\overset{\ominus}{\text{C}}\text{H}_2 - \text{CH} = \text{CH} - \overset{\oplus}{\text{C}}\text{H} = \text{NH}_2$ [4] $\text{CH}_2 = \text{CH} - \overset{\ominus}{\text{C}}\text{H} - \overset{\oplus}{\text{C}}\text{H} = \text{NH}_2$
67. Stability of the following alkenes in the increasing order is
- [1] $\text{CH}_3-\text{CH}=\text{CH}-\text{CH}_3$ [2] $\begin{array}{c} \text{CH}_3-\text{C}=\text{C}-\text{CH}_3 \\ | \qquad | \\ \text{CH}_3 \text{CH}_3 \end{array}$
 [3] $\begin{array}{c} \text{CH}_3-\text{C}=\text{CH}_2 \\ | \\ \text{CH}_3 \end{array}$ [4] $\begin{array}{c} \text{CH}_3-\text{C}=\text{CH}-\text{CH}_3 \\ | \\ \text{CH}_3 \end{array}$
- [1] $A > B > C > D$ [2] $C > B > A > D$ [3] $B > D > C > A$ [4] $B > D > A > C$
68. A mixture of ethyl iodide and n -propyl iodide is subjected to Wurtz reaction. The hydrocarbon which will not be formed is
- [1] Butane [2] Propane [3] Pentane [4] Hexane
69. What is the end product of the following sequence of operations
- $$\text{CaC}_2 \xrightarrow{\text{H}_2\text{O}} [1] \xrightarrow[\text{Hg}^{++}]{\text{dil. H}_2\text{SO}_4} [2] \xrightarrow[\text{H}_2]{\text{Ni}} [3]?$$
- [1] Methyl alcohol [2] Acetaldehyde [3] $\text{C}_2\text{H}_5\text{OH}$ [4] C_2H_4
70. Anti-Markwnifoff's addition of HBr is not observed in
- [1] Propane [2] 1-Butane [3] But-2-ene [4] Pent-2-ene
71. 1-Butyne of oxidation with hot alkaline KMnO_4 would yield
- [1] $\text{CH}_3\text{CH}_2\text{CH}_2\text{COOH}$ [2] $\text{CH}_3\text{CH}_2\text{COOH}$
 [3] $\text{CH}_3\text{CH}_2\text{COOH} + \text{CO}_2 + \text{H}_2\text{O}$ [4] $\text{CH}_3\text{CH}_2\text{COOH} + \text{HCOOH}$

SPACE FOR ROUGH WORK



- [1] A is *cis*, B is *trans* [2] A is *trans*, B is *cis*
 [3] A and B both are *cis* [4] A and B both are *trans*



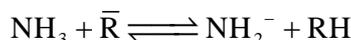
The approximate ratio of percentage yields of A and B formed in the above reaction is

- [1] 50 : 50 [2] 72 : 28 [3] 45 : 55 [4] 60 : 40

74. The reaction of propene with HOCl proceeds via the addition of

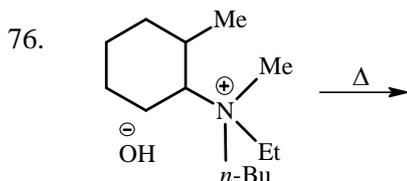
- [1] H^+ in the first step [2] Cl^+ in the first step
 [3] OH^- in the first step [4] Cl^- and OH^- in a single step

75. From the following reactions,



Predict which of the following orders regarding acid strength is correct?

- [1] $RH < NH_3 < HC \equiv CH$ [2] $RH > NH_3 > HC \equiv CH$
 [3] $RH > NH_3 < HC \equiv CH$ [4] $RH < NH_3 > HC \equiv CH$



The alkene formed as a major product in the above elimination reaction is

- [1] [2] $CH_2=CH_2$ [3] [4]

77. $(CH_3)_3CMgCl$ on reaction with D_2O produces

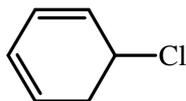
- [1] $(CH_3)_3CD$ [2] $(CH_3)_3OD$ [3] $(CD_3)_3CD$ [4] $(CD_3)_3OD$

