AIIMS Question Paper 2017

Duration : 3 : 30 Hrs

Exam AIIMS		Total Questions 200			
Marks for Correct Answer 1	Negative Marks 0.33	Physics 60	Chemistry 60	Biology 60	General Knowledge 20

Physics

1. A bus starts from rest and moves with constant acceleration $8 \mathrm{ms}^{-2}$. At the same time, a car travelling with a constant velocity 16 m/s overtakes and passes the bus. After how much time and at what distance, the bus overtakes the car?
(a) t = 4 s, d = 64 m
(b) t = 5 s, d = 72 m
(c) t = 8 s, d = 58 m
(d) None of the above

Correct: a

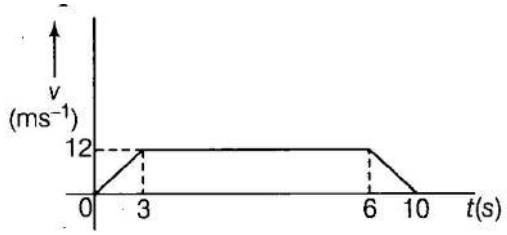
2. Consider a planet in some solar system which has a mass double the mass of the earth and density equal to the average density of the earth. An object weighing Won the earth will weigh
(a) W
(b) 2W
(c) W/2
(d) $2^{1/3}W$ at the planet

Correct: d

3. An interference pattern is observed by Young's double slit experiment. If now the separation between coherent source is halved and the distance of screen from coherent sources is doubled, then now fringe width
(a) becomes double
(b) becomes one-fourth
(c) remains same
(d) becomes four times

Correct: d

4. A lift is moving in upward direction. The total mass of the lift and the passengers is 1600 kg. The variation of the velocity of the lift is as shown in the figure. The tension in the rope at t = 8 s will be



(a) 11200 N
(b) 16000 N
(c) 48000 N
(d) 12000 N

Correct: a

5. A series R-C circuit is connected to AC voltage source. Consider two cases; (A) When C is without a dielectric medium and (B) When C is filled with dielectric of constant 4. The current I_R through the resistor and voltage Vc across the capacitor are compared in two cases. Which of the following is true?
(a) $I_R^A > I_R^B$
(b) $I_R^A < I_R^B$
(c) $V_C^A < V_C^B$
(d) None of these

Correct: b

6. In the following question, a Statement of assertion is given followed by a corresponding Statement of reason.
Assertion (A) Hydrogen atom consists of only one electron but its emission spectrum has many lines.
Reason (R) Only Lyman series is found in the absorption spectrum of hydrogen atom whereas in the emission spectrum, all the series are found.
Mark the correct answer.
(a) Both assertion and reason are true and reason is the correct explanation of assertion
(b) Both assertion and reason are true but reason is not the correct explanation of assertion
(c) Assertion is true but reason is false
(d) Both assertion and reason are false

Correct: b

7. A force $\mathbf{F} = -k(y\hat{\mathbf{i}} + x\hat{\mathbf{j}})$ where k is a positive constant, acts on a particle moving in the xy plane. Starting from the origin, the particle is taken along the positive x-axis to the point (a,0) and then parallel to the y-axis to the point (a, a). The total work done by the force on the particle is

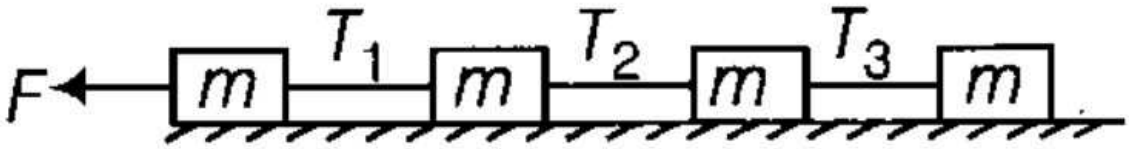
(a) $-2ka^2$
(b) $2ka^2$
(c) $-ka^2$
(d) ka^2

Correct: c

8. The escape velocity from the earth is about 11kms^{-1}. The escape velocity from a planet having twice the radius and the same mean density as the earth is
(a) 22kms^{-1}
(b) 22kms^{-1}
(c) 22kms^{-1}
(d) 22kms^{-1}

Correct: a

9. Four blocks of same mass connected by strings are pulled by a force F on a smooth horizontal surface as shown in figure. The tension T_1, T_2 and T_3- will be



(a) $T_1 = \frac{1}{4}F, T_2 = \frac{3}{2}F, T_3 = \frac{1}{4}F$
(b) $T_1 = \frac{1}{4}F, T_2 = \frac{1}{2}F, T_3 = \frac{1}{2}F$
(c) $T_1 = \frac{3}{4}F, T_2 = \frac{1}{2}F, T_{3.} = \frac{1}{4}F$
(d) $T_1 = \frac{3}{4}F, T_2 = \frac{1}{2}F, T_3 = \frac{1}{2}F$

Correct: c

10. What is the maximum height attained by a body projected with a velocity equal to one-third of the escape velocity from the surface of the earth? (Radius of the earth=R)
(a) R/2
(b) R/3
(c) R/5
(d) R/8

Correct: d

11. A particle having a charge 10 mC is held fixed on a horizontal surface. A block of mass 80 g and having charge stays in equilibrium on the surface at a distance of 3 cm from the first charge. The coefficient of friction between the surface and the block is u = 0.5. Find the range within which the charge on the block may lie
(a) $-4 \times 10^{-9}\text{C}$ to $4 \times 10^{-9}\text{C}$

(b) $-2 \times 10^{-9}\mathrm{C}$ to $2 \times 10^{-9}\mathrm{C}$
(c) $-4 \times 10^{-19}\mathrm{C}$ to $4 \times 10^{-19}\mathrm{C}$
(d) $-2 \times 10^{-19}\mathrm{C}$ to $2 \times 10^{-19}\mathrm{C}$

Correct: a

12. A tube of sugar solution 20 cm long is placed between crossed nicols and illuminated with light of wavelength 6×10^{-5} cm. If the optical rotation produced is 13° and the specific rotation is 65°, determine the strength of the solution.
(a) 0.1 g/cc
(b) 0.2 g/cc
(c) 0.9 g/cc
(d) 1.0 g/cc

Correct: a

13. A stone is moved in a horizontal circle of radius 4m by means of a string at a height of 20m above the ground. The string breaks and the particle flies off horizontally, striking the ground 10 m away. The centripetal acceleration during circular motion is
(a) $6.25ms^{-2}$
(b) $12.5ms^{-2}$
(c) $18.75ms^{-2}$
(d) $25ms^{-2}$

Correct: a

14. Two satellites S_1 and S_2 are revolving round a
planet in coplanar circular orbits of radii r_1 and r_2 in the same direction, respectively. Their respective periods of revolution are 1h and 8h. The radius of orbit of satellite S_1 is equal to $10^4\mathrm{km}$. What will be their relative speed (in km/h) when they are closest?
(a) $\pi/2 \times 10^4$
(b) $\pi \times 10^4$
(c) $2\pi \times 10^4$
(d) $4\pi \times 10^4$

Correct: b

15. A tube of length L is filled completely with an incompressible liquid of mass M and closed at both the ends. The tube is then rotated in horizontal plane about one of its ends with a uniform angular velocity w. The force exerted by the liquid at the other end is
(a) $\frac{1}{2}M\omega^2L^2$
(b) $M\omega^2L$
(c) $\frac{1}{4}M\omega^2L$
(d) $\frac{1}{2}M\omega^2L$

Correct: d

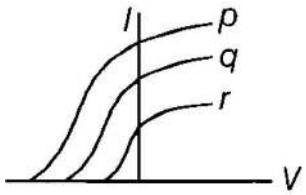
16. The coefficient of cubical expansion of mercury is 0.00018 /°C and that of brass 0.00006 /°C. If a barometer having a brass scale were to read 74.5 cm at 30°C, find the true barometric height at 0°C. The scale is supposed to be correct at 15°C.
(a) 74.122 cm
(b) 79.152 cm
(c) 42.161 cm
(d) 142.39 cm

Correct: a

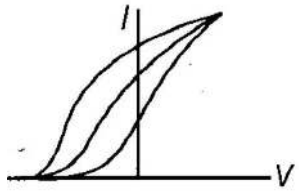
17. The particle of mass m is moving in a circular path of constant radius r such that its centripetal acceleration a_c is varying with time t as $a_c = k^2rt^2$, where k is a constant.
The power delivered to particle by the forces acting on it is
(a) $2\pi mk^2r^2t$
(b) mk^2r^2t
(c) $1/3mk^4r^2t^5$
(d) zero

Correct: b

18. Photoelectric effect experiments are performed using three different metal plates p, q and r having work functions $Q_s = 20e\text{V}$, $Q_9 = 2.5\text{eV}$ and $Q_r = 3.0\text{eV}$ are respectively. A light beam containing wavelength of 550 nm, 450 nm and 350 nm with equal intensities illuminates each of the plates. The correct I-V graph for the experiment is (take h_c = 1240 eV nm)



(a)



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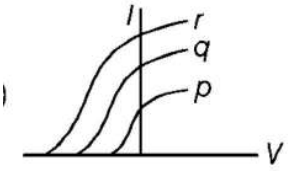
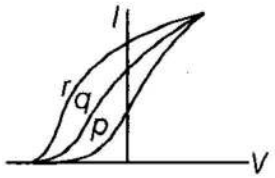


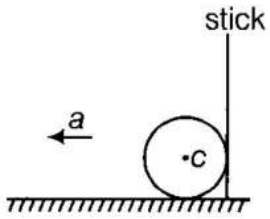
(c)



(d)

Correct: a

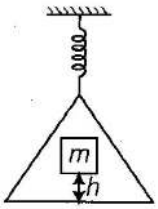
19. A boy is pushing a ring of mass 3 kg and radius 0.6 m with a stick as shown in figure. The stick applies a force of 3N on the ring and rolls it without slipping with an acceleration of $0.4\mathrm{m/s^2}$. The coefficient of friction between the ground and the ring is large enough that rolling always occurs and the coefficient of friction between the stick and the ring is F/10. The value of F is



(a) 2 N
(b) 4 N
(c) 6 N
(d) 3 N

Correct: a

20. A load of mass m falls from a height h on the scale pan hung from a spring as shown. If the spring constant is k and mass of the scale pan is zero and the mass m does not bounce relative to the pan, then the amplitude of vibration is



(a) mg
(b) $\frac{mg}{k}\sqrt{1+\frac{2hk}{mg}}$
(c) $\frac{mg}{k}+\frac{mg}{k}\sqrt{\frac{1+2hk}{mg}}$
(d) None of the above

