



RAVI MATHS TUITION CENTRE , WHATSAPP - 8056206308

Time : 450 Mins

NEET 10 4 23 MOCK TEST 13 AND 14 1

Marks : 1555

- Assertion: The stopping potential depends on the frequency of incident light.
 Reason : The stopping potential is related to maximum kinetic energy by $e V_0 = K_{\max}$.
 a) If both assertion and reason are true and reason is the correct explanation of assertion
 b) If both assertion and reason are true but reason is not the correct explanation of assertion.
 c) If assertion is true but reason is false. d) If both assertion and reason are false.
- If K_1 and K_2 are maximum kinetic energies of photoelectrons emitted when lights of wavelength λ_1 and λ_2 respectively incident on a metallic surface if λ_1 and $3\lambda_2$, then
 a) $K_1 > (K_2/3)$ b) $K_1 < (K_2/3)$ c) $K_1 = 3K_2$ d) $K_2 = 3K_1$
- Light of wavelengths λ falls on a metal having work function λ_0 . Photoelectric effect will take place only
 a) $\lambda \geq \lambda_0$ b) $\lambda \leq \lambda_0$ c) $\lambda \geq 2\lambda_0$ d) $\lambda = 4\lambda_0$
- An ionization chamber with parallel conducting plates as anode and cathode has 5×10^7 electrons and the same number of single charge positive ions per cm^3 . The electrons are moving towards the anode with velocity 0.4 m/s. The current density from anode to cathode is 4 mA/ m^2 . The velocity of positive ions moving towards cathode is _____
 a) 0.4m/s b) 1.6m/s c) 0 d) 0.1m/s
- The energy of a photon is $E = hv$ and the momentum of photon $p = h/\lambda$, then the velocity of photon will be :
 a) E/p b) Ep c) $(Ep)^2$ d) 3×10^8 m/s
- A particle moves in a closed orbit around the origin, due to a force which is directed towards the origin. The de Broglie wavelength of the particle varies cyclically between two values λ_1 and λ_2 with $\lambda_1 > \lambda_2$
 Which of the following statements is true?
 a) The particle could be moving in a circular orbit with origin as centre.
 b) The particle could be moving in an elliptical orbit with origin as its focus
 c) When the de Broglie wavelength is λ_1 the particle is nearer the origin than when its value is λ_2
 d) Both (a) and (c)
- The de Broglie wavelength of a photon is twice the de Broglie wavelength of an electron. The speed of the electron is $v_e = \frac{c}{100}$. Then
 a) $\frac{E_e}{E_p} = 10^{-4}$ b) $\frac{E_e}{E_p} = 10^{-2}$ c) $\frac{P_e}{m_e c} = 10^{-2}$ d) $\frac{P_e}{m_e c} = 10^{-4}$
- If h is Planck's constant, the momentum of a photon of wavelength 0.01 \AA is
 a) $10^{-2}h$ b) h c) 10^2h d) $10^{12}h$
- The energy of a photon of wavelength λ is given by :
 a) $h\lambda$ b) $ch\lambda$ c) λ/hc d) hc/λ
- Consider the four gases hydrogen, oxygen, nitrogen and helium at the same temperature. Arrange them in the increasing order of the de Broglie wavelengths of their molecules.
 a) Hydrogen, helium, nitrogen, oxygen b) Oxygen, nitrogen, hydrogen, helium
 c) Oxygen, nitrogen, helium, hydrogen d) Nitrogen, oxygen, helium, hydrogen

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11. When light of wavelength 300 nm (nanometer) falls on a photoelectric emitter, photoelectrons are liberated. For another emitter, however, light of 600 nm wavelength is sufficient for creating photoemission, what is the ratio of the work functions of the two emitters?
 a) 1:2 b) 2:1 c) 1:4 d) 4:1
12. Which of the following is true?
 a) The stopping potential increases with increasing intensity of incident light
 b) The photocurrent increases with increasing intensity of light
 c) The current in photocell increases with increasing frequency of light
 d) The photocurrent is proportional to applied voltage
13. The momentum of a photon of energy 1 MeV in kg m/s, will be _____ .
 a) 7×10^{-24} b) 10^{-22} c) 5×10^{-22} d) 0.33×10^6
14. The wavelength associated with an electron, accelerated through a potential difference of 100V is of the order of _____ .
 a) 1000 b) 100 c) 10.5 d) 1.2
15. work function of cesium is 2.14 eV. The threshold frequency of caesium is :
 a) 5.16×10^{19} Hz b) 5.16×10^{16} Hz c) 5.16×10^{18} Hz d) 5.16×10^{14} Hz
16. Wavelength of a 1 keV photon is 1.24×10^{-9} m. What is the frequency of 1 MeV photon?
 a) 1.24×10^{15} Hz b) 2.4×10^{20} Hz c) 1.24×10^{18} Hz d) 2.4×10^{23} Hz
17. A photon of energy E ejects a photoelectron from a metal surface whose work function is Φ_0 . If this electron enters into a uniform magnetic field B in a direction perpendicular to the field and describes a circular path of radius r, then the radius r is (in the usual notation)
 a) $\sqrt{\frac{2m(E-\phi_0)}{eB}}$ b) $\sqrt{2m(E-\phi_0)eB}$ c) $\sqrt{\frac{2m(E-\phi_0)}{mB}}$ d) $\sqrt{\frac{2m(E-\phi_0)}{eB}}$
18. The phenomenon of photoelectric emission was discovered in 1887 by
 a) Wilhelm Hallwachs b) Philipp Lenard c) Albert Einstein d) Heinrich Hertz
19. Thermionic emissions are related to:
 a) conduction b) convection c) radiation d) none of these
20. The de Broglie wavelength of an electron with kinetic energy 120 eV is (Given $h = 6.63 \times 10^{-31}$ J s, $m_e = 9 \times 10^{-31}$ kg, $1 \text{ eV} = 1.6 \times 10^{-19}$ J)
 a) 2.13 \AA b) 1.13 \AA c) 4.15 \AA d) 3.14 \AA
21. Light of frequency 7.21×10^{14} Hz is incident on a metal surface. Electrons with a maximum speed of $6 \times 10^5 \text{ m s}^{-1}$ are ejected from the surface. The threshold frequency for photoemission of electrons is (Given $h = 6.63 \times 10^{-34}$ Js, $m_e = 9.1 \times 10^{-31}$ kg)
 a) 2.32×10^{14} Hz b) 2.32×10^{12} Hz c) 4.74×10^{14} Hz d) 4.74×10^{12} Hz
22. When the photons of energy $h\nu$ fall on a photosensitive metallic surface of work function $h\nu_0$, electrons are emitted from the surface. The most energetic electron coming out of the surface have kinetic energy equal to
 a) $h\nu$ b) $h\nu_0$ c) $h\nu+h\nu_0$ d) $h\nu-h\nu_0$
23. A and B are two metals with threshold frequencies 1.8×10^{14} Hz and 2.2×10^{14} Hz. Two identical photons of energy 0.825 eV each are incident on them. Then photoelectrons are emitted in (Take $h = 6.6 \times 10^{-34}$ J s)
 a) B alone b) A alone c) neither A nor B d) both A and B
24. If the de Broglie wavelengths for a proton and for a α particle are equal, then the ratio of their velocities will be :
 a) 4 : 1 b) 2 : 1 c) 1 : 2 d) 1 : 4
25. In a photon-particle collision (such as photonelectron collision), which of the following may not be conserved?
 a) Total energy b) Number of photons c) Total momentum d) Both (a) and (b)
26. Which of the following moving particles (moving with same velocity) has largest wavelength of matter waves?
 a) Electron b) α -particle c) Proton d) Neutron
27. When ultraviolet radiation is incident on a surface, no photoelectrons are emitted. If a second beam causes photoelectrons to be ejected, it may consists of _____

- a) infra-red waves b) X-rays c) visible light rays d) radio waves

28. An electron (mass m) with an initial velocity $\vec{v} = v_0 \hat{i}$ ($v_0 > 0$) is in an electric field $\vec{E} = -E_0 \hat{i}$ ($E_0 = \text{constant} > 0$).

It's de Broglie wavelength at time t is given by :

- a) $\frac{\lambda_0}{\left(1 + \frac{eE_0 t}{mv_0}\right)}$ b) $\lambda_0 \left(1 + \frac{eE_0 t}{mv_0}\right)$ c) λ_0 d) $\lambda_0 t$

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29. Two particles A and B of de Broglie wavelengths λ_A and λ_B combine to form a particle C. The process conserves momentum. Find the de Broglie wavelength of the particle C. (The motion is one dimensional).