78. Which of the following gives propyne on hydrolysis?

- [1] Al_4C_3 [2] Mg_2C_3 [3] B_4C [4] La_4C_3

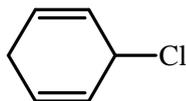
SPACE FOR ROUGH WORK

79. Which is most easily dehydrohalogenated?



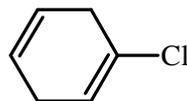
I

[1] I



II

[2] II

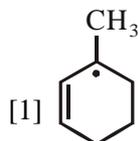


III

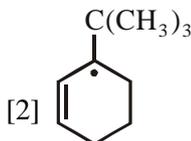
[3] III

[4] cannot be determined

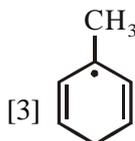
80. Which one is most stable free radical?



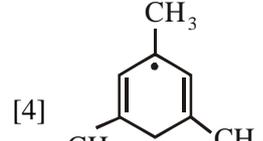
[1]



[2]

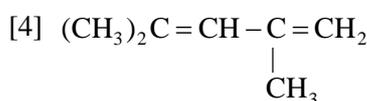
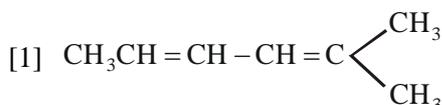


[3]



[4]

81. A compound on ozonolysis gives glyoxal, acetone and formaldehyde as the product. The compound be



82. Ozone is present in

[1] Thermosphere

[2] Mesosphere

[3] Stratosphere

[4] Troposphere

83. Water pollution is less if BOD is

[1] Less than 5 PPM

[2] Less than 15 PPM

[3] Less than 50 PPM

[4] Less than 100 PPM

84. Which of the following acids is most abundant in acid rain?

[1] HCl

[2] HNO₃

[3] H₂SO₄

[4] Organic acids

85. Which of the following is not a vehicular pollutant?

[1] CO

[2] NO₂

[3] Hydrocarbon

[4] None of these

ASSERTION-REASON TYPE QUESTIONS

Directions (Q. Nos. 86-90): These questions consist of two statements each linked as Assertion and Reason. While answering these questions you are required to choose any one of the following four responses.

[1] If both the assertion and the reason are true and the reason is the correct explanation of the assertion.

[2] If both the assertion and reason are true but the reason is not a correct explanation of the assertion.

[3] If the assertion is true but the reason is false.

[4] If both the assertion and reason are false.

86. **A:** Fumaric acid and maleic acid are examples of diastereomers

R: Physical properties of these two compounds are different.

SPACE FOR ROUGH WORK

87. **A:** The carbocation $\text{CH}_3\text{O}^+\text{CH}_2$ is more stable than $\text{CH}_3\text{C}^+\text{H}_2$
R: The Cation is stabilised by the +M effect of the $-\text{OCH}_3$ substitute.
88. **A:** Allyl carbocation is more stable than vinyl carbocation.
R: Vinyl carbocation is destabilized by resonance.
89. **A:** Tropylium cation is aromatic nature.
R: Cyclic planar structure with $(4n + 2) \pi$ electrons with proper delocalization of electron cloud defines aromatic nature.
90. **A:** A mixture of HNO_3 and H_2SO_4 is used for the nitration of benzene
R: H_2SO_4 works as an acid and HNO_3 as a base to produce NO_2^+ ion

BOTANY

91. Plant breeding is a technique of improving
 [1] Agricultural crops [2] Fodder crops [3] Fruit varieties [4] All the above
92. Apart from high yield, other main objective of plant breeding is
 [1] Improvement of quality [2] Development of resistance
 [3] Establishment of change in duration [4] All the above
93. Pioneer worker in plants tissue culture is
 [1] Guha and Maheshwari [2] Steward
 [3] Haberlandt [4] Swaminathan
94. *Sonora-64* and *Lerma rojo* are varieties of
 [1] Wheat [2] Rice [3] Pea [4] Maize
95. IR-36 was developed through breeding
 [1] Six rice varieties and *Oryza nivara* [2] 13 rice varieties and *Oryza nivara*
 [3] *Oryza indica* and *Oryza nivara* [4] *Oryza indica* and *Oryza sativa*
96. Dwarf wheat were developed by
 [1] Vavilov [2] Borlaug [3] Swaminathan [4] None of these
97. Which is the oldest breeding method
 [1] Hybridization [2] Selection [3] Mutation breeding [4] Introduction
98. Who coined the term '*heterosis*'
 [1] Shull [2] Huxley [3] Robard [4] Tansley
99. Somatic hybridization of potato and tomato forms
 [1] *Triticale* [2] Pomato [3] *Secale* [4] *Altonia*