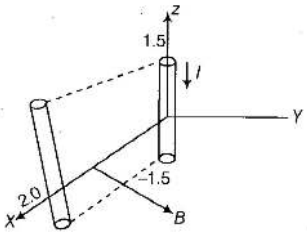
Correct: b

21. A simple pendulum is set up in a trolly which moves to the right with an acceleration a on a horizontal plane. Then, the thread of the pendulum in the mean position makes an angle with the vertical

(a) $\tan^{-1}\frac{a}{g}$ in the forward direction
(b) $\tan^{-1}\frac{a}{g}$ in the backward direction
(c) $\tan^{-1}\frac{g}{a}$ in the backward direction
(d) $\tan^{-1}\frac{g}{a}$ in the forward direction

Correct: b

22. A conductor lies along the z-axis at $-1.5 \leq Z \leq 1.5\text{m}$ and carries a fixed current of 10.0 A in $-a_z$ direction as shown in figure for a field $B = 3 \times 10^{-4} e^{-0.2x} a_y T$, the total power required to move the conductor at constant speed to x = 2.0 m, y = 0 m in 5×10^{-3}s is (Assume parallel motion along the x-axis)



(a) 1.57 W
(b) 2.97 W
(c) 4.45 W
(d) 9.87 W

Correct: b

23. A rod of length 10 cm lies along the principal axis of a concave mirror of focal length 10 cm in such a way that the end closer to the pole is 20 cm away from it. Find the length of the image.
(a) 2 cm
(b) 4 cm
(c) 5 cm
(d) 6 cm

Correct: c

24. A parallel plate capacitor has an electric field of 10^5Vm^{-1} between the plates. If the charge on the capacitor plates is $1\mu\text{C}$, the force on each capacitor plate is
(a) 0.5 N
(b) 0.05 N
(c) 0.005 N
(d) None of these

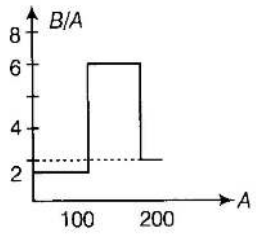
Correct: b

25. A parallel plate capacitor of capacitance C is connected to a battery and is charged to a potential difference V.

Another capacitor of capacitance 2C is connected to another battery and is charged to potential difference 2V. The charging batteries are now disconnected and the capacitors are connected in parallel to each other in such a way that the positive terminal of one is connected to the negative terminal of the other. The final energy of the configuration is
(a) zero
(b) $\frac{25CV^2}{6}$
(c) $\frac{3CV^2}{2}$
(d) $\frac{9CV^2}{2}$

Correct: c

26. Assume that the nuclear binding energy per nuclear (BA) versus mass number (A) as shown in the figure. Use this plot to choose the correct choice (s) given below.



(a) Fusion of two nuclei with mass number lying in the range of 51
The change in internal energy of the gas during the transition is
(a) 20 kJ
(b) - 12 kJ
(c) - 20 kJ
(d) 20 J

Correct: c

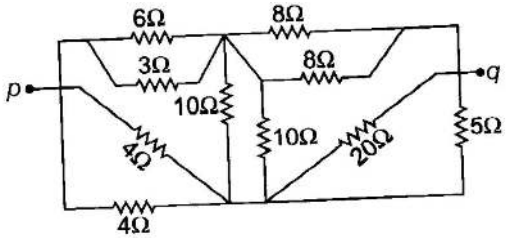
30. A nuclear explosive is designed to deliver 1 MW power in the form of heat energy. If the explosion is designed with nuclear fuel consisting of U^{235} to run a reactor at this power level for one year, then the amount of fuel needed is (Given energy per fission is 200 MeV)
(a) 1 kg
(b) 0.01 kg
(c) 3.84 kg
(d) 0.384 kg

Correct:

31. If the intensities of the two interfering beams in Young's double-slit experiment are I_1 and I_2, then the contrast between the maximum and minimum intensities are good when
(a) $|I_1 - l_2|$ is large
(b) $|l_1 - l_2|$ is small
(c) Either l_1 or l_2 is zero
(d) $l_1 = l_2$

Correct: d

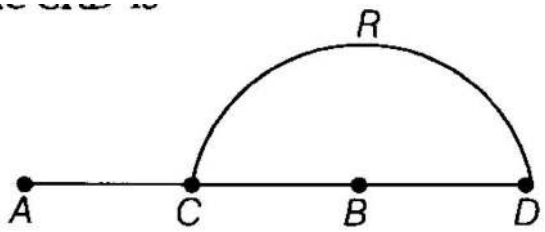
32. The effective resistance between p and q in given figure is



(a) 2Ω
(b) 3Ω
(c) 5Ω
(d) 6Ω

Correct: b

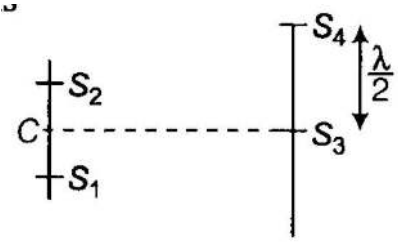
33. Charges +q and −q are placed at points A and B respectively which are a distance 2L apart, C is the mid-point between A and B. The work done in moving a charge +Q along the semicircle CRD is



(a) $\frac{qQ}{4\pi\varepsilon_0 L}$
(b) $\frac{qQ}{2\pi\varepsilon_0 L}$
(c) $\frac{qQ}{6\pi\varepsilon_0 L}$
(d) $\frac{-qQ}{6\pi\varepsilon_0 L}$

Correct: d

34. In the given figure, C is middle point of line S_1S_2. A monochromatic light of wavelength a is incident on slits. The ratio of intensities of S_3 and S_4 is



(a) 0
(b) ∞
(c) 4 : 1
(d) 1 : 4

Correct: b

35. A simple telescope, consisting of an objective of focal length 60 cm and a single eye lens of focal length 5 cm is focused on a distant object in such a way that parallel rays emerge from the eye lens. If the object subtends an angle of 2° at the objective, the angular width of the image is
(a) 10°
(b) 24°
(c) 50°
(d) $\frac{1}{6}^{\circ}$

Correct: b

36. A specimen of silicon is to be made P-type semiconductor for this one atom of indium, on an average, is doped in 5×10^{7} silicon atoms. If the number density of silicon is 5×10^{22} atom/m^3 then the number of acceptor atoms per cm^3 will be
(a) 2.5×10^{30}
(b) 1.0×10^{13}
(c) 1.0×10^{15}
(d) 2.5×10^{36}

Correct: c

37. The angle of dip, if dip needle oscillating in vertical plane makes 40 oscillations per min in a magnetic meridian and 30 oscillations per
minute in vertical plane at right angle to the magnetic meridian is
(a) $\theta = \sin^{-1}(0.5625)$
(b) $\theta = \sin^{-1}(0.325)$
(c) $\theta = \sin^{-1}(0.425)$
(d) $\theta = \sin^{-1}(0.235)$

Correct: a

38. A semiconductor has an electron concentration of 8×10^{13} per cm^3 and a hole concentration of 5×10^{12} per cm^3. The electron mobility is 25000 $\text{cm}^2\text{V}^{-1}\text{s}^{-1}-$ and the hole mobility is $100\text{cm}^2\text{V}^{-1}\text{s}^{-1}$. Then,
(a) the semiconductor is n-type
(b) the conductivity is 320 m mho cm^{-1}
(c) Both (a) and (b)
(d) None of the above

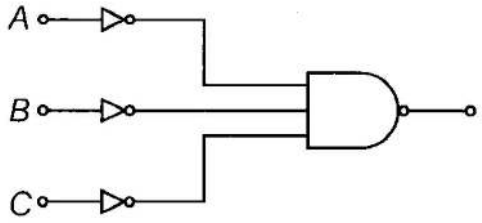
Correct: c

39. The Young's double slit experiment is performed with blue and green light of wavelengths 4360 Å and 5460 Å respectively. If x is the distance of 4th maxima from the central one, then

(a) $x_{\text{blue}} = x_{\text{green}}$
(b) $x_{\text{blue}} > x_{\text{green}}$
(c) $x_{\text{blue}} < x_{\text{green}}$
(d) $x_{\text{blue}} / x_{\text{green}}$

Correct: c

40. A proper combination of 3 NOT and 1 NAND gates is shown. If A = 0, B =1, C = 1, then the output of this combination is



(a) 1
(b) 0
(c) Not predictable
(d) None of these

Correct: a

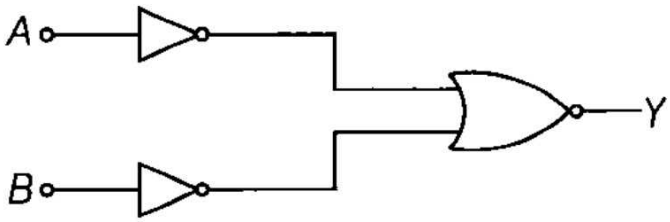
41. Read the Assertion and Reason carefully to mark the correct option from those given below
Assertion: For looping a vertical loop of radius, r the minimum velocity at lowest point should be $\sqrt{5gr}$.
Reason: In this event the velocity at the highest point will be zero.
(a) Both assertion and reason are true and reason is the correct explanation of assertion
(b) Both assertion and reason are true but reason is not the correct explanation of assertion
(c) Assertion is true but reason is false.
(d) Both assertion and reason are false.

Correct: c

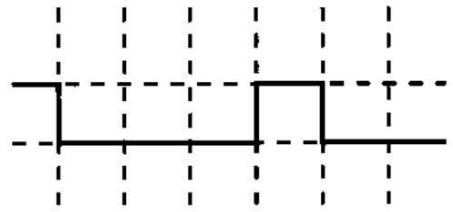
42. Read the Assertion and Reason carefully to mark the correct option from those given below
Assertion: A beam of charged particles is employed in the treatment of cancer.
Reason: Charged particles on passing through a material medium lose their energy by causing ionization of the atoms along their path.
(a) Both assertion and reason are true and reason is the correct explanation of assertion
(b) Both assertion and reason are true but reason is not the correct explanation of assertion
(c) Assertion is true but reason is false.
(d) Both assertion and reason are false.

Correct: a

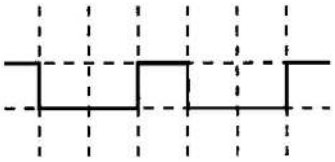
43. The logic circuit as shown below has the input waveforms A and B as shown. Pick out the correct output waveform.