- a) λ_A b) $\lambda_A \lambda_B / (\lambda_A + \lambda_B)$ c) $\lambda_A \lambda_B / |\lambda_A - \lambda_B|$ d) both (b) and (c)

30. In the question number 48, the energy of photon in eV at the red end of the visible spectrum is

- a) 6.63 b) 3.62 c) 7.61 d) 1.64

31. In photoelectric effect, the photoelectric current is independent of

- a) intensity of incident light b) potential difference applied between the two electrodes
c) the nature of emitter material d) frequency of incident light

32. Einstein work on the photoelectric effect provided support for the equation _____

- a) $E = hv$ b) $E = mc^2$ c) $E = -\frac{Rhc}{n^2}$ d) $K.E. = \frac{1}{2}mv^2$

33. When a beam of 10.6 eV photons of intensity 2.0 W/m^2 falls on a platinum surface of area $1.0 \times 10^{-4} \text{ m}^2$ and work function 5.6 eV, 0.53% of the incident photons eject photoelectrons. Find the number of photoelectrons emitted per second :

- a) 6.25×10^8 b) 1.25×10^9 c) 1.25×10^6 d) 6.25×10^{11}

34. Kinetic energy of an electron which is accelerated in a potential difference of 100 V is _____

- a) $1.6 \times 10^{-17} \text{ J}$ b) $1.6 \times 10^{-19} \text{ J}$ c) $1.6 \times 10^{-21} \text{ J}$ d) $1.6 \times 10^{-25} \text{ J}$

35. For a certain metal, incident frequency ν is five times of threshold frequency ν_0 and the maximum velocity of coming out photoelectrons is $8 \times 10^6 \text{ m s}^{-1}$. If $\nu = 2\nu_0$, the maximum velocity of photoelectrons will be:

- a) $4 \times 10^6 \text{ m s}^{-1}$ b) $6 \times 10^6 \text{ m s}^{-1}$ c) $8 \times 10^6 \text{ m s}^{-1}$ d) $1 \times 10^6 \text{ m s}^{-1}$

36. Assertion: Photosensitivity of a metal is high if its work function is small.

Reason : Work function = $h\nu_0$ where ν_0 is the threshold frequency

- a) If both assertion and reason are true and reason is the correct explanation of assertion
b) If both assertion and reason are true but reason is not the correct explanation of assertion.
c) If assertion is true but reason is false. d) If both assertion and reason are false.

37. Assertion: Though light of a single frequency (monochromatic) is incident on a metal, the energies of emitted photoelectrons are different.

Reason : The energy of electrons emitted from inside the metal surface is lost in collision with the other atoms in the metal

- a) If both assertion and reason are true and reason is the correct explanation of assertion
b) If both assertion and reason are true but reason is not the correct explanation of assertion.
c) If assertion is true but reason is false. d) If both assertion and reason are false.

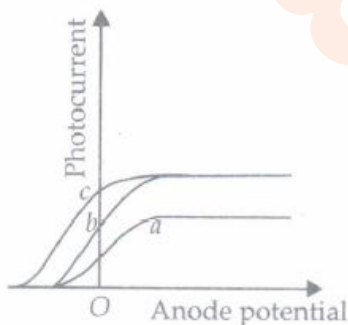
38. Assertion: If the frequency of the incident light on a metal surface is doubled, the kinetic energy of emitted electrons is more than doubled.

Reason : The metal will provide additional energy to the emitted photoelectron for light of higher frequency than that for lower frequency.

- a) If both assertion and reason are true and reason is the correct explanation of assertion
b) If both assertion and reason are true but reason is not the correct explanation of assertion.
c) If assertion is true but reason is false. d) If both assertion and reason are false.

39. Which of the following statements is correct regarding the photoelectric experiment?

- a) The photo current increases with intensity of light
 b) Stopping potential increases with increase in intensity of incident light.
 c) The photocurrent increases with increase in frequency. d) All of the these
40. The number of photoelectrons emitted for light of a frequency ν (higher than the threshold frequency ν_0) is proportional to :
 a) Frequency of light (ν) b) $\nu - \nu_0$ c) Threshold frequency (ν_0) d) Intensity of light
41. The rest mass of photon is
 a) $\frac{h\nu}{c}$ b) $\frac{h\nu}{c^2}$ c) $\frac{h\nu}{\lambda}$ d) zero
42. Which phenomenon best supports the theory that matter has a wave nature?
 a) Electron momentum b) Electron diffraction c) Photon momentum d) Photon diffraction
43. Assuming an electron is confined to a 1 nm wide region. Find the uncertainty in momentum using Heisenberg uncertainty principle.
 (Take $h = 6.63 \times 10^{-34}$ J s)
 a) 1.05×10^{-25} kg m s $^{-1}$ b) 2.03×10^{-31} kg m s $^{-1}$ c) 3.05×10^{-34} kg m s $^{-1}$ d) 2.49×10^{-32} kg m s $^{-1}$
44. The work function of a metal is 4.2 eV, its threshold wavelength will be :
 a) 4000 Å b) 3500 Å c) 2955 Å d) 2500 Å
45. Monochromatic light of frequency 6×10^{14} Hz is produced by a laser. The power emitted is 2×10^{-3} W. The number of photons emitted per second is (Given $h = 6.63 \times 10^{-34}$ Js).
 a) 2×10^{15} b) 3×10^{15} c) 4×10^{15} d) 5×10^{15}
46. An electron of mass m and charge e is accelerated from rest through a potential difference of V volt in vacuum. Its final speed will be _____
 a) $\frac{eV}{2m}$ b) $\frac{eV}{m}$ c) $\sqrt{\frac{2eV}{m}}$ d) $\sqrt{\frac{eV}{2m}}$
47. The nature of ions knocked out from hot surface is _____
 a) protons b) electrons c) neutrons d) nuclei
48. Light of wavelength 0.6 mm from a sodium lamp falls on a photocell and causes the emission of photoelectrons for which the stopping potential is 0.5 V With light of wavelength 0.4 mm from a sodium lamp, the stopping potential is 1.5 V With this data, the value of h/e is
 a) 4×10^{-59} V s b) 0.25×10^{15} V s c) 4×10^{-15} V s d) 4×10^{-8} V s
49. Frequency of photon having energy 66 eV is :
 a) 8×10^{-15} Hz b) 12×10^{-15} Hz c) 16×10^{-15} Hz d) None of these
50. The figure shows the variation of photo current with anode potential for a photo-sensitive surface for three different radiations. Let I_a , I_b and I_c be the intensities and ν_a , ν_b and ν_c be the frequencies for the curves a, b and c respectively. Then



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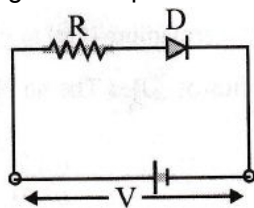
- a) $\nu_a = \nu_b$ and $I_a \neq I_b$ b) $\nu_a = \nu_c$ and $I_a = I_c$ c) $\nu_a = \nu_b$ and $I_a = I_b$ d) $\nu_b = \nu_c$ and $I_b = I_c$

51. In the question number 63, the frequency of emitted photon due to the given transition is ($h = 6.64 \times 10^{-34}$ J s, $1 \text{ eV} = 1.6 \times 10^{-19}$ J)
 a) 2.46×10^{10} Hz b) 2.46×10^{12} Hz c) 2.46×10^{15} Hz d) 2.46×10^{18} Hz

52. The ground state energy of hydrogen atom is 13.6 eV. When its electron is in the first excited state, its excitation energy is _____ .
a) 3.4 eV b) 6.8 eV c) 10.2 eV d) 0
53. A radio isotope X with a half life 1.4×10^9 years decays to Y which is stable. A sample of the rock from a cave was found to contain X and Y in the ratio 1:7. The age of the rock is:
a) 4.20×10^9 years b) 8.40×10^9 years c) 1.96×10^9 years d) 3.92×10^9 years
54. Two radioactive nuclei P and Q, in a given sample decay into a stable nucleolus R. At time $t = 0$, number of P species are $4N_0$ and that of Q are N_0 . Half-life of P (for conversion to R) is 1 minute where as that of Q is 2 minutes. Initially there are no nuclei of R present in the sample. When number of nuclei of P and Q are equal, the number of nuclei of R present in the sample would be:
a) $3 N_0$ b) $\frac{9N_0}{2}$ c) $\frac{5N_0}{2}$ d) $2 N_0$
55. An electron in hydrogen atom makes a transition $n_1 \rightarrow n_2$ where n_1 and n_2 are principal quantum numbers of the two states. Assuming Bohr's model to be valid the time period of the electron in the initial state is eight times that in the final state. The possible values of n_1 and n_2 are:
a) $n_1 = 4$ and $n_2 = 2$ b) $n_1 = 6$ and $n_2 = 2$ c) $n_1 = 8$ and $n_2 = 1$ d) $n_1 = 8$ and $n_2 = 2$
56. The halflife of a radioactive nucleus is 50 days. The time interval ($t_2 - t_1$) between the time t_2 when $\frac{2}{3}$ of it has decayed and the time t_1 when $\frac{1}{3}$ of it had decayed is:
a) 30 days b) 50 days c) 60 days d) 15 days
57. The valence electron in alkali metal is a _____.
a) f-electron b) p-electron c) s-electron d) d-electron
58. The binding energy of an electron in the ground state of He is equal to 24.6 eV. The energy required to remove both the electrons is
a) 49.2 eV b) 54.4 eV c) 79 eV d) 108.8 eV
59. Assertion: When a nucleus is in an excited state, it can make a transition to a lower energy state by the emission of gamma rays.
Reason: There are energy levels for a nucleus just like there are energy levels in atoms.
a) If both assertion and reason are true and reason is the correct explanation of assertion.
b) If both assertion and reason are true but reason is not the correct explanation of assertion.
c) If assertion is true but reason is false. d) If both assertion and reason are false.
60. The fission properties of ${}_{94}^{239}\text{Pu}$ are very similar to those of ${}_{92}^{235}\text{U}$. The average energy released per fission is 180 MeV. If all the atoms in 1 kg of pure ${}_{94}^{239}\text{Pu}$ undergo fission, then the total energy released in MeV is
a) 4.53×10^{26} MeV b) 2.21×10^{14} MeV c) 1×10^{13} MeV d) 6.33×10^{24} MeV
61. Which source is associated with a line emission spectrum?
a) Electric fire b) Neon street sign c) Red traffic light d) Sun
62. During negative β -decay, an antineutrino is also emitted along with the emitted electron. Then,
a) only linear momentum will be conserved
b) total linear momentum and total angular momentum but not total energy will be conserved
c) total linear momentum and total energy but not total angular momentum will be conserved
d) total linear momentum, total angular momentum and total energy will be conserved
63. A fission reaction is given by ${}_{92}^{236}\text{U} \rightarrow {}_{54}^{140}\text{Xe} + {}_{38}^{94}\text{Sr} + x + y$, where x and y are two particles. Considering ${}_{92}^{236}\text{U}$ to be at rest, the kinetic energies of the products are denoted by $K_{\text{Xe}}, K_{\text{Sr}}, K_x$ (2 MeV) and K_y (2 MeV), respectively. Let the binding energies per nucleon of ${}_{92}^{236}\text{U}, {}_{54}^{140}\text{Xe}$ and ${}_{38}^{94}\text{Sr}$ be 7.5 MeV, 8.5 MeV and 8.5 MeV, respectively. Considering different conservation laws, the correct option(s) is(are)
a) $x = n, y = n, K_{\text{Sr}} = 129$ MeV, $K_{\text{Xe}} = 86$ MeV b) $x = p, y = e, K_{\text{Sr}} = 129$ MeV, $K_{\text{Xe}} = 86$ MeV
c) $x = p, y = n, K_{\text{Sr}} = 129$ MeV, $K_{\text{Xe}} = 86$ MeV d) $x = n, y = n, K_{\text{Sr}} = 86$ MeV, $K_{\text{Xe}} = 129$ MeV
64. The set which represents the isotope, isobar and isotone respectively is:

- a) $({}^2_1H, {}^3_1H)$, $({}^{197}_{79}Au, {}^{198}_{80}Hg)$ and $({}^3_2He, {}^2_1H)$ b) $({}^3_2He, {}^1_1H)$, $({}^{197}_{79}Au, {}^{198}_{80}Hg)$ and $({}^1_1He, {}^3_1H)$
 c) $({}^3_2He, {}^3_1H)$, $({}^2_1H, {}^3_1H)$ and $({}^{197}_{79}Au, {}^{198}_{80}Hg)$ d) $({}^2_1H, {}^3_1H)$, $({}^3_2He, {}^3_1H)$ and $({}^{197}_{79}Au, {}^{198}_{80}Hg)$

65. Which of the following is used as a moderator in nuclear reactors?
 a) Plutonium b) Cadmium c) Heavy water d) Uranium
66. The half life of radioactive radon is 3.8 days. The time at the end of which $(1/20)^{th}$ of the radon sample will remain undecayed (Given $\log_{10}e = 0.4343$) is
 a) 3.8 days b) 16.5 days c) 33 days d) 76 days
67. The stable nucleus that has a radius half that of Fe^{56} is:
 a) Li^7 b) Na^{21} c) S^{16} d) Ca^{40}
68. In which of the following systems will the radius of the first orbit ($n=1$) be minimum?
 a) Hydrogen atom b) Doubly ionized lithium c) Singly ionized helium d) Deuterium atom
69. When an electron jumps from L to K shell :
 a) Energy is absorbed b) Energy is released c) Energy is sometimes absorbed and sometimes released
 d) Energy is neither absorbed nor released
70. Consider 3^{rd} orbit of He^+ (Helium) using nonrelativistic approach, the speed of electron in this orbit will be :
 a) 0.73×10^6 m/s b) 3.0×10^8 m/s c) 2.92×10^6 m/s d) 1.46×10^6 m/s
71. Assertion: Neutrons penetrate matter more readily as compared to protons.
 Reason: A neutron has no charge.
 a) If both assertion and reason are true and reason is the correct explanation of assertion.
 b) If both assertion and reason are true but reason is not the correct explanation of assertion.
 c) If assertion is true but reason is false. d) If both assertion and reason are false.
72. Nuclei of a radioactive element A are being produced at a constant rate α . The element has a decay constant λ . At time $t = 0$, there are N_0 nuclei of the element. The number N of nuclei of A at time t is :
 a) $\frac{1}{\lambda} [\alpha + (\alpha - N_0\lambda)e^{-\lambda t}]$ b) $\frac{1}{\lambda} [\alpha - (\alpha - N_0\lambda)e^{-\lambda t}]$ c) $[\alpha - (\alpha - N_0\lambda)e^{-\lambda t}]$ d) $[\alpha - (N_0\lambda - \alpha)e^{-\lambda t}]$
73. Assertion: The detection of neutrinos is extremely difficult.
 Reason: Neutrinos interact only very weakly with matter.
 a) If both assertion and reason are true and reason is the correct explanation of assertion.
 b) If both assertion and reason are true but reason is not the correct explanation of assertion.
 c) If assertion is true but reason is false. d) If both assertion and reason are false.
74. The wavelength of the first line of Lyman series for hydrogen atom is equal to that of the second line of Balmer series for hydrogen like ion. The atomic number Z of hydrogen like ion is :
 a) 3 b) 4 c) 1 d) 2
75. If a proton had a radius R and the charge was uniformly distributed, the ground state energy (in eV) of a H-atom for $R = 0.1 \text{ \AA}$ is
 a) -13.6 b) -27.2 c) -3.4 d) -30.8
76. A d.c. battery of V volt is connected to a series combination of a resistor R and an ideal diode D as shown in the figure. The potential difference across -R will be:



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- a) 2V when diode is forward biased b) Zero when diode is forward biased
 c) V when diode is reverse biased d) V when diode is forward biased

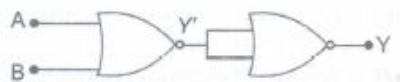
77. The following truth table belongs to which of the following four gates?

Input	Output
A B	Y

1	1	0
1	0	0
0	1	0
0	0	1

a) NOR b) XOR c) NAND d) OR

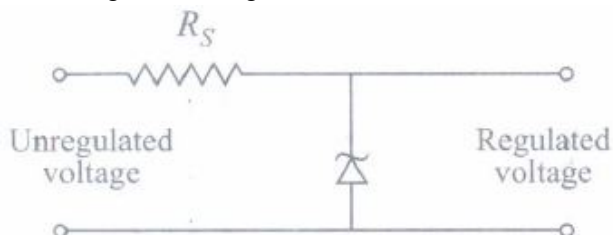
78. In a CE transistor amplifier, the audio signal voltage across the collector resistance of 2kW is 2V. If the base resistance is 1kW and the current amplification of the transistor is 100, the input signal voltage is:
a) 0.1 V b) 1.0 V c) 1 mV d) 10 mV
79. The number of beta particles emitted by a radioactive substance is twice the number of alpha particles emitted by it. The resulting daughter is an _____ .
a) isomer of parent b) isotone of parent c) isotope of parent d) isobar of parent
80. In a half wave rectifier circuit operating from 50 Hz mains frequency, the fundamental frequency in the ripple would be
a) 25 Hz b) 50 Hz c) 70.7Hz d) 100 Hz
81. Transmission of light in optical fibre is due to:
a) Scattering b) Diffraction c) Polarisation d) Multiple total internal reflections
82. In the following circuit, the output Y for all possible inputs A and B is expressed by the truth table:



a)	b)	c)	d)
ABY	ABY	ABY	ABY
011	001	011	001
011	010	101	010
101	100	000	100
110	110	111	111

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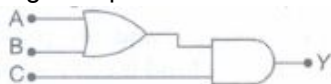
83. A Zener diode is specified as having a breakdown voltage of 9.1 V, with a maximum power dissipation of 364 mW. What is the maximum current the diode can handle?
a) 40 mA b) 60 mA c) 50 mA d) 45 mA
84. In semiconductors, at room temperature:
a) the conduction band is completely empty
b) the valence band is partially empty and conduction band is completely filled
c) the valence band is partially empty and the conduction band is partially filled
d) the valence band is completely filled
85. For transistor action, which of the following statements is correct?
a) The base region must be very thin and lightly doped.
b) Base, emitter and collector regions should have same doping concentrations.
c) Base, emitter and collector regions should have same size.
d) Both emitter junction as well as the collector junction are forward biased.
86. A Zener diode of power rating 1 W is to be used as a voltage regulator. If Zener has a breakdown of 5 V and it has to regulate voltage which fluctuated between 3 V and 7 V, what should be the value of R_S for safe operation?



a) 5Ω b) 10Ω c) 15Ω d) 20Ω

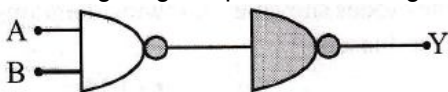
87. In a common base amplifier the phase difference between the input signal voltage and the output voltage is:
a) zero b) $\frac{\pi}{4}$ c) $\frac{\pi}{2}$ d) P

88. To get output 1 for the following circuit, the correct choice for the input is:



- a) $A = 0, B = 1, C = 0$ b) $A = 1, B = 0, C = 0$ c) $A = 1, B = 1, C = 0$ d) $A = 1, B = 0, C = 1$

89. Following diagram performs the logic function of



- a) XOR gate b) AND gate c) NAND gate d) OR gate

90. In the case of a common emitter transistor amplifier, the ratio of the collector current to the emitter current $I_c/I_e = 0.96$. The current gain of the amplifier is _____.