SPACE FOR ROUGH WORK

112. The linkage map of 'X' chromosome of fruit fly has 59 units with yellow body gene (Y) at one end and bobbed hair (b) gene on the other end. The recombination gene between these 2 gene should.
 [1] < 50% [2] 100% [3] 59% [4] > 50%
113. How many linkage groups are present in *Drosophila*?
 [1] 4 [2] 2 [3] 8 [4] 1
114. Extra nuclear inheritance is due to presence of genes in
 [1] Lysosomes and dictyosomes [2] Mitochondria and Chloroplast
 [3] Ribosome and spherosomes [4] Peroxisomes and Mitochondria
115. According to genic balance theory chromosomal constitution for intersex would be
 [1] AA + XXX [2] AAA + XXY [3] AA + XY [4] AA + XO
116. Which among the following is not a sex limited trait?
 [1] Beard [2] Musculature of particular sex
 [3] Antler in deer [4] Pattern baldness
117. Shell coiling in a fresh water snail is of two types dextral (Clockwise) due dominant gene and sinistral (anti clock wise) due to recessive gene. Find out the ratio of dextral and sinistral offspring in F₂ generation if a cross is made between dextral ♀ and sinistral ♂.
 [1] 3 : 1 [2] 2 : 2 [3] 4 : 0 [4] 1 : 3
118. In case of complete linkage the test cross ratio of dihybrid cross is
 [1] 1 : 1 [2] 1 : 1 : 1 : 1 [3] 3 : 1 [4] 1 : 3
119. Gene 'B' of pea is responsible for starch synthesis and shape of grain. What is most appropriate for gene 'B'?
 [1] It shows incomplete dominance [2] It shows dominant recessive relationship
 [3] It shows pleiotropy [4] It shows multiple Allelism
120. *Mirabilis jalapais* similar to *Antirrhinum majus* in which of the following aspect?
 [1] both have same genus
 [2] both have same color flowers
 [3] both show same phenotypic and genotypic ratio
 [4] both show same genotypic ratio only
121. Change in single base pair of DNA is known's as
 [1] Germinal Mutation [2] Chromosomoal mutation
 [3] Point mutation [4] Gross mutation
122. Which among the following is man made allopolyploid?
 [1] *Citrulluslanatus* [2] *Triticale* [3] *Triticum* [4] *Gossypium*

SPACE FOR ROUGH WORK

123. CML(Chronic myeloid leukemia) and Burkitt lymphoma in human are due to
 [1] Duplication [2] Deficiency [3] Translocation [4] Inversion
124. There is a break in the chromosome. After a break the chromosome takes a turn of 180° rotation. It shows
 [1] Inversion [2] Duplication [3] Translocation [4] Deletion
125. Gene for Huntington's chorea is located on chromosome:
 [1] 4 [2] 6 [3] 8 [4] - 16
126. The 'X' linked recessive gene is
 [1] Always expressed in male [2] always expressed in female
 [3] always expressed as lethal gene [4] always expressed as recessive gene
127. If there is absence of one sex chromosome it will result in
 [1] Edward syndrome [2] Down syndrome
 [3] Klinefelter's syndrome [4] Turner syndrome
128. The process by which DNA of nucleus passes genetic information to mRNA
 [1] Translocation [2] Transcription [3] Translation [4] Transportation
129. Who discovered "Reverse transcription"
 [1] Watson and Crick [2] Beadle and tatum [3] Temin and Baltimore [4] Khorana
130. Repressor protein is formed from
 [1] Repressor gene [2] Structural gene [3] Operator gene [4] Regulatory gene
131. Which amino acids are present in histones
 [1] Lysine and histidine [2] Valine and Histidine
 [3] Arginine and lysine [4] Arginine and histidine
132. Where Anticodon occurs in transcription
 [1] *m*-RNA [2] *t*-RNA [3] *μ*-RNA [4] DNA
133. Which enzyme plays important role in transcription
 [1] DNA dependent RNA polymerase [2] DNA dependent DNA polymerase
 [3] RNA dependent DNA polymerase [4] RNA dependent RNA polymerase
134. Jacob and Monad studied lactose metabolism in *E. coli* and proposed operon concept, which is applicable for
 [1] Prokaryotes [2] Eukaryotes [3] Protozoanes [4] All of these
135. Mark the odd one w.r.t to tetra ploidy.
 [1] Apples [2] Berseem [3] Corn [4] Grapes