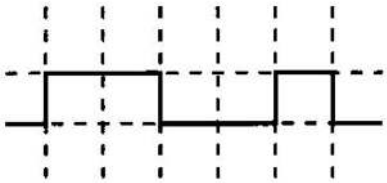
(a)



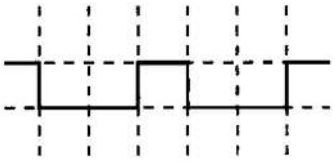
(b)



(c)



(d)



Correct: a

44. Read the Assertion and Reason carefully to mark the correct option from those given below
Assertion: The total kinetic energy of a rolling solid sphere is the sum of translational and rotational kinetic energies.
Reason: for all solid bodies, total kinetic energy is always twice of translational kinetic energy.
(a) Both assertion and reason are true and reason is the correct explanation of assertion
(b) Both assertion and reason are true but reason is not the correct explanation of assertion
(c) Assertion is true but reason is false.
(d) Both assertion and reason are false.

Correct: c

45. Read the Assertion and Reason carefully to mark the correct option from those given below
Assertion: In He-Ne laser, population inversion takes place between energy levels of neon atoms.
Reason: Helium atoms have a metastable energy level.
(a) Both assertion and reason are true and reason is the correct explanation of assertion
(b) Both assertion and reason are true but reason is not the correct explanation of assertion
(c) Assertion is true but reason is false.
(d) Both assertion and reason are false.

Correct: b

46. In the following question, a Statement of assertion is given followed by a corresponding Statement of reason.
Assertion (A) The positively charged nucleus of an atom has a radius of almost $10^{-15}\mathrm{m}$
Reason (R) In α particle scattering experiment, the distance of closest approach for α - particles is = $10^{-15}\mathrm{m}$.
Mark the correct answer.
(a) Both assertion and reason are true and reason is the correct explanation of assertion
(b) Both assertion and reason are true but reason is not the correct explanation of assertion
(c) Assertion is true but reason is false
(d) Both assertion and reason are false

Correct: a

47. Read the Assertion and Reason carefully to mark the correct option from those given below
Assertion: The average value of alternating emf is 63.39% of the peak value.
Reason: The rms value of alternating emf is 70.72% of peak value.
(a) Both assertion and reason are true and reason is the correct explanation of assertion
(b) Both assertion and reason are true but reason is not the correct explanation of assertion
(c) Assertion is true but reason is false.
(d) Both assertion and reason are false.

Correct: b

48. Read the Assertion and Reason carefully to mark the correct option from those given below
Assertion: Photoelectric effect can take place only with an electron bound in the atom.
Reason: Electron is a fermion whereas proton is a boson.
(a) Both assertion and reason are true and reason is the correct explanation of assertion
(b) Both assertion and reason are true but reason is not the correct explanation of assertion
(c) Assertion is true but reason is false.
(d) Both assertion and reason are false.

Correct: c

49. In the following question, a Statement of assertion is given followed by a corresponding Statement of reason.
Assertion (A) In an adiabatic process change in internal energy of a gas in equal to work done on or by the gas in the process.
Reason (R) Temperature of gas remains constant in an adiabatic process.
Mark the correct answer.
(a) Both assertion and reason are true and reason is the correct explanation of assertion
(b) Both assertion and reason are true but reason is not the correct explanation of assertion
(c) Assertion is true but reason is false
(d) Both assertion and reason are false

Correct: c

50. Read the Assertion and Reason carefully to mark the correct option from those given below
Assertion: in adiabatic expansion the product of p and V always decreases.
Reason: in adiabatic expansion process, work is done by the gas at the cost of internal energy of gas.
(a) Both assertion and reason are true and reason is the correct explanation of assertion
(b) Both assertion and reason are true but reason is not the correct explanation of assertion
(c) Assertion is true but reason is false.
(d) Both assertion and reason are false.

Correct: b

51. Read the Assertion and Reason carefully to mark the correct option from those given below
Assertion: Cyclotron does not accelerate electron.
Reason: Mass of the electron is very small.
(a) Both assertion and reason are true and reason is the correct explanation of assertion
(b) Both assertion and reason are true but reason is not the correct explanation of assertion
(c) Assertion is true but reason is false.
(d) Both assertion and reason are false.

Correct: a

52. In the following question, a Statement of assertion is given followed by a corresponding Statement of reason.
Assertion (A) The phenomenon of X-ray production is basically inverse of photoelectric effect.
Reason (R) X-rays are electromagnetic waves.
Mark the correct answer.
(a) Both assertion and reason are true and reason is the correct explanation of assertion
(b) Both assertion and reason are true but reason is not the correct explanation of assertion
(c) Assertion is true but reason is false

(d) Both assertion and reason are false

Correct: b

53. In the following question, a Statement of assertion is given followed by a corresponding Statement of reason.
Assertion (A) The magnetic field at the ends of a very long current carrying solenoid is half of that at the centre.
Reason (R) The focal length of lens does not depends on colour of light used.
Mark the correct answer.
(a) Both assertion and reason are true and reason is the correct explanation of assertion
(b) Both assertion and reason are true but reason is not the correct explanation of assertion
(c) Assertion is true but reason is false
(d) Both assertion and reason are false

Correct: b

54. Read the Assertion and Reason carefully to mark the correct option from those given below
Assertion: The magnetism of magnet is due to the spin motion of electrons. Reason: Dipole moment of electron is smaller than that due to orbit motion around nucleus.
(a) Both assertion and reason are true and reason is the correct explanation of assertion
(b) Both assertion and reason are true but reason is not the correct explanation of assertion
(c) Assertion is true but reason is false.
(d) Both assertion and reason are false.

Correct: c

55. In the following question, a Statement of assertion is given followed by a corresponding Statement of reason.
Assertion (A) Electric conduction in gases is possible at normal pressure.
Reason (R) The electric conduction in gases depends only upon the potential difference between the electrodes.
Mark the correct answer.
(a) Both assertion and reason are true and reason is the correct explanation of assertion
(b) Both assertion and reason are true but reason is not the correct explanation of assertion
(c) Assertion is true but reason is false
(d) Both assertion and reason are false

Correct: d

56. Read the Assertion and Reason carefully to mark the correct option from those given below
Assertion: The molecules of a monatomic gas has three degrees of freedom.
Reason: The molecules of diatomic gas has five degrees of freedom.
(a) Both assertion and reason are true and reason is the correct explanation of assertion

(b) Both assertion and reason are true but reason is not the correct explanation of assertion
(c) Assertion is true but reason is false.
(d) Both assertion and reason are false.

Correct: b

57. Read the Assertion and Reason carefully to mark the correct option from those given below
Assertion: Corpuscular theory fails in explaining the velocities of light in air and water.
Reason: According to corpuscular theory is that light should travel faster in denser medium than rarer media.
(a) Both assertion and reason are true and reason is the correct explanation of assertion
(b) Both assertion and reason are true but reason is not the correct explanation of assertion
(c) Assertion is true but reason is false.
(d) Both assertion and reason are false.

Correct: a

58. Read the Assertion and Reason carefully to mark the correct option from those given below
Assertion: In a-decay atomic number of daughter nucleus reduces by 2 units from the parent nucleus.
Reason: An Q-particle carries four units of mass.
(a) Both assertion and reason are true and reason is the correct explanation of assertion
(b) Both assertion and reason are true but reason is not the correct explanation of assertion
(c) Assertion is true but reason is false.
(d) Both assertion and reason are false.

Correct: a

59. In the following question, a Statement of assertion is given followed by a corresponding Statement of reason.
Assertion (A) The focal length of lens does not change, when red light is replaced by blue light.
Reason (R) The focal length of lens does not depends on the colour of the light used.
Mark the correct answer.
(a) Both assertion and reason are true and reason is the correct explanation of assertion
(b) Both assertion and reason are true but reason is not the correct explanation of assertion
(c) Assertion is true but reason is false
(d) Both assertion and reason are false

Correct: d

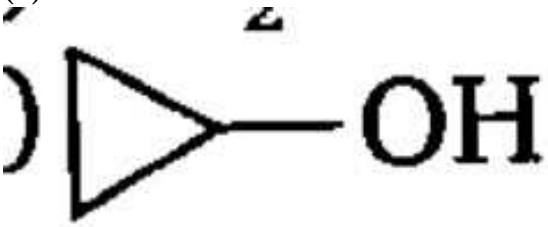
60. Read the Assertion and Reason carefully to mark the correct option from those given below
Assertion: Molar heat capacity cannot be defined for isothermal process.

Reason: In isothermal process P-V versus T graph is a dot.
(a) Both assertion and reason are true and reason is the correct explanation of assertion
(b) Both assertion and reason are true but reason is not the correct explanation of assertion
(c) Assertion is true but reason is false.
(d) Both assertion and reason are false.

Correct: b

Chemistry

61. A primary alcohol with a vapour density of 29 contained C = 62.1%, H = 10.3% and reacted with bromine to give a derivative which contains C = 16.5%, H = 2.7% and Bą = 73.4%. The structural formula of the compound is
(a) $CH_3CH_2CH_2OH$
(b) $CH_3CH = CHOH$
(c) $CH_2 = CH - CH_2OH$
(d)



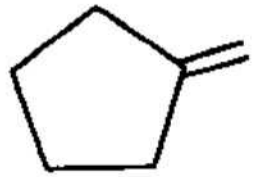
Correct: c

62. Total number of optically active forms in molecules with 'n' number of asymmetric C-atoms and which are not divisible into two equal halves is
(a) 2^n
(b) 2^{n-1}
(c) $2^{\frac{(n-1)}{2}}$
(d) $2^{\left(\frac{n}{2}-1\right)}$

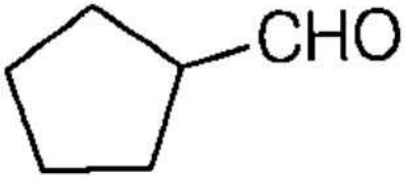
Correct: a

63. In which of the following sets the order of boiling points are incorrect?
(a) Xe > Ar > Ne
(b) HF > HCI > HBr
(c) $H_2O > H_2Se > H_2S$
(d) $C_3H_6 > C_2H_6 > CH_4$

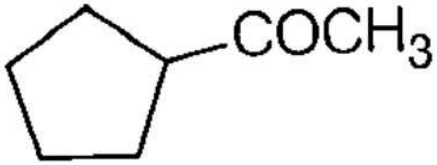
Correct: b

64.  on ozonolysis gives

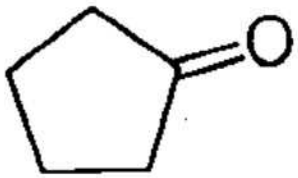
(a)