- a) 6 b) 48 c) 24 d) 12

91. An oscillator is nothing but an amplifier with:

- a) positive feedback b) negative feedback c) large gain d) no feedback

92. The part of the transistor which is heavily doped to produce large number of majority carriers is:

- a) emitter b) base c) collector d) any of the above depending upon the nature of transistor

93. A block of pure silicon at 300 K has a length of 10 cm and an area of 1.0 cm^2 . A battery of emf 2 V is connected across it. The mobility of electrons is $0.14 \text{ m}^2 \text{ V}^{-1} \text{ S}^{-1}$ and their number density is $1.5 \times 10^{16} \text{ m}^{-3}$. The electron current is

- a) $6.72 \times 10^{-4} \text{ A}$ b) $6.72 \times 10^{-5} \text{ A}$ c) $6.72 \times 10^{-6} \text{ A}$ d) $6.72 \times 10^{-7} \text{ A}$

94. The input resistance of a silicon transistor is 100Ω . Base current is changed by $40 \mu\text{A}$ which results in a change in collector current by 2 mA. This transistor is used as a common emitter amplifier with a load resistance of $4 \text{ k}\Omega$. The voltage gain of the amplifier is :

- a) 3000 b) 4000 c) 1000 d) 2000

95. A common emitter amplifier has a voltage gain of 50, an input impedance of 100Ω and an output impedance of 200Ω . The power gain of the amplifier is :

- a) 1000 b) 1250 c) 100 d) 500

96. What will be input of A and B for the Boolean expression $(A + B) \cdot (A \cdot B) = 1$?

- a) (0, 0) b) (0, 1) c) (1, 0) d) (1, 1)

97. p-n junction is said to be forward biased, when

- a) the positive pole of the battery is connected to n-semiconductor and p-semiconductor
b) mechanical force is applied in the forward direction
c) the positive pole of the battery is joined to the p-semiconductor and negative pole to the n-semiconductor
d) the positive pole of the battery is joined to the n-semiconductor and p-semiconductor

98. The depletion layer in the p-n junction region is caused by:

- a) drift of holes b) diffusion of charge carriers c) migration of impurity ions d) drift of electrons

99. For CE transistor amplifier, the audio signal voltage across the collector resistance of $2 \text{ k}\Omega$ is 4V. If the current amplification factor of the transistor is 100 and the base resistance is $1 \text{ k}\Omega$, then the input signal voltage is

- a) 10 mV b) 20 mV c) 30 mV d) 15 mV

100. For a common emitter transistor amplifier, the audio signal voltage across the collector resistance of $2 \text{ k}\Omega$ is 2 V. Suppose the current amplification factor of the transistor is 100, the base current if base resistance is $1 \text{ k}\Omega$ is

- a) $10 \mu\text{A}$ b) $20 \mu\text{A}$ c) $5 \mu\text{A}$ d) $2 \mu\text{A}$

101. The following substances are the excretory products in animals. Choose the least toxic from among them.

- a) Urea b) Uric acid c) Ammonia d) Carbon dioxide

102. Most of vertebrates can maintain a constant internal osmolarity different from the surrounding medium, expect:

- a) Myxine b) Sharks c) Bony fishes d) Both (1) & (2)

103. Which one of the following is not normally excreted in urine?

- a) Uric acid b) Haemoglobin c) Ketone bodies d) Hippuric acid

104. The presence of glucose and ketone bodies in urine are indicative of

- a) Diabetes mellitus b) Diabetes insipidus c) Renal calculi d) Glomerulonephritis
105. **Assertion:** Angiotensin II increases the glomerular blood pressure thereby GFR.
Reason: Angiotensin II activates the JG cells to release renin.
- a) If both assertion and reason are true and reason is the correct explanation of assertion.
b) If both assertion and reason are true but reason is not the correct explanation of assertion
c) If assertion is true but reason is false. d) If both assertion and reason are false.
106. Which of the following component of blood does not enter into the nephron?
a) Water b) Glucose c) Urea d) Plasma proteins
107. Nitrogenous waste products are eliminated mainly as____
a) urea in tadpole and ammonia in adult frog b) ammonia in tadpole and urea in adult frog
c) urea in both tadpole and adult frog d) urea in tadpole and uric acid in adult frog
108. Which of the following statements is correct?
a) The ascending limb of loop of Henle is impermeable to water
b) The descending limb of loop of Henle is impermeable to water
c) The ascending limb of loop of Henle is permeable to water.
d) The descending limb of loop of Henle is permeable to electrolytes
109. Consider the following four statements (i) - (iv) and select the option that correctly identifies the true (T) and false (F) ones.
- (i) Micturition is carried out by a reflex.
(ii) ADH helps in water elimination making the urine hypotonic.
(iii) Protein-free fluid is filtered from blood plasma into the Bowman's capsule.
(iv) Glucose is actively reabsorbed in the proximal convoluted tubule
- a)

(i)	(ii)	(iii)	(iv)
T	F	T	T

 b)

(i)	(ii)	(iii)	(iv)
T	T	F	F

 c)

(i)	(ii)	(iii)	(iv)
F	F	F	T

 d)

(i)	(ii)	(iii)	(iv)
F	T	F	T
110. Which one of the following statements is incorrect?
a) The medullary zone of kidney is divided into a few conical masses called medullary pyramids projecting into the calyces
b) Inside the kidney the cortical region extends in between the medullary pyramids as renal pelvis.
c) Glomerulus along with Bowman's capsule is called the renal corpuscle
d) Renal corpuscle, proximal convoluted tubule (PCT) and distal convoluted tubule (DCT) of the nephron are situated in the cortical region of kidney.
111. Consider the following four statements (i-iv) and select the option that correctly identifies the true (T) and false (F) ones.
- (i) Atrial natriuretic factor can cause vasodilation (dilation of blood vessels) and thereby decreases the blood pressure.
(ii) On an average, 60-70 gm of urea is excreted out per day.
(iii) Sebaceous glands eliminate certain substances like NaCl, urea and lactic acid through sebum.
(iv) PCT is lined by simple cuboidal brush border epithelium which increases the surface area for reabsorption.
- a)

(i)	(ii)	(iii)	(iv)
F	F	T	T

 b)

(i)	(ii)	(iii)	(iv)
F	T	T	T

 c)

(i)	(ii)	(iii)	(iv)
T	F	F	T

 d)

(i)	(ii)	(iii)	(iv)
T	T	F	T
112. A fall in glomerular filtration rate (GFR) activates
a) juxtaglomerular cells to release renin b) adrenal cortex to release aldosterone
c) adrenal medulla to release adrenaline d) posterior pituitary to release vasopressin.

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113. Which of the following organs, other than kidneys, also help in the elimination of excretory wastes?

- a. Lungs
b. Liver
c. Skin
d. Sebaceous glands
a) a only b) a and b c) a, b and c d) a, b, c and d

114. Match column I with column II and select the correct option from the codes given below.

Column I	Column II
A. Nephridia	(i) Crustaceans
B. Malpighian tubules	(ii) Annelids
C. Antennal gland or Green glands	(iii) Insects

- a) A-(i), B-(ii), C-(iii) b) A-(iii), B-(ii), C-(i) c) A-(ii), B-(iii), C-(i) d) A-(ii), B-(i) C-(iii)

115. Match column I with column II and select the correct option from the codes given below.

Column I	Column II
A. Delivers blood to glomerulus	(i) Ascending and descending limbs
B. Carries urine to pelvis	(ii) Renal artery
C. Collects filtrate from Bowman's capsule	(iii) Collecting duct
D. Loop of Henle	(iv) PCT

- a) A-(ii), B-(iii), C-(iv), D-(i) b) A-(i), B-(iii), C-(ii), D-(iv) c) A-(ii), B-(iv), C-(i), D-(iii)
d) A-(iv), B-(iii), C-(ii), D-(i)

116. Read the given statements and select the correct option.

Statement 1: Small amount of urea enters the thick segment of Henle's loop which is transported back to interstitium by collecting tubules.

Statement 2: Collecting tubules and thick segment of Henle's loop are permeable to urea.

- a) Both statements 1 and 2 are correct. b) Statement 1 is correct but statement 2 is incorrect.
c) Statement 1 is incorrect but statement 2 is correct. d) Both statements 1 and 2 are incorrect.

117. Human beings are

- a) Uricotelic b) Ureotelic c) Ammonotelic d) Both (2) & (3)

118. A notch present on the inner medial side of kidney is known as

- a) ureter b) pelvis c) hilus d) pyramid

119. Kidneys are reddish brown, bean-shaped structures situated between the levels of _____ thoracic and _____ lumbar vertebrae.

- a) 11th; 10th b) 12th; 3rd c) 10th; 2nd d) 12th; 5th

120. The most advanced kidneys in which loop of Henle is present are called metanephric kidneys, these are found in all, except one

- a) Amphibians b) Reptiles c) Birds d) Mammals

121. Which of the following sequences is correct?

- a) An increase in body fluid volume → Switch off the osmoreceptors → Suppresses the ADH release
b) ADH → Constricting effect on blood vessel → B.P.high → More glomerular blood flow → More GFR
c) Angiotensinogen → Angiotensin I → Angiotensin II → Adrenal cortex → Aldosterone d) All of these

122. Match the terms given in column I with their physiological processes given in column II and choose the correct answer.