SPACE FOR ROUGH WORK

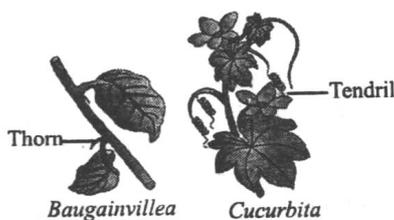
ZOOLOGY

136. Refer the given statements and select the correct ones.
 (i) Fossils are remains of hard parts of life forms in Rocks
 (ii) A study of fossils in different sedimentary layers indicates the geological period in which they live
 (iii) Environmental factors act on an organism's phenotype
 (iv) Natural selection was considered as a mechanism of evolution by Darwin
 [1] (i), (ii), (iii) and (iv) [2] (i) and (ii)
 [3] (iii) and (iv) [4] (i), (iii) and (iv)
137. Bryophytes have evolved from
 [1] chlorophyte ancestors [2] tracheophyte ancestors
 [3] Rhynia type plants [4] Psilophyton
138. Which of the following statements is correct?
 [1] *Homo habilis* had brain capacities between 650-800 cc and they probably did not eat meat
 [2] Fish with stout and strong fins could move on land and go back to water. This was about 350 mya.
 [3] Sea weeds and few plants existed probably around 320 mya.
 [4] All of these

139. Match Column – I and Column – II and select the correct option from the codes given below

	Column – I		Column – II
[1]	Pasteur	(i)	Essay on population
[2]	Malthus	(ii)	Theory of special creation
[3]	Hugo de Vries	(iii)	Mutation theory of evolution
[4]	Father Suarez	(iv)	Swan Neck Experiment

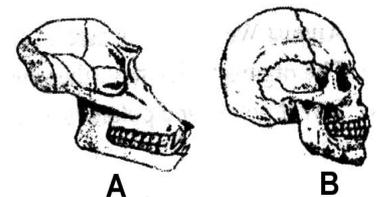
- [1] A-(iii), B-(iv), C-(ii), D-(i) [2] A-(ii), B-(i), C-(iv), D-(iii)
 [3] A-(iv), B-(i), C-(ii), D-(iii) [4] A-(iv), B-(i), C-(iii), D-(ii)
140. The given figures shows an example of



- [1] homologous organs [2] convergent evolution
 [3] divergent evolution [4] both [1] and [3]
141. The following are some major events in the early history of life :
- P. First heterotrophic prokaryotes Q. First genes