(b)



(c)



(d) None of these

Correct: c

65. An allylide on hydrolysis gives allylene. The alkaline the earth metal cation of allyhide dissolves in dry ether in the presence of alkyl halide to form Grignard reagent. The allylide is

(a) $\mathrm{Mg_2C_2}$

(b) $\mathrm{Ca_2C_3}$

(c) $\mathrm{MnC_2}$

(d) MgB_2

Correct: a

66. For the reaction

$\mathrm{H_2}(g) + \mathrm{CO_2(g)} \rightleftharpoons \mathrm{CO}(g) + \mathrm{H_2O}(g)$, If the initial concentration of $[\mathrm{H_2}] = [\mathrm{CO_2}]$ and x mol/L of hydrogen is consumed at equilibrium, the correct expression of k_p is

(a) $\frac{x^2}{(1-x)^2}$

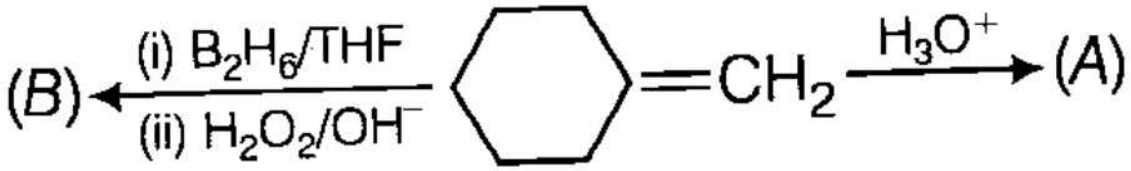
(b) $\frac{x^2}{(2+x)^2}$

(c) $\frac{x^2}{1-x^3}$

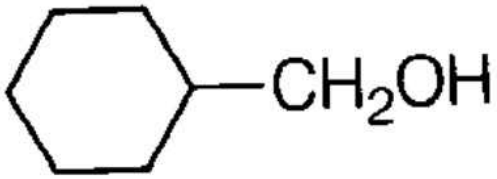
(d) $\frac{(1+x)^2}{(1-x)^2}$

Correct: a

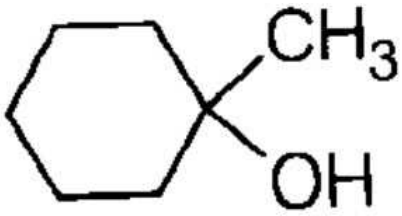
67. In the following reaction,



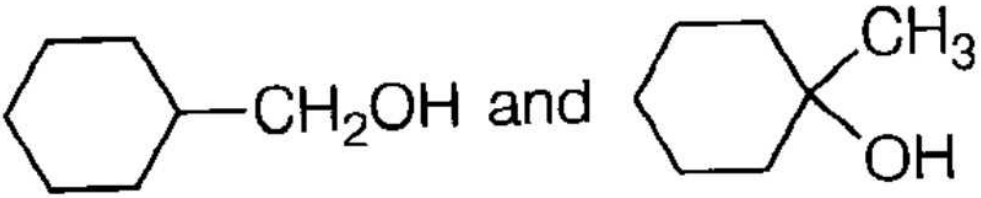
(A) and (B) are respectively, are



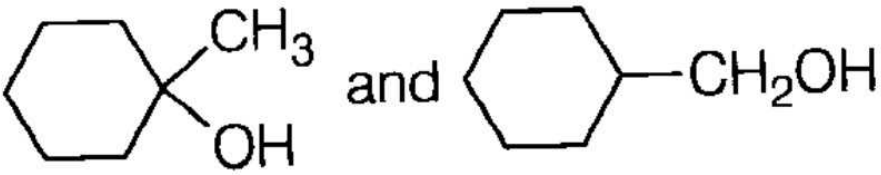
(a) Both are



(b) Both are



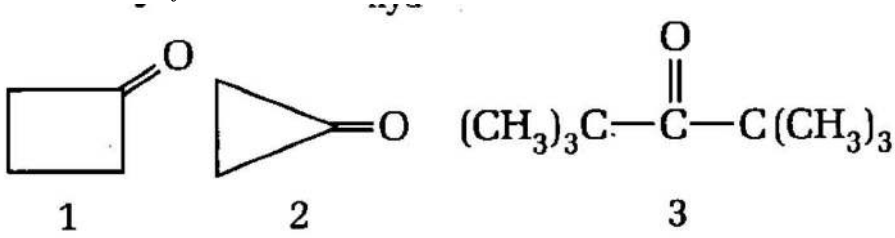
(c)



(d)

Correct: d

68. Arrange the following in the order of increasing value of the equilibrium constant for hydration, K_{byd} (smallest value first)



(a) 2 <1 <3
(b) 3 < 1<2
(c) 1 <2<3
(d) 2 <3 <1

Correct: b

69. For the reaction,

$$Cr_2O_7^{2-} \xrightarrow{pH=x} CrO_4^{2-} \xrightarrow{pH=y} Cr_2O_7^{2-}$$

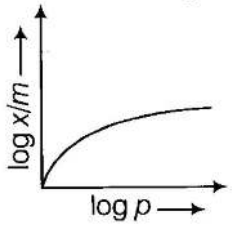
(a) 4 and 5
(b) 4 and 8
(c) 8 and 4
(d) 8 and 9

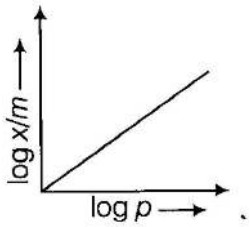
Correct: c

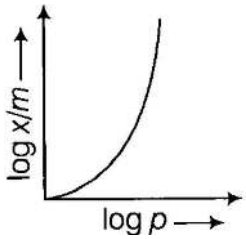
70. The mass of potassium dichromate crystals required to oxidise 750 cm^3 of 0.6 M Mohr's salt solution is (Given, molar mass, potassium dichromate = 294, Mohr's salt = 392)
(a) 0.39 g
(b) 0.37 g
(c) 22.05 g
(d) 2.2 g

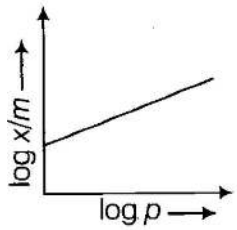
Correct: c

71. Which of the following curve best explains the Freundlich adsorption isotherm?

(a)


(b)


(c)


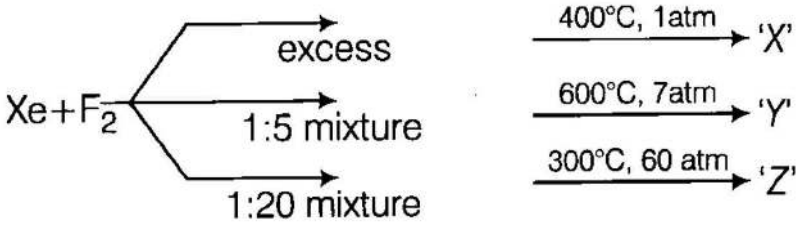
(d) 

Correct: d

72. In a gas lighter, mechanical energy is converted into electrical energy by using crystals of barium titanate. Barium titanate is
(a) piezoelectric but not ferroelectric
(b) both piezoelectric as well as ferroelectric
(c) ferroelectric
(d) neither ferroelectric nor piezoelectric

Correct: b

73. Consider the following reactions



Here, X, Y and Z respectively, are
(a) XeF_2, XeF_6, XeF_4
(b) XeF_2, XeF_4, XeF_6
(c) XeF_4, XeF_2, XeF_6
(d) XeF_6, XeF_4, XeF_2

Correct: b

74. In the equation,

$$4M + 8CN^- + 2H_2O + O_2 \longrightarrow 4[M(CN)_2]^- + 4OH^-$$

Identify the metal (M)
(a) Au
(b) Fe
(c) Zn
(d) Cu

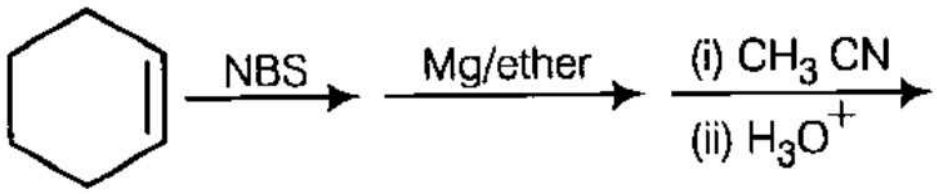
Correct: a

75. When two ice cubes are pressed over each other, they unite to form one cube. Which of the following forces is responsible to hold them together?

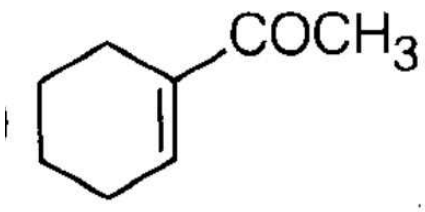
(a) van der Waals' forces
(b) Hydrogen bond formation
(c) Covalent attraction
(d) lonic interaction

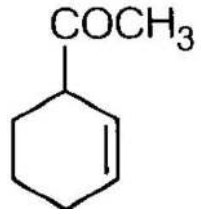
Correct: b

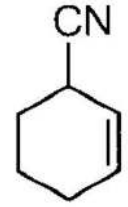
76. Consider the following equation

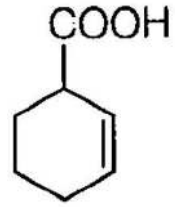


The end product for the given sequence of reaction is

(a)


(b)


(c)


(d)


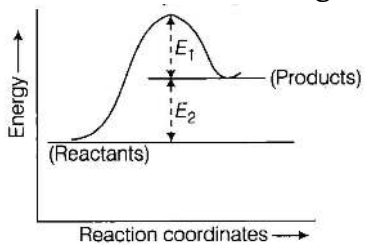
Correct: b

77. For the reaction,
$2NO + Br_2 \longrightarrow 2NOBr$
the following mechanism has been given
$NO + Br_2 \xrightarrow{Fast} NOBr_2$
$NOBr_2 + NO \xrightarrow{Slow} 2NOBr$

Hence, rate law is
(a) $k[\mathrm{NO}]^2\ [\mathrm{B_{r_2}}]$
(b) $k[\mathrm{NO}]\ [\mathrm{Br_2}]$
(c) $k\ [\mathrm{NOBr_2}]\ [\mathrm{NO}]$
(d) $k[\mathrm{NO}][\mathrm{Br_2}]^2$