Column I	Column II
A. Proximal convoluted tubule	(i) Formation of concentrated urine
B. Distal convoluted tubule	(ii) Filtration of blood
C. Henle's loop	(iii) Reabsorption of 70-80% of electrolytes
D. Counter current mechanism	(iv) Ionic balance
E. Renal corpuscle	(v) Maintenance of concentration gradient in medulla

- a) A-(iii), B-(v), C-(iv), D-(ii), E-(i) b) A-(iii), B-(iv), C-(i), D-(v), E-(ii) c) A-(i), B-(iii), C-(ii), D-(v), E-(iv)
d) A-(iii), B-(i), C-(iv), D-(v), E-(ii)
123. Which one of the following is also known as antidiuretic hormone?
a) Oxytocin b) Vasopressin c) Adrenaline d) Calcitonin
124. Which one of the following is a correct pair showing the function of a specific part of the human nephron?
a) Podocytes: create minute spaces (slit pores) for the filtration of blood into the Bowman's capsule
b) Henle's loop: most reabsorption of the major substances from the glomerular filtrate
c) Distal convoluted tubule: reabsorption of K^+ ions into the surrounding blood capillaries
d) Afferent arteriole: carries the blood away from the glomerulus towards renal vein
125. Which of the following is an incorrect match?
a) Bowman's capsule - Glomerular filtration b) DCT - Absorption of glucose
c) Henle's loop - Concentration of urine d) PCT - Absorption of Na^+ and K^+ ions
126. All Bowman's capsules of the kidney are found in
a) cortex b) pelvis c) medulla d) none of these.
127. The number of nephrons in a kidney is equal to:
a) the number of Bowman's capsules b) the sum of Bowman's capsules and Malpighian bodies
c) the sum of Bowman's capsules and glomeruli d) double the number of Bowman's capsules.
128. Select the correct option representing the parts of nephron that respectively absorb (i) glucose, (ii) amino acids, (iii) inorganic ions (Na^+ , K^+ , Cl^-) and (iv) urea in maximum.
- a)
- | (i) | (ii) | (iii) | (iv) |
|-----|----------------------------------|-------|------|
| DCT | Descending limb of loop of Henle | DCT | DCT |
- b)
- | (i) | (ii) | (iii) | (iv) |
|-----|----------------------------------|-------|------|
| DCT | Descending limb of loop of Henle | PCT | DCT |
- c)
- | (i) | (ii) | (iii) | (iv) |
|-----|------|-------|---------------------------------|
| PCT | PCT | PCT | Ascending limb of loop of Henle |
- d)
- | (i) | (ii) | (iii) | (iv) |
|-----|------|-------|---------------------------------|
| PCT | DCT | DCT | Ascending limb of loop of Henle |
129. Proximal convoluted tubule is highly specialized for reabsorption of substances. It is lined by
a) Simple squamous epithelium b) Simple columnar epithelium
c) Simple cuboidal epithelium without microvilli d) Simple cuboidal epithelium with microvilli
130. The longest loop of Henle is found in
a) kangaroo rat b) opossum c) rhesus monkey d) porcupine
131. as compared to plasma, all are the constituents of dialysis fluid, except
a) $NaCl$ b) Glucose c) Aminoacid d) Urea
132. A condition of failure of kidney to form urine is called ____
a) deamination b) entropy c) anuria d) None of these
133. Which one of the following statements in regard to the excretion by the human kidneys is correct?
a) Descending limb of Loop of Henle is impermeable to water
b) Distal convoluted tubule is incapable of reabsorbing HCO_3^-
c) Nearly 99 per cent of the glomerular filtrate is reabsorbed by the renal tubules
d) Ascending limb of Loop of Henle is impermeable to electrolytes
134. Hormone responsible for the absorption of water in DCT is
a) ADH b) ACTH c) Oxytocin d) Insulin
135. On an average, how much urea is excreted out per day by an adult human?
a) 25-20 g b) 15-20 g c) 35-40 g d) 40-45 g
136. Match the abnormal conditions given in Column A with their explanations given in Column B and choose the correct option.

Column A	Column B
A. Glycosuria	(i) Accumulation of uric acid in joints

B. Renal calculi	(ii) Inflammation in glomeruli
C. Glomerular nephritis	(iii) Masses of crystallised salts within the kidney
D. Gout	(iv) Presence of glucose in urine

- a) A-(i), B-(iii), C-(ii), D-(iv) b) A-(iii), B-(ii), C-(iv), D-(i) c) A-(iv), B-(iii), C-(ii), D-(i)
d) A-(iv), B-(ii), C-(iii), D-(i)
137. Which one of the following is not a part of a renal pyramid?
a) Peritubular capillaries b) Convoluted tubules c) Collecting ducts d) Loop of Henle
138. **Assertion:** Vasa recta is absent or highly reduced in cortical nephrons.
Reason: Cortical nephrons are mainly concerned with concentration of urine.
a) If both assertion and reason are true and reason is the correct explanation of assertion.
b) If both assertion and reason are true but reason is not the correct explanation of assertion.
c) If assertion is true but reason is false. d) If both assertion and reason are false.
139. Select the true statement
a) In fishes kidney play a major role in ammonia b) Ammonia is 100,000 times less toxic urea
c) Sharks retain a large amount of urea in the blood as a major osmolyte to balance the osmolarity of the body fluids
d) Most terrestrial reptile excrete ammonia
140. Consider the following statements each with one or two blanks.
(i) The ascending limb of loop of Henle is impermeable to (1) but allows transport of (2).
(ii) (3) and (4) play a significant role in producing a concentrated urine.
(iii) A fall in glomerular blood flow/glomerular blood pressure/GFR can activate the JG cells to release (5).
Which one of the following options correctly fills the blanks in any two of the statements?
a) (1)-water, (2)-electrolytes, (5)-renin b) (3)-Henle's loop, (4)-vasa recta, (5)-angiotensin
c) (1)-electrolytes, (2)-water, (3)-PCT, (4)-DCT d) (3)-Henle's loop, (4)-vasa recta, (5)-angiotensinogen
141. Bowman's glands are found in _____
a) external auditory canal b) cortical nephrons only c) juxtamedullary nephrons d) olfactory epithelium
142. Glycosuria is the condition, where a man
a) eats more sugar b) excretes sugar in urine c) sugar is excreted in faeces
d) has low sugar level in blood.
143. The pH of human urine is approximately
a) 6.5 b) 7 c) 6 d) 7.5
144. Dialysis fluid contain all the constituents as in plasma, except _____.
a) Glucose b) NaCl c) Amino acids d) Urea
145. **Assertion:** Liver is referred to as the primary excretory organ in vertebrates.
Reason: Liver helps kidneys in the secretion of urine.
a) If both assertion and reason are true and reason is the correct explanation of assertion.
b) If both assertion and reason are true but reason is not the correct explanation of assertion.
c) If assertion is true but reason is false. d) If both assertion and reason are false.
146. If a healthy man drinks one litre of water on occasion A and one litre of 0.9% saline on occasion B, what shall we expect in two hours?

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a)

Occasion A		Occasion B	
Volume of urine	Concentration of Na ⁺ in urine	Volume of urine	Concentration of Na ⁺ in urine
+++	+	+	+++

b)

Occasion A		Occasion B	
Volume of urine	Concentration of Na ⁺ in urine	Volume of urine	Concentration of Na ⁺ in urine
+++	+	+	+

c)

Occasion A		Occasion B	
Volume of urine	Concentration of Na ⁺ in urine	Volume of urine	Concentration of Na ⁺ in urine
++	++	++	+++

d)

Occasion A		Occasion B	
Volume of urine	Concentration of Na ⁺ in urine	Volume of urine	Concentration of Na ⁺ in urine
+++	++	+++	+++

147. Effective filtration pressure in glomerulus is caused due to
 a) powerful pumping action of the heart b) secretion of adrenaline
 c) afferent arteriole is slightly wider than efferent arteriole
 d) vacuum develops in proximal convoluted tubule and sucks the blood.
148. Substances like glucose, amino acids, Na⁺ etc. in the filtrate are reabsorbed by
 a) Active transport b) Passive transport c) Both active and passive transport d) Facilitated diffusion
149. Uric acid is an excretory product of
 (a) Cockroach
 (b) Sparrow
 (c) Terrestrial reptiles
 (d) Man
 a) (a) & (d) b) (b) & (d) c) (a), (b), & (c) d) (a), (c) & (d)
150. The characteristic(s) common to urea, uric acid and ammonia is/are
 (i) They are nitrogenous wastes.
 (ii) They all need very large amount of water for excretion.
 (iii) They are all equally toxic.
 (iv) They are produced in the kidneys.
 a) (i), (iii) and (iv) b) (i) only c) (i) and (iii) d) (i) and (iv)
151. Reabsorption of useful substances from glomerular filtrate occurs in _____
 a) collecting tube b) loop of Henle c) proximal convoluted tubule d) distal convoluted tubule
152. Aquatic reptiles are _____
 a) ammonotelic b) ureotelic c) ureotelic in water d) ureotelic over land
153. Mark the inappropriate term w.r.t the glomerular filtration
 a) Non selective b) Passive process c) Active process d) Occurs due to pressure difference
154. Mark the incorrect statement :
 a) Micturition is carried out by a reflex b) ADH helps in H₂O elimination, making the urine hypotonic
 c) Protein-free fluid is filtered from blood plasma into the Bowman's capsule
 d) Glucose is actively reabsorbed in the PCT
155. Osmotic concentration of glomerular filtrate is the highest at the bottom of the U-shaped Henle's loop. It is about _____ mos mL⁻¹.
 a) 300 b) 600 c) 900 d) 1200
156. Nearly all of the essential nutrients, and 70-80% of electrolytes and water are reabsorbed in the