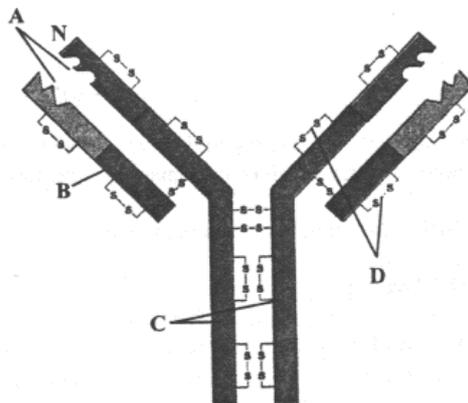
SPACE FOR ROUGH WORK

148. Coacervates are
 [1] colloid droplets [2] nucleoprotein containing entities
 [3] both [1] and [2] [4] protobiont
149. The Australian mammal spotted cuscus is most similar to the placental mammal
 [1] mole [2] bobcat [3] flying squirrel [4] lemur
150. What is the correct arrangement of periods of palaeozoic era in ascending order in geological time scale?
 [1] Cambrian → Devonian → Ordovician → Silurian → Carboniferous → Permian
 [2] Cambrian → Ordovician → Silurian → Devonian → Carboniferous → Permian
 [3] Cambrian → Ordovician → Devonian → Silurian → Carboniferous → Permian
 [4] Silurian → Devonian → Cambrian → Ordovician → Permian → Carboniferous
151. Which one of the following correctly describes the homologous structures?
 [1] Organs with anatomical similarities, but performing different functions
 [2] Organs with anatomical dissimilarities, but performing same function
 [3] Organ that have no function now, but had an important function in ancestors
 [4] Organs appearing only in embryonic stage and disappearing later in the adult
152. Stanley Miller had put the Oparin-Haldane theory to test in 1953 by creating in the laboratory, the probable conditions of the primitive earth. In the experiment, simple amino acids were synthesized from which of the following mixtures as observed after 18 days?
 [1] H₂, O₂, N and H₂O [2] CH₄, CN, H₂ and O₂
 [3] H₂, NH₃, CH₄ and water vapour [4] NH₃, CH₄ and O₂
153. The prebiotic atmosphere of the earth was of a reducing nature. It was transformed into an oxidizing atmosphere of present day due to the emergence of
 [1] cyanobacteria [2] angiosperms
 [3] photosynthetic bacteria [4] eukaryotic algae
154. Natural selection can lead to
 [1] Stabilization: in which more individuals acquire mean character value)
 [2] Directional change: more individuals acquire value other than the mean character value
 [3] Disruption: more individuals acquire peripheral character value at both ends of the distribution curve
 [4] any of these
155. The diagram given here shows the skull of two different mammals. Which of the following accurately describes the differences between these skulls?
 [1] Skull A has more teeth than skull B
 [2] Skull A has more brain capacity than skull B
 [3] Skull A is of human and skull B is of an ape
 [4] Skull A is of an ape and skull B is of human



SPACE FOR ROUGH WORK

156. Which of the following statements regarding the disease typhoid is/are correct?
- (i) *Salmonella typhi* are the pathogenic bacteria which enter human intestine through contaminated food and water and migrate to other organs through blood.
 - (ii) Sustained high fever (39°C to 40°C), weakness, stomach pain, constipation, headache and loss of appetite are some common symptoms of typhoid.
 - (iii) Typhoid vaccine is available as DPT vaccine.
 - (iv) The patient of this disease is not required to be treated with antibiotics.
 - (v) Blood culture test is more effective test for the diagnosis of typhoid fever than the Widal test.
- [1] (i) and (ii) [2] (iii) and (iv) [3] (i), (ii) and (v) [4] (i), (ii), (iii) and (iv)
157. Which one of the following is a mismatched pair of the drug and its effect?
- [1] Amphetamines - CNS stimulants
 - [2] Lysergic acid diethylamide (LSD) - Psychedelic (hallucinogen)
 - [3] Heroin - Depressant, slows down body functions
 - [4] Barbiturates - CNS stimulants
158. Select the correct option showing the life cycle of *Plasmodium*.
- [1] Sporozoites (human) → RBCs → liver cells → gametocytes in blood → blood meal, bite (female mosquito) → multiply (mosquito) → sporozoites (mosquito)
 - [2] Sporozoites (human) → liver cells → RBCs → gametocytes in blood → blood meal, bite (female mosquito) → multiply (mosquito) → sporozoites (mosquito)
 - [3] Gametocytes (mosquito) → bite → gametocytes (human) → RBCs → multiply → sporozoites blood meal (human) → bite → sporozoites (female mosquito) → multiply (mosquito) → gametocytes (mosquito)
 - [4] Sporozoites (human) → liver cells → gametocytes in blood → blood meal, bite (female mosquito) → multiply (mosquito) → sporozoites (mosquito)
159. Identify the marking A, B, C and D in the figure given below and select the correct option



SPACE FOR ROUGH WORK

- [1] A - light chains, B - heavy chain, C - antigen binding sites, D - disulphide bonds
- [2] A - disulphide bonds, B - antigen binding site, C - heavy chains, D - light chains
- [3] A - antigen binding sites, B - light chain, C - heavy chains, D - disulphide bonds
- [4] A - antigen binding sites, B - disulphide bonds, C - light chain, D - heavy chains