Correct: a

78. Consider the below given figure.



The correct option for the above presentation is
(a) activation energy of forward reaction is $E_1 + E_2$ and product is less stable than reactant
(b) activation energy of forward reaction is $E_1 + E_2$ and product is more stable than reactant
(c) activation energy for both forward and backward reaction is $reactant$ and reactant is more stable than product
(d) activation energy for the backward direction is E_1 and product is more stable than reactant

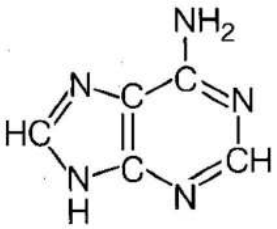
Correct: a

79. Arrange the elements Se, Cl and S in the increasing order of ionisation energy
(a) Se>S>Cl
(b) SeCI
(d) None of the above

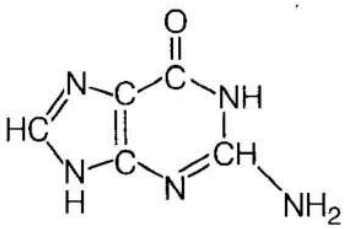
Correct: b

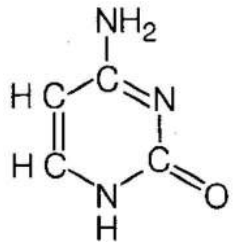
80. The nitrogen base which is present in RNA and absent in DNA is

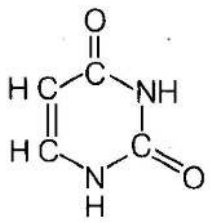
(a)



(b)



(c) 

(d) 

Correct: d

81. The polymer used as packaging material in orthopaedic devices and for controlled dry release is
(a) Kevlar
(b) PHBV
(c) Glyptal
(d) Bakelite

Correct: b

82. 3.5g of a mixture of NaOH and KOH were dissolved and made up to 250 mL. 25 mL of this solution were completely neutralised by 17 mL of (N/2) HCl solution. Then, the percentage of KOH in mixture is
(a) 80
(b) 10
(c) 34
(d) 56

Correct: b

83. Which of the following does not represent the correct order of the properties indicated?
(a) $\mathrm{O}^{-2} > \mathrm{Ne} > \mathrm{Mg}^{2+} > \mathrm{Al}^{3+}(\mathrm{Size})$
(b) $\mathrm{N}^{3-} > \mathrm{O}^{2-} < \mathrm{F}^{-} < \mathrm{Na}^{+}(\text{ Nuclear charge})$
(c) $\mathrm{Li} > \mathrm{Be} > \mathrm{B} > \mathrm{C}(\text{ Electron gain enthalpy })$
(d) $\mathrm{Li} < \mathrm{Na} > \mathrm{K} > \mathrm{Cs}(\mathrm{E})_1$

Correct: a

84. In van der Waals' equation of state for non-ideal gas, the term that accounts for intermolecular force is
(a) (V = b)
(b) $(RT)^{-1}$

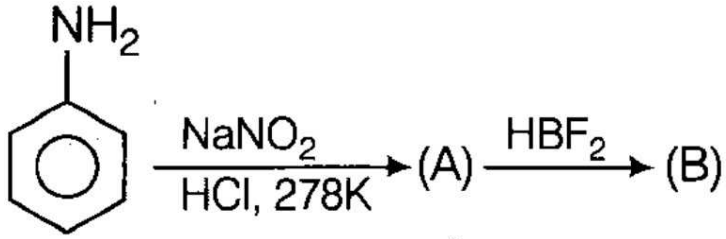
(c) $\left(p+\frac{a}{V^2}\right)$
(d) RT

Correct: c

85. Calculate the number of a and particles in the following change.
$^{235}_{92}\mathrm{U} \longrightarrow \frac{207}{\mathrm{a2}}\mathrm{Pb}$
α β
(a) 4 3
(b) 2 3
(c) 5 3
(d) 7 4

Correct: d

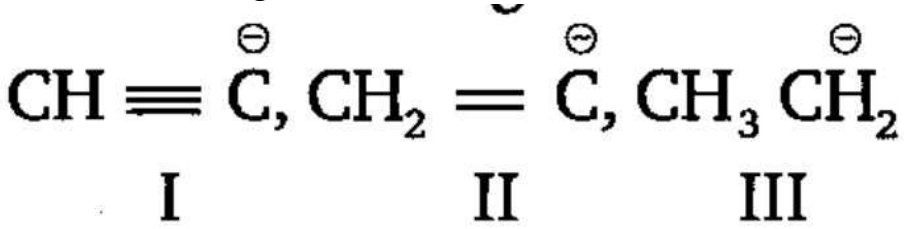
86. In the following reaction,



(a) Nitrobenzene and fluorobenzene
(b) Phenol and benzene
(c) Benzene diazonium chloride and fluorobenzene
(d) Nitrobenzene and chlorobenzene

Correct: c

87. The basic strength of



will be in order
(a) I < II < III
(b) II < III < I
(c) III < II < I
(d) III < I < II

Correct: a

88. Calculate the degree of hydrolysis and pH of 0.02M ammonium cyanide $(\mathrm{NH_4CN})$ at 298 K. $\mathbb{K}_a$ of $\mathrm{HCN}=4.99 \times 10^{-9}, \mathrm{K_b}$

$NH_4OH = 1.77 \times 10^{-5} J$
(a) 8.2
(b) 3.2
(c) 9.3
(d) 3.9

Correct: c

89. Which of the following has maximum number of unpaired d-electrons?
(a) Fe^{2+}
(b) Cu^{+}
(c) Zn
(d) Ni^{3+}

Correct: a

90. Determine $\Delta G^{\ominus}$ for the following reaction.
$CO(g) + \frac{1}{2}O_2(g) \longrightarrow CO_2(g)$
$\Delta H^0 = -282.84 kJ$ given , $S^{\ominus}CO_2 = 213.8$
$S^{\ominus}O_2 = 205.8 JK/mol$
(a) -157.33 kJ
(b) +201.033 kJ
(c) -257.033 kJ
(d) +257.033 kJ

Correct: c

91. We have three aqueous solutions of NaCl labelled as (A), (B) and (C) with concentration of 0.1 M, 0.01 M and 0.001 M, respectively. The value of van't Hoff factor of these solutions will be in order
(a) $i_A < i_B < i_C$
(b) $i_A > i_B > i_C$
(c) $i_A = i_B = i_c$
(d) $i_A < i_B > i_c$

Correct: c

92. Which transition in the hydrogen atomic spectrum will have the same wavelength as the Balmer transition (i.e. n = 4 to n=2) of He^{+} spectrum?
(a) n = 4 to n = 3
(b) n = 3 to n = 2
(c) n = 4 to n = 2
(d) n = 2 to n = 1

Correct: d

93. A sample of a mixture of $CaCl_2$ and Na_2CO_3 weighing 4.22 g was treated to precipitate all
the Ca as $CaCO_3$. This $CaCO_3$ is heated and quantitatively converted into 0.959 g of Cao. Calculate the percentage of $CaCl_2$ in the mixture. (Atomic mass of Ca = 40, 0 = 16, C = 12 and Cl = 35.5)
(a) 55.28%
(b) 37.3%
(C) 45.00%
(d) 49.01%

Correct: c

94. Among the following, the true statements are
I. PH_5 and $BiCl_5$ do not exist.
II. $p\pi - d\pi$ is present in SO_2
III. electrons travel with speed of light.
IV. SF_4 and CH_4 has same shape.
V. I^{3+} has bent shape.
(a) I, III
(b) I, II, V
(c) I, III, V
(d) I, II, IV

Correct: d

95. In the following questions a statement of Assertion (A) followed by a statement of Reason (R) is given. Choose the correct answer out of the following choice.
Assertion (A) At the end of electrolysis using platinum electrodes, an aqueous solution of $CuSO_4$ turns colourless.
Reason (R) During the electrolysis $CuSO_4$ changes to $Cu(OH)_2$ during electrolysis.
(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion
(c) Assertion is true but Reason is false
(d) Both Assertion and Reason are false

Correct: c

96. pH of solution of a strong acid is 5.0. What will be the pH of solution obtained after diluting the given solution to 100 times?
(a) 5.8
(b) 6.7
(c) 9.3
(d) 13

Correct: b

97. If at 298 K, the bond energies of C—H, C—C,C=C and H-H bonds are respectively 414, 347, 615 and 435 kJ mol^{-1}, the value of enthalpy change for the reaction; $\mathrm{H_2C = CH_2 + H_2(g) \longrightarrow H_3C - CH_3}(g)$ at 298 K, will be
(a) +250 kJ
(b) -250 kJ
(c) +125 kJ
(d) – 125 kJ

Correct: d

98. The number of coulombs required to reduce 12.3 g of nitrobenzene to aniline is
(a) 96500 C
(b) 5790 C
(c) 95700 C
(d) 57900 C

Correct: d

99. If 0.5 moles of $\mathrm{BaCl_2}$ is mixed with 0.2 moles of $\mathrm{Na_3PO_4}$, the maximum number of moles of $\mathrm{Ba_3(PO_4)_2}$ that can be formed is
(a) 0.7
(b) 0.5
(c) 0.03
(d) 0.10

Correct: d

100. For the reaction,
$A_2(g) + 4B_2(g) \rightleftharpoons 2AB_4(g), \Delta H < 0$,, the formation of AB, will be favoured at
(a) low temperature, high pressure
(b) high temperature, low pressure
(c) low temperature, low pressure
(d) high temperature, high pressure

Correct: a

101. In the following questions a statement of Assertion (A) followed by a statement of Reason (R) is given. Choose the correct answer out of the following choice.
Assertion (A) E_{cell} increases with increase in concentration of $\mathrm{Ag^+}$ ions.
Reason (R) E_{cell} has positive value.
(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
(c) Assertion is true but Reason is false
(d) Both Assertion and Reason are false

Correct: b

102. In the following questions a statement of Assertion (A) followed by a statement of Reason (R) is given. Choose the correct answer out of the following choice.
Assertion (A) Adding inert gas to dissociation equilibrium of N204 at constant temperature and pressure increases the dissociation.
Reason (R) Due to the addition of inert gas molar concentration of reactants and products decreases.
(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion
(c) Assertion is true but Reason is false
(d) Both Assertion and Reason are false

Correct: a

103. In the following questions a statement of Assertion (A) followed by a statement of Reason (R) is given. Choose the correct answer out of the following choice.
Assertion (A) Buffer solution are composed of strong acids and strong bases.
Reason (R) It maintain the pH to a constant value of 7.4.
(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
(c) Assertion is true but Reason is false
(d) Both Assertion and Reason are false