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- a) PCT b) Henle's loop c) DCT d) Collecting duct
157. Of the total nephrons, juxtamedullary nephrons constitute
a) 15% b) 45% c) 65% d) 85%.
158. Angiotensinogen is a protein produced and secreted by
a) juxtaglomerular (JG) cells b) macula densa cells c) endothelial cells (cells lining the blood vessels)
d) liver cells.
159. In urinary system, aldosterone takes part in retention (reabsorption) of
a) K^+ b) Na^+ c) water d) both (b) and (c).
160. **Assertion:** Tubular secretion removes foreign bodies, ions and molecules from the body.
Reason: As much as 99 per cent of the material in the filtrate is reabsorbed from the body because of tubular secretion.
a) If both assertion and reason are true and reason is the correct explanation of assertion.
b) If both assertion and reason are true but reason is not the correct explanation of assertion.
c) If assertion is true but reason is false. d) If both assertion and reason are false.
161. Prolactin activates
a) Growth of breasts and secretion of milk in mammary glands b) Secondary sexual characters in males
c) Melatonin secretion d) Estrogen secretion
162. If 'X' is a hormone which controls the carbohydrate metabolism in the body and 'Y' is a hormone which controls the secretion of 'X' then 'X' and 'Y' are
a) Insulin and somatotrophin b) Aldosterone and growth hormone c) Glucocorticoid and ACTH respectively
d) Glucocorticoid and GHRH
163. Which hormone causes dilation of blood vessels, increased oxygen consumption and gluconeogenesis?
a) Adrenaline b) Glucagon c) ACTH d) Insulin
164. Drug called 'Heroin' is synthesised by _____
a) acetylation of morphine b) glycosylation of morphine c) nitration of morphine
d) methylation of morphine
165. Which hormone promotes cell division, protein synthesis and bone growth?
a) PTH b) ACTH c) ADH d) GH
166. Which of the following is an amino acid derived hormone?
a) Estradiol b) Ecdysone c) Epinephrine d) Estriol
167. The gonadotropic hormones are produced by _____ .
a) interstitial cells of testes b) adrenal cortex c) adenohypophysis of pituitary d) posterior part of thyroid
168. When both ovaries are removed from rat then which hormone is decreased in blood?
a) Oxytocin b) Prolactin c) Estrogen d) Gonadotropin releasing factor
169. Which of the following is incorrect match?
a) Thyroxine - Iodinated tyrosine b) Aldosterone - Polypeptide hormone c) Estrogen - steroid hormone
d) Thyropin - Glycoprotein hormone
170. **Assertion:** Cortisol produces anti-inflammatory reactions and suppresses the immune response.
Reason: Cortisol stimulates gluconeogenesis, lipogenesis and proteogenesis.
a) If both assertion and reason are true and reason is the correct explanation of assertion
b) If both assertion and reason are true but reason is not the correct explanation of assertion
c) If assertion is true but reason is false d) If both assertion and reason are false.
171. Which one of the following hormones though synthesised elsewhere, is stored and released by the master gland?
a) Melanocyte stimulating hormone b) Antidiuretic hormone c) Luteinizing hormone d) Prolactin

172. Read the given paragraph and select the option that correctly fills the blanks in it.

Hormones produce their effect on target tissue by binding to specific _____ A _____ called hormone receptors located in the target tissues only. Water soluble hormones usually need _____ B _____ receptor that generate _____ C _____ messengers for regulating cellular metabolism. _____ D _____ soluble hormones can pass through cell membrane and bind to _____ E _____ receptors, mostly nuclear receptors. The hormone receptor complex enter the nucleus and mostly regulate gene expression or chromosome function by interaction of hormone-receptor complex with the genome.

a)

A	B	C	D	E
proteins	membranebound	second	lipid	intracellular

b)

A	B	C	D	E
lipids	membranebound	second	water	intracellular

c)

A	B	C	D	E
proteins	intracellular	second	lipid	extracellular

d)

A	B	C	D	E
proteins	membranebound	primary	lipid	intracellular

173. **Assertion:** Melatonin influences the menstrual cycle, pigmentation and defense capability.

Reason: Melatonin plays an important role in the regulation of diurnal rhythm of our body.

- a) If both assertion and reason are true and reason is the correct explanation of assertion
 b) If both assertion and reason are true but reason is not the correct explanation of assertion
 c) If assertion is true but reason is false. d) If both assertion and reason are false

174. Anterior pituitary gland facilitates growth of an individual by release of the human growth hormone (HGH) which in turn is regulated by two hormones namely growth hormone releasing hormone (GHRH) and growth hormone inhibiting hormone (GHIH). Imbalance of these hormones could result in gigantism, dwarfism or acromegaly. Interpret the data given below and select the appropriate statement.

Individual	Age group	Hormones released
1	2-5 yrs	Excessive GHRH
2	2-5 yrs.	Normal GHRH
3	30- 35 yrs.	Excessive GHRH
4	30- 35 yrs	Excessive GHIH
5	2-5 yrs	Excessive GHIH

- a) 1 and 3 will lead to gigantism while 4 and 5 will show dwarfism.
 b) 3 will show gigantism, 1 will show acromegaly and 4 and 5 will show dwarfism.
 c) 2, 3 and 4 will show normal growth.
 d) 1 will show gigantism, 3 will show acromegaly and 5 will show dwarfism.

175.

Column I	Column II
A. FSH	(i) Transported axonally to neurohypophysis from hypothalamus
B. MSH	(ii) Acts on melanocytes and regulates pigmentation of skin
C. Vasopressin (ADH)	(iii) Stimulates the growth and development of ovarian follicles in female
D. Pars intermedia	(iv) In human, it is almost merged with pars distalis

- a) A-(iii), B-(ii), C-(i), D-(iv) b) A-(i), B-(ii), C-(iii), D-(iv) c) A-(iv), B-(iii), C-(ii), D-(i)
 d) A-(iii), B-(ii), C-(iv), D-(i)

176. Ovulation in females is under the control of

- a) ADH and LH b) LH c) TSH and LH d) LTH and TSH

177. Select the mismatched pair from the following.

- a) Insulin - Gluconeogenesis b) Glucagon - Glycogenolysis c) Oxytocin - Contraction of uterine muscles
 d) Prolactin - Milk production in mammary glands

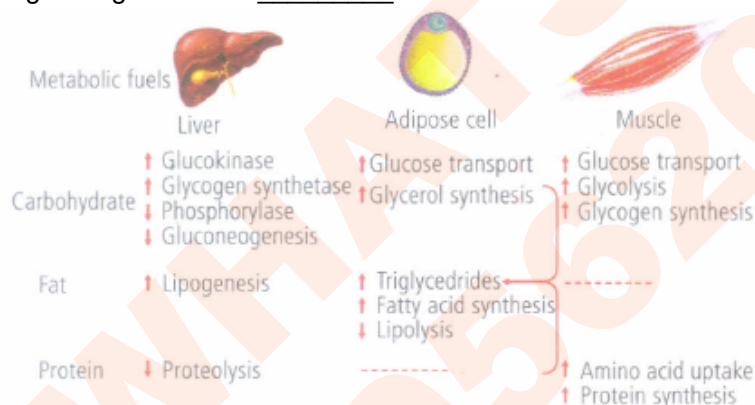
178. According to the accepted concept of hormone action, if receptor molecules are removed from target organs, then the target organ will _____

- a) not respond to the hormone b) continue to respond to hormone without any difference
 c) continue to respond to the hormone but in the opposite way

- d) continue to respond to the hormone but will require higher concentration
179. The function of oxytocin is to help in
a) child birth b) gametogenesis c) growth d) all of these
180. Hypothalamic hormones directly regulate the synthesis and secretion of
a) Thyroid hormones b) Pituitary hormones c) Adrenal hormones d) parathormone
181. Match column I with column II and select the correct option from the codes given below.

Column I	Column II
A. Thyroid	(i) Acts on the renal tubules
B. Adrenal	(ii) Regulates blood calcium level
C. Pituitary	(iii) Maintains diurnal rhythm of our body
D. Pineal	(iv) Acts on the melanocytes

- a) A-(iv), B-(iii), C-(ii), D-(i) b) A-(iii), B-(iv), C-(i), D-(ii) c) A-(iv), B-(ii), C-(iii), D-(i)
d) A-(ii), B-(i), C-(iv), D-(iii)
182. Which of the following is the widest layer adrenal cortex?
a) Zona glomerulosa b) Zona fasciculata c) Zona reticularis d) Both (1) & (3) together make widest layer
183. Secretion of which of the following is under control of neurosecretory nerve cells?
a) Pineal b) Adrenal cortex c) Anterior pituitary d) Thymus
184. Pituicytes are under the control of
a) adenohypophysis b) hypothalamus c) neurohypophysis d) both (a) and (c)
185. Which one of the following hormones is a modified amino acid?
a) Epinephrine b) Progesterone c) Prostaglandin d) Estrogen
186. The given figure shows _____ .



- a) the major target sites and the metabolic actions of the anabolic hormone secreted by the beta cells of heterocrine gland
b) the major target sites and the metabolic actions of the hormone secreted by alpha cells of pancreas
c) the major target sites and the functions of the hormone secreted by the anterior pituitary gland
d) the major target sites and the metabolic actions of the hormone secreted by the parafollicular (C) cells
187. Which of the following hormones is/are stored in herring bodies?
a) Both (2) & (3) b) Somatocrinin c) Vasopressin d) Oxytocin
188. Hypothalamus forms an important link between
a) Digestive system and nervous system b) Digestive system and respiratory system
c) Digestive system and endocrine system d) Integumentary system and reproductive system
189. Neural coordination is
a) Fast and long lived b) Fast and short lived c) Slow and long lived d) Slow and short lived
190. Name a peptide hormone which acts mainly on hepatocytes, adipocytes and enhances cellular glucose uptake and utilisation.
a) Insulin b) Glucagon c) Secretin d) Gastrin

191. Match column I with column II and select the correct option from the codes given below.

Column I	Column II
A. Testis	(i) Pigmentation
B. Ovaries	(ii) Atrophies in adult
C. Thymus	(iii) Estrogen
D. Melanin	(iv) Testosterone

- a) A-(iii), B-(iv), C-(i), D-(ii) b) A-(ii), B-(iii), C-(iv), D-(i) c) A-(iv), B-(iii), C-(ii), D-(i)
d) A-(i), B-(iv), C-(ii), D-(iii)

192. Which one of the following endocrine glands stores its secretion in the extracellular space before discharging it into the blood?

- a) Testis b) Thyroid c) Pancreas d) Adrenal

193. A person entering an empty room suddenly finds a snake right in front of an opening the door. Which one of the following is likely to happen in his neuro-hormonal control system?