160. An intestinal parasite which causes blockage of the intestinal passage and whose eggs are excreted along with the faeces of infected person is

- [1] *Wuchereriabancrofti* [2] *Ascaris* [3] *Epidermophyton* [4] *Microsporium*

161. Match Column - I with Column - II and select the correct answer from codes given below.

Column - I **Column - II**

- | | |
|----------------|-----------------------|
| A. Sporozoites | (i) Infectious form |
| B. Filariasis | (ii) Aedes mosquitoes |
| C. Typhoid | (iii) Wuchereria |
| D. Chikungunya | (iv) Widal test |

- [1] A - (iv), B - (ii), C - (i), D - (iii) [2] A - (iii), B - (iv), C - (ii), D - (i)
- [3] A - (ii), B - (iii), C - (i), D - (iv) [4] A - (i), B - (iii), C - (iv), D - (ii)

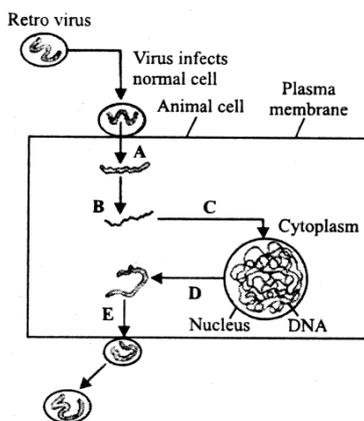
162. The genetic material of HIV is

- [1] dsDNA [2] dsRNA [3] ssDNA [4] ssRNA

163. Hepatitis B vaccine has been commercially produced from

- [1] inactivated viruses [2] yeast
- [3] *Haemophilus influenzae* [4] *Salmonella typhimurium*

164. The figure given below shows mode of action of AIDS virus. Identify steps A, B, C, D and E labelled in it



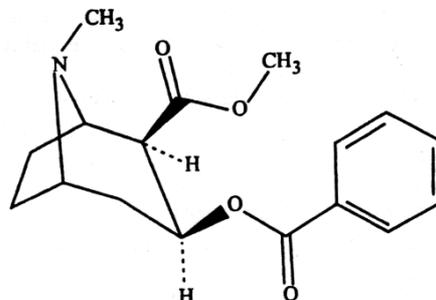
- [1] A - new viral DNA, B - viral RNA introduced into cell, C- viral DNA incorporated into host genome, D - viral DNA, viruses produced

SPACE FOR ROUGH WORK

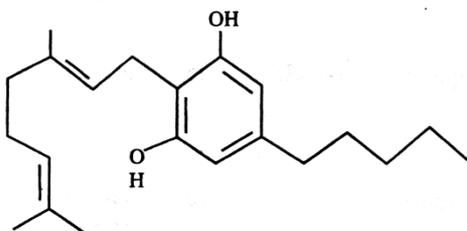
- [2] A-viral DNA incorporated into host genome, B-viral DNA, C-new viral RNA, D-viral RNA introduced, E- new viruses produced
- [3] A-viral RNA introduced, B-viral DNA, C-viral DNA incorporated into host genome, D-new viral RNA, E-new viruses produced A
- [4] A-viral DNA introduced, B-viral RNA, C-viral RNA incorporated into host genome, D-new viral DNA, E-new viruses produced
165. Select the correct statements regarding the characteristics of acquired immunity.
- (i) Acquired immunity shows the properties of specificity and diversity.
 (ii) Vaccination provides artificially acquired active immunity.
 (iii) Active and passive immunity are types of acquired immunity.
 (iv) Polymorphonuclear leukocytes and natural killer cells are involved in acquired immunity.
- [1] (i), (ii) and (iii) [2] (i), (iii) and (iv) [3] (i) and (iv) [4] (i) and (iii)
166. Read the following statements regarding spleen and select the correct option.
- (i) Spleen is a large bean-shaped organ which mainly contains lymphocytes and phagocytes.
 (ii) Spleen is a large reservoir of erythrocytes.
 (iii) Spleen is a primary lymphoid organ.
 (iv) Spleen acts as a filter of the blood by trapping blood-borne micro-organisms.
- [1] (i) and (ii) [2] (ii) and (iv) [3] (i), (ii) and (iii) [4] (i), (ii) and (iv)
167. AIDS is characterized by
- [1] decrease in the number of killer T-cells
 [2] decrease in the number of suppressor T-cells
 [3] decrease in the number of helper T-cells
 [4] increase in the number of helper T-cells.
168. Which one of the following pairs is not correctly matched?
- [1] Dengue fever - *Flavi-ribo* virus [2] Syphilis - *Trichuristrichiura*
 [3] Plague - *Yersinia pestis* [4] Filariasis – *Wuchereria*
169. Which of the following is mainly affected by the infection of *Wuchereriabancrofti*?
- [1] Lymphatic vessels [2] Respiratory system [3] Nervous system [4] Blood circulation
170. Which of the following are the reason(s) for Rheumatoid arthritis? Choose the correct option.
- i. Lymphocytes become more active
 ii. Body attacks self cells
 iii. More antibodies are produced in the body
 iv. The ability to differentiate pathogens or foreign molecules from self cells is lost
- [1] i and ii [2] ii and iv [3] iii and iv [4] i and iii