Correct: d

104. In the following questions a statement of Assertion (A) followed by a statement of Reason (R) is given. Choose the correct answer out of the following choice.
Assertion (Al Generally alkali and alkaline earth metals form superoxides.
Reason (R) There is a single bond between O and 0 in superoxides.
(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion
(c) Assertion is true but Reason is false
(d) Both Assertion and Reason are false

Correct: d

105. In the following questions a statement of Assertion (A) followed by a statement of Reason (R) is given. Choose the correct answer out of the following choice.
Assertion (A) Superoxides of alkali metals are paramagnetic in nature.
Reason (R) Superoxide contain the ion which has one unpaired electron.
(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) Assertion is true but Reason is false
(d) Both Assertion and Reason are false

Correct: a

106. In the following questions a statement of Assertion (A) followed by a statement of Reason (R) is given. Choose the correct answer out of the following choice.
Assertion (A) The ionisation of hydrogen sulphide in water is low in the presence of HCl.
Reason (R) H_2S is a weak acid.
(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
(c) Assertion is true but Reason is false
(d) Both Assertion and Reason are false

Correct: b

107. In the following questions a statement of Assertion (A) followed by a statement of Reason (R) is given. Choose the correct answer out of the following choice.
Assertion (A) Nitration of salicylic acid gives picric acid by elimination of CO_2 H group.
Reason (R) OH group is strongly activating group hence, S_E reaction takes place at o- and p-positions.
(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion
(c) Assertion is true but Reason is false
(d) Both Assertion and Reason are false

Correct: a

108. In the following questions a statement of Assertion (A) followed by a statement of Reason (R) is given. Choose the correct answer out of the following choice.
Assertion (A) Presence of nitro group facilitates nucleophilic substitution reactions in aryl halides.
Reason (R) The intermediate carbocation is stable due to presence of nitro group.
(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
(c) Assertion is true but Reason is false
(d) Both Assertion and Reason are false

Correct: a

109. In the following questions a statement of Assertion (A) followed by a statement of Reason (R) is given. Choose the correct answer out of the following choice.
Assertion (A) Glucose gives reddish brown precipitate with Fehling solution.
Reason (R) Reaction of glucose with Fehling solution gives CuO and gluconic acid.

(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
(c) Assertion is true but Reason is false
(d) Both Assertion and Reason are false

Correct: c

110. In the following questions a statement of Assertion (A) followed by a statement of Reason (R) is given. Choose the correct answer out of the following choice.
Assertion (A) Proteins, starch and rubber are lyophilic colloids.
Reason (R) They have strong interaction with the dispersion medium.
(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion
(c) Assertion is true but Reason is false
(d) Both Assertion and Reason are false

Correct: a

111. In the following questions a statement of Assertion (A) followed by a statement of Reason (R) is given. Choose the correct answer out of the following choice.
Assertion (A) Pb^{4+} compounds are stronger
oxidising agents than Sn^{4+} compounds.
Reason (R) The higher oxidation state for group-14 elements are more stable for the heavier members of the group due to inert pair effect.
(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
(c) Assertion is true but Reason is false
(d) Both Assertion and Reason are false

Correct: c

112. In the following questions a statement of Assertion (A) followed by a statement of Reason (R) is given. Choose the correct answer out of the following choice.
Assertion (A) Aryl halides undergo nucleophilic substitution with ease.
Reason (R) Hybridisation of C-atom attached to halide is sp^3-hybrid.
(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
(c) Assertion is true but Reason is false
(d) Both Assertion and Reason are false

Correct: d

113. In the following questions a statement of Assertion (A) followed by a statement of

Reason (R) is given. Choose the correct answer out of the following choice.
Assertion (A) Both vapour pressure and boiling point depends on surface area of the liquid.
Reason (R) Higher the surface area, lower be the boiling point whereas higher will be the vapour pressure.
(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
(c) Assertion is true but Reason is false
(d) Both Assertion and Reason are false

Correct: d

114. In the following questions a statement of Assertion (A) followed by a statement of Reason (R) is given. Choose the correct answer out of the following choice.
Assertion (A) Black body is an ideal body that emits and absorb radiations of all frequencies.
Reason (R) The frequency of radiations emitted by a body goes from lower frequency to higher frequency with an increase in temperature.
(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
(c) Assertion is true but Reason is false
(d) Both Assertion and Reason are false

Correct: b

115. In the following questions a statement of Assertion (A) followed by a statement of Reason (R) is given. Choose the correct answer out of the following choice.
Assertion (A) Acyl halide are more reactive than acid substance amide toward nucleophilic substitution.
Reason (R) X^- are better leaving group than NH_2
(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion
(c) Assertion is true but Reason is false
(d) Both Assertion and Reason are false

Correct: b

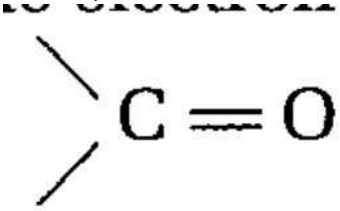
116. In the following questions a statement of Assertion (A) followed by a statement of Reason (R) is given. Choose the correct answer out of the following choice.
Assertion (A) ΔH_{mixing} and ΔV_{mixing} for non-ideal solution with + ve deviation is zero.
Reason (R) A-B interaction is more than that between A-A and B-B.
(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
(c) Assertion is true but Reason is false
(d) Both Assertion and Reason are false

Correct: d

117. In the following questions a statement of Assertion (A) followed by a statement of Reason (R) is given. Choose the correct answer out of the following choice.
Assertion (A) It is impossible to determine the exact position and exact momentum of an electron, simultaneously.
Reason (R) The path of an electron is clearly defined.
(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
(c) Assertion is true but Reason is false
(d) Both Assertion and Reason are false

Correct: c

118. In the following questions a statement of Assertion (A) followed by a statement of Reason (R) is given. Choose the correct answer out of the following choice.
Assertion (A) Benzaldehyde is more reactive than ethanol towards nucleophilic attack.
Reason (R) The overall effect of–1 and + R effect of phenyl group decreases the electron density on the carbon atom of



group in benzaldehyde.
(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion
(c) Assertion is true but Reason is false
(d) Both Assertion and Reason are false

Correct: a

119. In the following questions a statement of Assertion (A) followed by a statement of Reason (R) is given. Choose the correct answer out of the following choice.
Assertion (A) Complexes of MX_6 and MX_3L
type (X and L are unidentate) do not show geometrical isomerism.
Reason (R) Geometrical isomerism is not shown by complexes of coordinate number -6.
(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
(c) Assertion is true but Reason is false
(d) Both Assertion and Reason are false

Correct: c

120. In the following questions a statement of Assertion (A) followed by a statement of Reason (R) is given. Choose the correct answer out of the following choice.
Assertion (A) When acetamide reacts with NaOH and Br_2, methyl amine is formed.
Reason (R) The reaction occurs through intermediate formation of isocyanate.
(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion
(c) Assertion is true but Reason is false
(d) Both Assertion and Reason are false

Correct: a

Biology

121. In which among the following animals, retrogressive metamorphosis is found?
(a) Vertebrata
(b) Urochordata
(c) Invertebrates
(d) Chordates

Correct: b

122. Read the following statement regarding bacteria.
I. Bacteria exchange their genetic matter through conjugation which involve cell to cell contact.
II. Transduction in 'Salmonella is reported by Tatum and Lederberg in 1952.
III. Citrus canker disease is caused by bacteria Xanthomonas citri.
IV. Hans Christian gram's staining method is based on cell wall composition of bacteria.
Choose the correct option with true statements
(a) I and III
(b) I, III and IV
(c) I, II and III
(d) II and IV

Correct: b

123. Reproductive isolation in sympatric speciation develops without a
(a) geographic barrier
(b) barrier to gene flow
(c) change in chromosome number
(d) barrier to mating

Correct: a

124. An example of gene therapy is

(a) production of injectable hepatitis-B vaccine
(b) production of vaccines in food crops like potatoes which can be eaten
(c) introduction of gene for adenosine deaminase in persons suffering from Severe Combined Immunodeficiency (SCID)
(d) production of test tube babies by artificial insemination and implantation of fertilised eggs

Correct: c

125. In pea plants, green pod colour is dominant over yellow pods. 1000 seeds taken from a pea plant on germination produces 760 green pod and 240 yellow pod plants. The parental genotype and phenotype of the seed plant are
(a) heterozygous and yellow
(b) heterozygous and green
(c) homozygous and yellow
(d) homozygous and green

Correct: b

126. Read the following statements regarding bryophytes and choose the incorrect option.
(a) Gametophytic phase is dominant in life cycle
(b) Fertilisation takes place in presence of water
(c) Zygote undergoes meiosis to produce sporophyte
(d) Sporophyte is physiologically dependent on gametophyte

Correct: c

127. Classical Taxonomy is based on
(a) morphological traits
(b) habitat of organisms
(c) similarities and dissimilarities of behaviour
(d) phylogeny

Correct: a

128. Dikaryotisation (n + n) in Agaricus is brought about by
(a) clamp connections
(b) somatogamay between two hyphae of different strains
(c) Both (a) and (b) are correct
(d) basidiospores

Correct: c

129. Heterocyst present in Nostoc is specialised for
(a) fragmentation
(b) nitrogen-fixation

(c) symbiotic relation
(d) food storage

Correct: b

130. Which of the following plant growth hormone increases the yield of sugar by increasing the length of stem in sugarcane?
(a) Cytokinin
(b) Ethylene
(c) Gibberellic acid
(d) Auxin

Correct: c

131. Match the following columns

Column I		Column II	
I.	Multigenes	(i)	transposons
II	Inducible genes	(ii)	insulin
III.	Overlapping genes	(iii)	B, E and k in $\phi \times 174$
IV.	Structural genes	(iv)	snRNA
		(v)	globin gene
		(vi)	nitrate reductase

(a) I - (i), II - (iii), III - (v), IV - (ii)
(b) I - (v), II - (vi), III - (iii), IV - (ii)
(c) I - (iv), II - (v), III - (vi), IV - (i)
(d) I - (i), II - (ii), III - (v), IV - (vi)

Correct: b

132. Identify the correct matched pair.
(a) Segregation-Metaphase II
(b) Significance of meiosis–Production of genetically similar cells
(c) Exchange of genetic material-Diakinesis
(d) Anaphase II of meiosis–Centromeric division