- a) Sympathetic nervous system is activated releasing epinephrine and norepinephrine from adrenal medulla
b) Neurotransmitters diffuse rapidly across the cleft and transmit a nerve impulse
c) Hypothalamus activates the parasympathetic division of brain
d) Sympathetic nervous system is activated releasing epinephrine and norepinephrine from adrenal cortex

194. Which of the following hormones is necessary for the development of secondary sexual characters in human beings?

- a) Estrogen b) FSH c) Testosterone d) Both (a) and (c)

195. Identify the hormone with its correct matching of source and function _____

- a) Oxytocin - posterior pituitary growth and maintenance of mammary glands.
b) Melatonin - pineal gland, regulates the normal rhythm of sleepwake cycle.
c) Progesterone - corpus-luteum, stimulation of growth and activities of female secondary sex organs
d) Atrial natriuretic factor - ventricular wall increases the blood pressure

196. A person is having problems with calcium and phosphorus metabolism in his body. Which one of following glands may not be functioning properly?

- a) Parotid b) Pancreas c) Thyroid d) Parathyroid

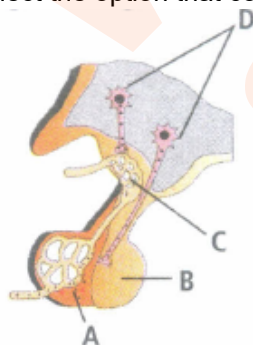
197. Select the correct match.

- a) Matthew Meselson and F. Stahl : *pisum sativum* b) Alfred Hershey TMV and Martha Chase
c) Alec Jeffreys : *Streptococcus pneumoniae* d) Francois Jacob and Jacques Monod : Lac operon.

198. Goitre is a pathological condition associated with

- a) glucagon b) progesterone c) thyroxine d) testosterone

199. Select the option that correctly identifies the labels A, B, C and D in the given diagram.



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a)

A	B	C	D
Anterior pituitary	Posterior pituitary	Blood vessels	Thalamus

b)

A	B	C	D
Posterior pituitary	Anterior pituitary	Hypothalamus	Thalamus

c)

A	B	C	D
Anterior pituitary	Posterior pituitary	Portal circulation	Hypothalamic neurons

d)

A	B	C	D
Hypo-thalamic neurons	Posterior pituitary	Anterior pituitary	Portal circulation

200. Which of the following hormones is responsible for gigantism?
 a) Growth hormone b) Somatostatin c) Adrenaline d) GnRH
201. Read the given statements that define functions of a particular hormone.
 (i) Regulates the development, maturation and functions of epididymis, vas deferens, seminal vesicle, prostate gland, urethra, etc.
 (ii) Stimulates muscular growth of facial and axillary hair, aggressiveness, low pitch of voice, etc.
 (iii) Stimulates spermatogenesis.
 (iv) Act on CNS and sexual behaviour (libido).
 (v) Produce anabolic (synthetic) effect on protein and carbohydrate metabolism.
 (vi) The Leydig's cells/interstitial cells (present in intertubular space) secrete this hormone under the influence of LH.
 Which of the following hormones is referred here?
 a) FSH b) Progesterone c) Androgen d) Melatonin
202. Which of the following statements is correct in relation to the endocrine system?
 a) Organs in the body like gastrointestinal tract, heart, kidney and liver do not produce any hormones.
 b) Non-nutrient chemicals produced by the body in trace amount that act as intercellular messenger are known as hormones.
 c) Releasing and inhibitory hormones are produced by the pituitary gland.
 d) Adenohypophysis is under direct neural regulation of the hypothalamus.
203. Exophthalmic goitre is also called _____.
 a) Addison's disease b) diabetes insipidus c) Grave's disease d) acromegaly
204. Which one of the following hormones never reaches to cytoplasm?
 a) Estrogen b) FSH c) Progesterone d) Testosterone
205. In which of the following hormone works from outside the cell?
 a) Estrogen b) Cortisol c) Insulin d) Thyroxine
206. A chemical signal that has both endocrine and neural roles is:
 a) Melatonin b) Calcitonin c) Epinephrine d) Cortisol
207. The given table enlists various hormones and their chemical nature. Select the option which completes the table.

Hormone	Chemical composition
(i)	Peptide
Testosterone	(ii)
Thyroxine	(iii)
(iv)	Amino-acid derivative

a)

(i)	(ii)	(iii)	(iv)
Cortisol	Steroid	Polypeptide	Estradiol

b)

(i)	(ii)	(iii)	(iv)
Oxytocin	Protein	Iodothyronine	Epinephrine

c)

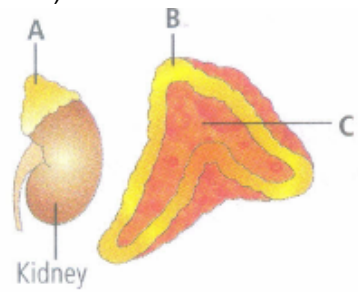
(i)	(ii)	(iii)	(iv)
Cortisol	Protein	Amine	Estradiol

d)

(i)	(ii)	(iii)	(iv)
Oxytocin	Steroid	Iodothyronine	Epinephrine

208. ADH
 a) increases water absorption b) decreases water absorption c) synthesises salt
 d) controls sugar level of blood.
209. What is correct to say about the hormone action in humans?

- a) Glucagon is secreted by 3-cells of islets of Langerhans and stimulates glycogenolysis.
 - b) Secretion of thyrosins is stimulated with ageing.
 - c) In females FSH first binds with specific receptors on ovarian cell membrane.
 - d) FSH stimulates the secretion of estrogen and progesterone.
210. Diabetes insipidus occurs due to the hyposecretion of
 a) thymosine b) oxytocin c) insulin d) vasopressin
211. Which of the following is under the direct control of neurosecretory cells?
 a) Pars distalis and pars intermedia b) Pars intermedia and pars nervosa c) Pars nervosa only
 d) Pars distalis only
212. Which of the following conditions is not linked to deficiency of thyroid hormone?
 a) Cretinism b) Goitre c) Myxoedema d) Exophthalmia
213. Addition of a trace of thyroxine or iodine in water containing tadpoles will _____
 a) keep them in larval stage b) hasten their metamorphosis c) slow down their metamorphosis
 d) kill the tadpoles
214. Identify the parts labelled A, B and C in the given figure and select the correct option (second figure is the cross section of A).



a)

A	B	C
Adrenal gland	Cortex	Medulla

b)

A	B	C
JGA	Cortex	Medulla

c)

A	B	C
Adrenal gland	Medulla	Cortex

d)

A	B	C
Adrenal gland	Pars distalis	Pars intermedia

215. In females, LH stimulates _____ in the ovary to secrete____.
 a) Graafian follicle, ICSH respectively b) Graafian follicle, prolactin respectively
 c) Corpus luteum, FSH respectively d) Corpus luteum, Progesterone respectively
216. Low level of progesterone and estrogen in blood stimulate
 a) FSH-RH production b) LH production c) GH production d) all of these
217. Thyroxine brings about effects on target cells by
 a) Altering gene expression b) Activating adenylate cyclase c) Activating guanylate cyclase
 d) Activating G-protein
218. GnRH stimulates _____ to release_____
 a) Hypothalamas, gonadotropins b) Pituitary gland, gonadotropins c) Pituitary gland, growth hormone
 d) Hypothalamus, growth hormone
219. Which part of body secretes the hormone secretion?
 a) Stomach b) Oesophagus c) Ileum d) Duodenum
220. Which one of the following hormones stimulates the 'let down' (release) of milk from the mother's breasts when the baby is sucking?

- a) Progesterone b) Oxytocin c) Prolactin d) Relaxin

221. TSH (thyroid stimulating hormone) is produced by

- a) adrenal cortex b) middle pituitary lobe c) anterior pituitary lobe d) posterior pituitary lobe

222. In which of the following options, hormone is not matching with its source and function?

a)

Hormone	Source	Function
Glucocorticoids	Adrenal cortex	Produces anti inflammatory reactions

b)

Hormone	Source	Function
Vasopressin	Posterior pituitary	Stimulates resorption of water and electrolytes

c)

Hormone	Source	Function
Parathyroid hormone	Thyroid	Decreases the blood Ca^{2+} level

d)

Hormone	Source	Function
Melatonin	Pineal gland	Maintains sleep-wake cycle

223. GnRH, a hypothalamic hormone, needed in reproduction, acts on _____.

- a) anterior pituitary gland and stimulates secretion of LH and FSH.
 b) posterior pituitary gland and stimulates secretion of oxytocin and FSH.
 c) posterior pituitary gland and stimulates secretion of LH and relaxin.
 d) anterior pituitary gland and stimulates secretion of LH and oxytocin.

224. Underproduction of hormones by adrenal cortex causes _____.

- a) Addison's disease b) diabetes mellitus c) diabetes insipidus d) Grave's disease

225. Injury to adrenal cortex is not likely to affect the secretion of which one of the following?

- a) Aldosterone b) Both Androstenedione and Dehydroepiandrosterone c) Adrenaline d) Cortisol

226. Which hormone stimulates the secretion of milk from female?

- a) Oxytocin b) Progesterone c) LH d) Prolactin

227. Which of the following statements about 'neurohypophysis' is correct?

- a) It stores the hormones produced by adenohypophysis
 b) It is poorly developed and functionless in humans
 c) It stores and releases hormones secreted by hypothalamus d) It secretes its own hormones.