SPACE FOR ROUGH WORK

171. When an apparently healthy person is diagnosed as unhealthy by a psychiatrist, the reason could be that:
 [1] the patient was not efficient at his work
 [2] the patient was not economically prosperous
 [3] the patient shows behavioural and social maladjustment
 [4] he does not take interest in sports
172. The chemical compound whose chemical structure is given below is obtained from which plant?



- [1] *Papaversomniferum* [2] *Erythroxyllum coca*
 [3] *Atropabelladona* [4] *Cannabis sativa*
173. Which of these is a member of the group of chemicals whose chemical structure is given below?



- [1] Marijuana [2] Hashish [3] Ganja [4] All of these
174. Select the correct options to fill up the blanks.
- (i) With repeated use of drugs, the tolerance level of receptors present in our body.....
 (ii) Smoking produces and reduces the concentration of in blood.
 (iii) Cannabinoid receptors are present in the
 (iv) Morphine is a very effective and
 (v) Opioids are extracted from the of poppy plant, *Papaversomniferum*.
- [1] (i) decreases, (ii) sedative, pain killer, (iii) brain, (iv) hallucinogen, depressant, (v) latex
 [2] (i) increases, (ii) CO, haembound oxygen, (iii) brain, (iv) sedative, painkiller, (v) latex
 [3] (i) decreases, (ii) CO, haembound oxygen, (iii) brain, (iv) sedative, painkiller, (v) latex
 [4] (i) increases, (ii) CO, haembound oxygen, (iii) latex, (iv) sedative, painkiller, (v) resin

SPACE FOR ROUGH WORK

175. Many diseases can be diagnosed by observing the symptoms in the patient. Which group of symptoms are indicative of pneumonia?
- [1] Difficulty in respiration, fever, chills, cough, headache
 - [2] Constipation, abdominal pain, cramps, blood clots
 - [3] Nasal congestion and discharge, cough, sore throat, headache
 - [4] High fever, weakness, stomach pain, loss of appetite and constipation

ASSERTION-REASON TYPE QUESTIONS

Directions (Q. Nos. 176-180): These questions consist of two statements each linked as Assertion and Reason. While answering these questions you are required to choose any one of the following four responses.

- [1] If both the assertion and the reason are true and the reason is the correct explanation of the assertion.
 - [2] If both the assertion and reason are true but the reason is not a correct explanation of the assertion.
 - [3] If the assertion is true but the reason is false.
 - [4] If both the assertion and reason are false.
176. **A:** Adenoma is a sarcoma.
R: Adenoma is located in the adipose tissue.
177. **A:** Tetanus can be diagnosed by Mantoux test.
R: In Mantoux test, the dye gives colour to tetanospasmin.
178. **A:** The type of immunoglobulin transported through placenta is Ig G.
R: Ig G is the largest immunoglobulin in humans.
179. **A:** Hardy Weinberg principle says that allele frequencies in a population are stable and is constant from generation to generation.
R: Five factors are known to affect Hardy-Weinberg equilibrium.
180. **A:** The first organisms that invaded land were plants.
R: Plants were not widespread on land when animals invaded land.



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