Correct: d

133. Which one of the following is the correct matching of a vitamin, its nature and its deficiency disease?
(a) Vitamin-A - Fat soluble - Night blindness
(b) Vitamin K - Fat soluble - beri-beri
(c) Vitamin-A - Fat soluble-beri-beri
(d) Vitamin-K - Water soluble - Pellagra

Correct: a

134. Suppose, evolution on earth had occurred in such a way that there are 96 amino acids

instead of 20. DNA has 12 different types of bases and DNA synthesis occurs in the same way as today. The minimum number of bases per DNA codon would be
(a) 12
(b) 8
(c) 2
(d) 3

Correct: c

135. Which one of the following option is correct regarding digestion of food substrates?

	Substrate	Enzyme	Site of action	Product
(a)	Starch	Amylase	Stomach	Maltose
(b)	Protein	Pepsin	Duodenum	Peptones
(c)	Lipid	Lipase	Pancreas	Fat globules
(d)	Sucrose	Invertase	Duodenum	Glucose and Fructose

(a) Substrate - Starch, Enzyme - Amylase, Site Of Action - Stomach, Product - Maltose
(b) Substrate - Protein, Enzyme - Pepsin, Site Of Action - Duodenum, Product - Peptones
(c) Substrate - Lipid, Enzyme - Lipase, Site Of Action - Pancreas, Product - Fat globules
(d) Substrate - Sucrose, Enzyme - Invertase, Site Of Action - Duodenum, Product - Glucose and fructose

Correct: d

136.The preparation and flowering of leaves of tea and tobacco is due to the activities of
(a) Bacillus subtilis
(b) Bacillus megatherium
(c) Streptococcus lactis
(d) Acetobacter aceti

Correct: b

137. Gemmule formation is a common mode of asexual reproduction in
(a) Paramecium
(b) Hydra
(c) Sponges
(d) Yeast

Correct: c

138. Inflorescence of which one of the following sets completely develop into composite fruits?
(a) Spike, corymb, hypanthodium
(b) Spike, female catkin, hypanthodium
(c) Umbel, catkin, spadix
(d) Female catkin, corymb, spike

Correct: b

139. Which of the following is not used as a biopesticide?
(a) Bacillus thuringiensis
(b) Xanthomonas campestris
(c) Nuclear Polyhedrosis Virus (NPV)
(d) Trichoderma harzianum

Correct: b

140. Which one of the following option is not correctly matched?

(a)	Cymose	*Acacia*
(b)	Hypanthodium	Banyan
(c)	Cyanthium	*Euphorbia*
(d)	Verticillaster	*Calotropis*

(a) Cymose - Acacia
(b) Hypanthodium - Banyan
(c) Cyathium - Euphorbia
(d) Verticillaster - Calotropis

Correct: d

141. Which one option is incorrectly matched regarding biological magnification of DDT in aquatic ecosystem.
(a) Small Fish - 0.5 ppm
(b) Large Fish - 2 ppm
(c) Fish-eating birds - 25 ppm
(d) Zooplankton - 0.003 ppm

Correct: d

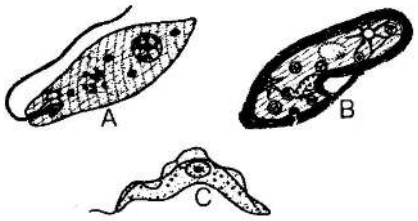
142. The sequence of development during the formation of endosperm is
(a) Archesporium -> Megaspore mother cell ——
Megaspore — Embryo sac
(b) Archesporium - Megaspore —
Megaspore mother cell —→ Embryo sac
(c) Megaspore →→ Archesporium — Megaspore
Mother cell — Embryo sac
(d) Megaspore mother cell —→ spore mother cell
Embryo spore mother cell Embryo sac

Correct: a

143. Identify the correct matches for crops and their improved varieties
(a) Crops - Wheat, Varieties - Karan rai, Disease - White rust
(b) Crops - Cauliflower, Varieties - Pusa Shubhna, Disease - Leaf and stipe rust
(c) Crops - Cowpea, Varieties - Pusa Komal, Disease - Hill bunt
(d) Crops - Chili, Varieties - Pusa Sadabahar, Disease - Tobacco Mosaic virus and leaf curl

Correct: d

144. Refer to the following figures.



Match the following columns and choose the correct option from the codes given below.

C-I	Column II	Column III
A	I. *Paramecium*	I. kinetoplast
B	II. *Euglena*	II. Trichocysts
C	III. *Trypanosoma*	III. Astaxanthin

(a) A - 3-II, B - 1-III, C - 2-I
(b) A - 1-II, B - 3-I, C - 2-I
(c) A - 2-III, B - 1-II, C - 3-I
(d) A - 3-I, B - 2-II, C - 1-III

Correct: c

145. In Cycas
(a) ovule and microsporangia are present in same sporophyll
(b) micro and megasporophyllus are present in same cone
(c) male cone and megasporophylls are borne on the same plant
(d) male cone and megasporophylls are borne on separate individual plants

Correct: d

146. From the statements given below, which one most likely represents an example of disruptive selection.
I. Industrial melanism in peppered moth.
II. Population of butterflies that are either all yellow or all blue.
III. Population of rabbits that evolves more body fat in response to a cold climate.
IV. Population of wrens that evolves to be smaller at sexual maturity in response to predation pressure.
V. Very tall and very short pine trees being removed from a population by herbivore.
(a) Only II
(b) II and III

(c) Only IV
(d) III and IV

Correct: a

147. Which of the following is the action of insulin?
(a) Blood glucose level increases by hydrolysing logistic glycogen in liver
(b) Decreases blood sugar level by forming glycogen
(c) Increases blood glucose level by stimulating glucagon production
(d) Increases blood glucose level by promoting cellular uptake of glucose

Correct: b

148. In which of the following reactions of glycolysis, a molecule of water is removed from the substrate?
(a) Glucose → Glucose-6-phosphate
(b) Fructose-6-phosphate Fructose-1,6 bisphosphate
(c) 2-phosphoglycerate → Phosphoenol pyruvate
(d) Phosphoenol pyruvate → Pyruvate

Correct: c

149. Which one is correct sequence occurring in glycolysis?
(a) G-6-P → PEP → 3-PGAL → 3-PGA
(b) G-6-P → 3-PGAL → 3-PGA → PEP
(c) G-6-P → PEP → 3-PGA → 3-PGAL
(d) G-6-P → 3-PGA → 3-PGAL → PEP

Correct: b

150. Match the larval stages (in column I) with their corresponding animals (in column II) and select the correct option.

Column I		Column II	
I.	*Planula*	(i)	*Holothuria* (Sea cucumber)
II	*Trocophore*	(ii)	Hermit crab
III.	*Glochideum*	(iii)	*Obelia* I
IV.	*Glaucothoe*	(iv)	*Neresis* II
		(v)	*Unio*

(a) I - (i), II - (iii), III - (v), IV - (iv)
(b) I - (iii), II - (iv), III - (v), IV - (ii)
(c) I - (i), II - (ii), III - (iii), IV - (iv)
(d) I - (iii), II - (i), III - (ii), IV - (v)

Correct: b

151. Identify the incorrect match from those given below

(a) Jelly Fish, Aurelia Aurita, Scyphozoa
(b) Paddle Worm, Chaetopterus, Polychaeta
(c) Cray Fish, Oniscus, Crustacea
(d) Acorn worm, Balanoglossus, Enteropneusta

Correct: c

152. A man whose father was colourblind marries a woman, who had a colourblind mother and normal father. What percentage of male children of this couple will be colourblind?
(a) 25%
(b) 0%
(c) 50%
(d) 75%

Correct: a

153. The contraction of the muscle continues in sliding filament theory
(a) till ATP binds to myosin head
(b) till ADP binds to myosin head
(c) till Ca^{2+} is present in sarcoplasm
(d) till polymerisation of myosin head is going on

Correct: c

154. The following are found in Taenia solium, which one is the correct sequence?
(a) Onchosphere, hexacanth, cysticercus, matured proglottid, gravid
(b) Matured proglottid, cysticercus, gravid, onchosphere, hexacauth
(c) Hexacanth, cysticercus, gravid, onchosphere, mature proglottid
(d) Gravid, onchosphere, cysticercus, hexacanth, mature proglottid

Correct: a

155. Which of the following process of urine formation takes place all along the renal tubule and collecting duct?
(a) Ultrafiltration and tubular reabsorption
(b) Ultrafiltration and tubular secretion
(c) Tubular reabsorption and secretion
(d) Anti-current mechanism and reabsorption

Correct: c

156. Oxyhaemoglobin dissociates into oxygen and deoxyhaemoglobin at
(a) low O_2 pressure in tissue
(b) high O_2 pressure in tissue
(c) equal O_2 pressure inside and outside tissue
(d) all times irrespective of O_2 pressure

Correct: a

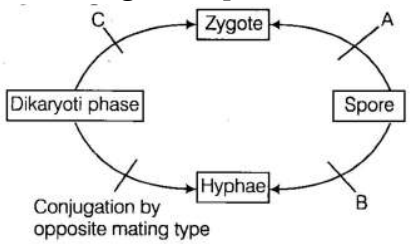
157. Which one of the following pairs is the matching pair of the part and the hormone it secretes?
(a) Anterior pituitary - Thyroxine
(b) Alpha cells of pancreas - Glucagon
(c) Thyroid - Epinephrine
(d) Stomach epithelium - Secretin

Correct: b

158. The best description of natural selection is
(a) the survival of the fittest
(b) the struggle for existence
(c) the reproductive of the members of a population best adapted to the environment
(d) a change in the proportion of variations within a population

Correct: c

159. The given below figure shows a generalised life cycle of a fungus. Identify A, B, and C from the given option.



(a) A - Meiosis, B - Fertilisation, C - Mitosis
(b) A - Meiosis, B - Mitosis, C - Fertilisation
(c) A - Mitosis, B - Meiosis, C - Fertilisation
(d) A - Mitosis, B - Fertilisation, C - Meiosis

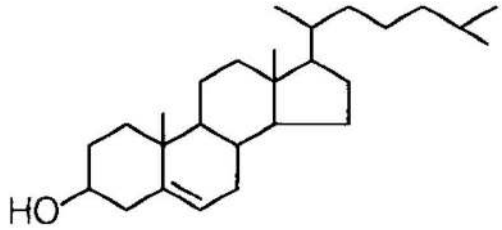
Correct: b

160. In man, in which part of the uriniferous tubule reabsorption of glucose occurs?
(a) Collecting tube
(b) Henle's loop
(c) Distal convoluted tubule
(d) Proximal convoluted tubule

Correct: d

161. Read the Assertion and Reason carefully to mark the correct option from those given below

Assertion The structure given is the most important animal steroid which is insoluble in water and chemically unreactive



Reason It is important because it is a structural components of cells.
(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
(c) Assertion is true but Reason is false
(d) Both Assertion and Reason are false

Correct: a

162. Tyloses are ballon-like outgrowths in the lumen of secondary xylem tracheids and vessel of duramen region. These are actually
(a) outgrowth of vessels of xylem
(b) ingrowth of vessels
(c) ingrowth of xylem parenchyma
(d) swelling of xylem fibres for no function

Correct: c

163. Read the Assertion and Reason carefully to mark the correct option from those given below
Assertion Endosperm is formed by the fusion of one male gamete and two polar nuclei.
Reason In pea, the endosperm remains the part of seed as it is not completely used up during embryo development.
(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
(c) Assertion is true but Reason is false
(d) Both Assertion and Reason are false

Correct: c

164. The fluid which is rich in calcium fibrinolysin and acid phosphatase and contributes about 30% of the total volume of semen, is released by
(a) Cowper's glands
(b) prostate gland
(c) seminal vesicles
(d) epididymis

Correct: b

165. Read the Assertion and Reason carefully to mark the correct option from those given below
Assertion Gross primary productivity is always more than net primary productivity.
Reason Consumers exhibit secondary productivity in a ecosystem.
(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
(c) Assertion is true but Reason is false
(d) Both Assertion and Reason are false

Correct: b

166. Read the Assertion and Reason carefully to mark the correct option from those given below
Assertion Gene bank is a type of ex-situ conservation of biodiversity.
Reason It involves maintaining stocks of viable seeds, living growing plants, tissue culture, etc.
(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
(c) Assertion is true but Reason is false
(d) Both Assertion and Reason are false

Correct: a

167. In each of the following questions statement of Assertion is given followed by corresponding statement of Reason. Of the statements, mark the correct answer as
Assertion (A) Maize is an albuminous seed.
Reason (R) It's endosperm is completely absorb by its growing embryo.
(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
(b) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion
(c) Assertion is true, but Reason is false
(d) Both assertion and Reason is false

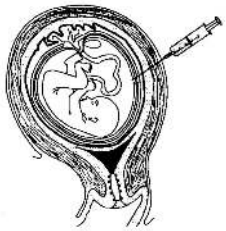
Correct: c

168. Read the Assertion and Reason carefully to mark the correct option from those given below
Assertion Claspers of cartilaginous fishes are analogous to human penis.
Reason Both acts as a copulatory organs and transfer the sperms into female.
(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) Assertion is true but Reason is false
(d) Both Assertion and Reason are false

Correct: a

169. Read the Assertion and Reason carefully to mark the correct option from those given below
Assertion The technique shown in the given figure is frequently used in prenatal disease treatment.



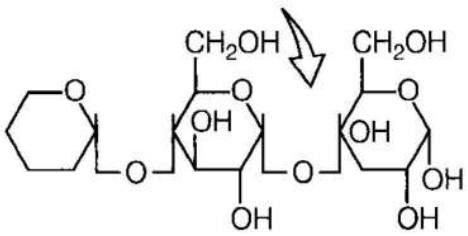
Reason This technique cannot be used for sex-determination of child.
(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
(c) Assertion is true but Reason is false
(d) Both Assertion and Reason are false

Correct: d

170. In each of the following questions statement of Assertion is given followed by corresponding statement of Reason. Of the statements, mark the correct answer as
Assertion (A) The rate of decomposition of detritus is reduced in the regions of high altitude.
Reason (R) It happen due to immobilisation of nutrients.
(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
(b) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion
(c) Assertion is true, but Reason is false
(d) Both assertion and Reason is false

Correct: a

171. Read the Assertion and Reason carefully to mark the correct option from those given below
Assertion The structure given below contains $1-4\alpha-$glycosidic bonds.



Reason This is a polysaccharide and have right end as reducing end and its left end is called the non-reducing end.

(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
(c) Assertion is true but Reason is false
(d) Both Assertion and Reason are false

Correct: b

172. In each of the following questions statement of Assertion is given followed by corresponding statement of Reason. Of the statements, mark the correct answer as
Assertion (A) A chemical substance fertilizin is founded in the egg of animals.
Reason (R) It helps in the maturation of embryo after fertilisation.
(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
(b) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion
(c) Assertion is true, but Reason is false
(d) Both assertion and Reason is false

Correct: c

173. Read the Assertion and Reason carefully to mark the correct option from those given below
Assertion Besides curdling of milk, LAB also improve its nutritional quality, by increasing vitamin$-B_{12}$
Reason LAB check disease causing microbes when it is present in human stomach.
(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
(c) Assertion is true but Reason is false
(d) Both Assertion and Reason are false

Correct: b

174. Read the Assertion and Reason carefully to mark the correct option from those given below
Assertion Urinary bladder is lined by transitional epithelium.
Reason Transitional epithelium keeps the size of the urinary bladder constant at all time.
(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
(c) Assertion is true but Reason is false
(d) Both Assertion and Reason are false

Correct: c

175. In each of the following questions statement of Assertion is given followed by

corresponding statement of Reason. Of the statements, mark the correct answer as
Assertion (A) The immunoglobuline, which cannot pass through placenta and such foetus is IgM.
Reason (R) IgM is a pentamer immunoglobuline joined by J-chain.
(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
(b) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion
(c) Assertion is true, but Reason is false
(d) Both assertion and Reason is false

Correct: a

176. Read the Assertion and Reason carefully to mark the correct option from those given below
Assertion Arteries pump blood away from the heart at very low pressure. Reason Arteries have thin wall with large lumen.
(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
(c) Assertion is true but Reason is false
(d) Both Assertion and Reason are false

Correct: d

177. Read the Assertion and Reason carefully to mark the correct option from those given below
Assertion Arrival of an impulse at the axon terminal stimulates the release of neurotransmitters in synaptic cleft.
Reason These neurotransmitters are responsible for the opening of ion channels.
(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
(c) Assertion is true but Reason is false
(d) Both Assertion and Reason are false

Correct: b

178. In each of the following questions statement of Assertion is given followed by corresponding statement of Reason. Of the statements, mark the correct answer as
Assertion (A) In ECG graph of heart pulse 'R' is the peak point.
Reason (R) It shows the atrial depolarisation which takes 0.3 seconds.
(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
(b) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion
(c) Assertion is true, but Reason is false
(d) Both assertion and Reason is false

Correct: c

179. Read the Assertion and Reason carefully to mark the correct option from those given below
Assertion Hexokinase require divalent cation Mg^{2+}
Reason Mg^{2+} or Mn^{2+} combines with ATP to form $MgATP^{2+}$.
(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
(c) Assertion is true but Reason is false
(d) Both Assertion and Reason are false

Correct: a

180. In each of the following questions statement of Assertion is given followed by corresponding statement of Reason. Of the statements, mark the correct answer as
Assertion (A) In TCA cycle isomerisation of citric acid into isocitric acid is done by change in CO_2 ($C00^-$) position.
Reason (R) Isocitric acid is more stable than citric Acid.
(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
(b) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion
(c) Assertion is true, but Reason is false
(d) Both assertion and Reason is false

Correct: d

General Knowledge

181. Which of the following is a river flowing from Central India and joining Yamuna/Ganga?
(a) Ganga
(b) Gomti
(c) Kosi
(d) Betwa

Correct: d

182. Which of the following is essential for blood clotting?
(a) RBC
(b) WBC
(c) Blood platelets
(d) Lymphs

Correct: c

183. The Viceroy upon whom a bomb was thrown, but he did not change his attitude towards the Indians, was
(a) Lord Hardinge
(b) Warren Hastings
(c) Lord Curzon
(d) Lord Chelmsford

Correct: a

184. What is the middle name of the world class batsman Sachin Tendulkar?
(a) Rohan
(b) Ramesh
(c) Rahul
(d) Ravi

Correct: b

185. Who among the following was awarded the first Tagore Award for Cultural Harmony for the year 2012?
(a) Jasraj
(b) Ravi Shankar
(c) Nikhil Bannerjee
(d) Bhimsen Joshi

Correct: b

186. Miss Universe 1995, Ms Sushmita Sen hails from which of the following cities?
(a) Mumbai
(b) Chandigarh
(c) Bengaluru
(d) New Delhi

Correct: d

187. The country recently announced by WHO as a ‘malaria-free country' is
(a) India
(b) Australia
(c) China
(d) Sri Lanka

Correct: d

188. The constitution names our country as
(a) Bharat
(b) India, that is Bharat
(c) Hindustan

(d) Aryavarta

Correct: b

189. When did Amitav Ghosh awarded with Padma Shri?
(a) 2007
(b) 2009
(c) 2005
(d) 2006

Correct: a

190. Who presides over the meetings of the Rajya Sabha?
(a) President
(b) Vice President
(c) Prime Minister
(d) Speaker

Correct: b

191. 'Emotionally Yours' is the punchline of
(a) Raymond
(b) Orange
(c) Sahara
(d) Sansui

Correct: c

192. Who is Taniya Sachdev?
(a) Dancer
(b) Chess player
(c) Cricketer
(d) Actress

Correct: b

193. Sanjay Dutt, a noted film actor was held under
(a) Act 302
(b) Anti Defection Act
(c) TADA
(d) None of these

Correct: c

194. The number of DNA molecules per chromatid is/are
(a) one

(b) two
(c) three
(d) four

Correct: a

195. Who has won the greatest number of Oscars in his life time?
(a) Ingrid Bergman
(b) David Leon
(c) Charlie Chaplin
(d) Wall Disney

Correct: b

196. Private sector lender IDFC Bank has appointed whom on its board as independent director?
(a) Anand Sinha
(b) Rahul Gandhi
(c) Umesh Chandra Sarangi
(d) Vinod Rai

Correct: a

197. Leander Paes is associated with
(a) football
(b) cricket
(c) badminton
(d) tennis

Correct: d

198. Who has been appointed as Chief Product and Technology Officer for Reality startup Housing. com on 17th August, 2016?
(a) Vivek Singh
(b) Vivek Sharma
(c) Vivek Mehta
(d) Vivek Jain

Correct: d

199. The famous novel “Pride and Prejudice'’ is written by
(a) RL Stevenson
(b) George Eliot
(c) Charles Dickens
(d) Jane Austen

Correct: d

200. Who wrote the book 'A passage to India'?
(a) Minoo Masani
(b) Jawaharlal Nehru
(c) Victor Banerjee
(d) EM Forster

Correct: d