228. Which one of the following pairs correctly/matches a hormone with a disease resulting from its deficiency?

- a) Luteinizing - Failure of ovulation b) Insulin - Diabetes insipidus c) Thyroxine - Tetany
 d) Parathyroid - Diabetes mellitus

229. Estrogen and testosterone are steroid hormones, and most likely bind to

- a) membrane ion channels b) enzyme-linked membrane receptors
 c) G-protein coupled membrane receptors d) cytoplasmic receptors

230. Increase in bleeding time and delay in blood coagulation is due to the deficiency of which hormone?

- a) Adrenaline b) Noradrenaline c) Parathormone d) Thyroxine

231. Match column I with column II and select the correct option from the given codes.

Column I	Column II
A. Anemophily	(i) Grasses, Date palm
B. Hydrophily	(ii) Rose, Jasmine
C. Entomophily	(iii) Butea, Bignonia
D. Ornithophily	(iv) Vallisneria, Ceratophyllum

- a) A-(i), B-(iv), C-(ii), D-(iii) b) A-(i), B-(iv), C-(iii), D-(ii) c) A-(ii), B-(iii), C-(i), D-(iv)
 d) A-(ii), B-(i), C-(iii), D-(iv)

232. Pollen tube is produced by

- a) Exine b) Intine c) Both exine and intine d) Generative cell

233. The coconut water from tender coconut represents

- a) Free nuclear endosperm b) Endocarp c) Fleshy mesocarp d) Free nuclear proembryo

234. Match the column - I with column - II and select the correct option using the codes given below

Column - I	Column - II
(a) Pistil fused together	(i) Gametogenesis
(b) Formation of gametes	(ii) Pistillate
(c) Hyphae of higher Ascomycetes	(iii) Syncarpous
(d) Unisexual female flower	(iv) Dikaryotic

a)	b)	c)	d)
abc d	a b c d	a b c d	abc d
i ii iv iii	iiii iv ii	iv iii i ii	ii i iv iii

235. Refer to the given characteristics of some flowers:

- (i) Light and non-sticky pollen grains
 (ii) Exserted stigmas and anthers
 (iii) Large, often feathery stigmas
 (iv) Flowers colourless, odourless and nectarless
 (v) Common in grasses

Above features are the characteristics of

- a) anemophily b) hydrophily c) entomophily d) zoophily

236. Male gametophyte with least number of cell present in:

- a) Pteris b) Funaris c) Liliium d) Pinus

237. A particular species of plant produces light, non-sticky pollen in large numbers and its stigmas are long and feathery. These modifications facilitate pollination by

- a) insects b) water c) wind d) animals

238. The total number of nuclei involved in double fertilisation in angiosperms are

- a) two b) three c) four d) five

239. Choose the mismatched pair.

- a) **Cannabis** - Anemophily b) **Zostera** - Hydrophily c) **Salvia** - Entomophily d) **Adansonia** - Ornithophily

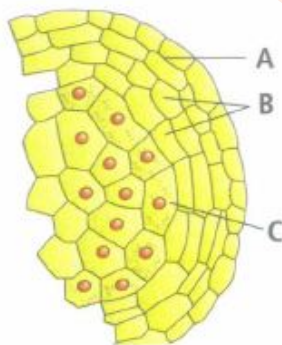
240. In Angiosperm, if haploid number of chromosomes is 12 then what will be the no of chromosomes integuments and synergids

- a) 12, 12 b) 24, 12 c) 24, 24 d) 12, 24

241. In an angiospermic plant just after double fertilization, arrangement of nuclei in an oule

- a) Five haploid, one diploid, one triploid b) Three haploid, Two diploid, Two triploid
 c) Two haploid, Three diploid, Two triploid d) one haploid, Three diploid, Three triploid

242. The given diagram shows microsporangium of a mature anther. Identify A, B and C



- a) A-Middle layer, B-Endothecium, C-Tapetum b) A-Endothecium, B-Tapetum, C- Middle layer
 c) A-Endothecium, B-Middle layer, C-Tapetum d) A-Tapetum, B-Middle layer, C-Endothecium

243. Select the correct option regarding the ploidy level of different structures of an angiospermous ovule.

a)

Nucellus	MMC	Functional megaspore
n	2n	2n

b)

Nucellus	MMC	Functional megaspore
2n	n	n

c)

Nucellus	MMC	Functional megaspore
2n	2n	n

d)

Nucellus	MMC	Functional megaspore
n	2	n

244. Free nuclear division in an angiosperm takes place during
a) Pollen formation b) Endosperm formation c) Embryo gamete d) Flower formation
245. Micropyle in seed helps in the entry of
a) Male gamete b) Pollen tube c) Water & air d) All
246. Triploid primary endosperm nucleus is the characteristic feature of
a) Algae b) Bryophytes c) Gymnosperm d) Angiosperm
247. Which of the following is true for primary endosperm nuclei (PEN)
a) Fusion of two polar nuclei and one male gamete b) Fusion of one synergid and two polar nuclei
c) Fusion of two antipodal and one male gamete
d) Fusion of one male gamete one synergids and one antipodal cell
248. Just before fertilization the diploid structure in the ovule of Capsella is
a) Pollen tube b) Nucellus / sec. nucleus c) Synergids d) Antipodals
249. What is common between vegetative reproduction and Apomixis?
a) Both produces progeny identical to the parent b) Both are applicable to only dicot plants
c) both occur round the year d) Both occur round the year
250. A typical angiospermous ovule is attached to the placenta by means of a stalk called X. Body of the ovule fuses with X in the region called Y. Identify X and Y.

a)

X	Y
Funicle	Hilum

b)

X	Y
Hilum	Funicle

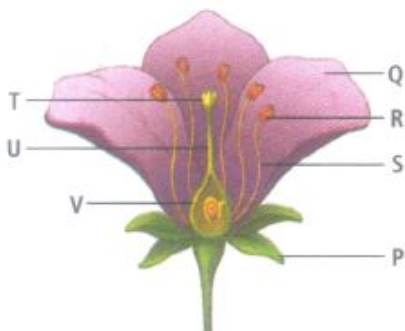
c)

X	Y
Funicle	Micropyle

d)

X	Y
Hilum	Chalaza

251. Which is generally not a characteristic of anemophilous flower?
a) Unisexual nature b) Abundant pollen grains c) Bright coloured
d) Reduction in number of sepals, petals and ovules
252. What is the ploidy primary endosperm nucleus (Pen) in angiosperm?
a) Haploid b) Diploid c) Triploid d) Hexaploid
253. Dioecious condition and epihydrophyly is found in
a) Vallisneria b) Salvia c) Zostera d) Coconut
254. Which is correct?
a) Tapetum nourishes the developing pollen b) Hard outer layer of pollen is called intine
c) Sporogenous tissue is haploid d) Endothecium produces the microspore
255. Identify P - V in the given figure and select the correct option



- a) P-Petal, Q-Sepal, R-Filament, S-Anther, T-Style, U-Stigma, V-Ovary
b) P-Petal, Q-Sepal, R-Anther, S-Filament, T-Stigma, U-Style, V-Ovary

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- c) P-Sepal, Q-Petal, R-Anther, S-Filament, T-Stigma, U-Style, V-Ovary
d) P-Ovary, Q-Petal, R-Anther, S-Filament, T-Stigma, U-Style, V-Sepal
256. Single sheild shaped cotyledon of grass known as
a) Tigellum b) Scutellum c) Coleoptile d) Coleorrhiza
257. The type of cells under going meiosis in the flower are
a) Microspore mother cell & megaspore mother cell b) Ovule & stamen c) Tapetal cells d) Placental cell
258. Parthenogenesis occurs when:
a) When embryo is formed without the fusion of egg and the sperm
b) When embryo is formed by the fusion of egg and sperm c) When embryo is formed from another cell
d) When sperm produces the haploid and diploid
259. The part of castor seed that yields oil is
a) Cotyledon b) Caruncle c) Endosperm d) nucellus
260. Arising from placenta is megasporangium which is commonly known as
a) Ovule b) Ovary c) Ovaration cavity d) Stamen
261. During the process of fertilisation the pollen tube of the pollen grain usually enters the embryo sac through
a) integument b) nucellus c) chalaza d) micropyle
262. Egg apparatus is situated at _____ end and is composed of _____ cells
a) Micropylar, 2 b) Chalazal, 3 c) Micropylar, 3 d) Chalazal, 2
263. In a Cereal grain the single cotyledon of embryo is represented by
a) Coleorrhiza b) Scutellum c) Prophyll d) Coleoptile
264. A typical anther is generally
a) Bisporangiate b) Tetrsporangiate c) Monosporangiate d) Mulisporangiate
265. Find odd one out w.r.t. thalamus contribution to fruit formation
a) Apple b) Pear c) Cashew d) Grapes
266. Which one of the following plants shows a very close relationship with a species of moth, where none of the two can complete its life cycle without the other?
a) Banana b) Yucca c) Hydrilla d) Viola
267. Pollination in water hyacinth and water lily is brought about by the agency of:
a) Bats b) Water c) Insects or winds d) Birds
268. In majority of angiosperms
a) there are numerous antipodal cells b) reduction division occurs in the megaspore mother cells
c) a small central cell is present in the embryo sac d) egg has a filiform apparatus
269. Two non motile male gametes in angiosperm are produced by
a) generative cell b) Microspore mother cell c) Vegetative cell d) Tube cell
270. Which one of the following is false fruit?
a) Apple b) Strawberry c) Cashew d) All
271. Flowers which have a single ovule in the ovary and are packed into inflorescence are usually pollinated by
a) Water b) Bee c) Wind d) Bat
272. In (i) condition, both male and female flowers are borne on same plant; an example of such plants is (ii) .
a)

(i)	(ii)
monoecious	cucurbit

 b)

(i)	(ii)
monoecious	papaya

 c)

(i)	(ii)
dioecious	cucurbit

 d)

(i)	(ii)
dioecious	papaya
273. After culturing the anther of a pants few diploid plant were got along with haploid plant. Which of the following part might have given rise to diploid plant
a) Vegetative cell of pollen b) Exine of pollen wall c) Cells of anther wall d) Generative cell of pollen
274. The megasporangium is equivalent to:
a) Embryo b) Nucellus c) Ovule d) Fruit
275. In Flowering plant, archesporium gives rise to

- a) Only the wall of the sporangium b) Both wall and the sporogenous cells c) Wall and the tapetum
d) Only tapetum and sporogenous cells

276. A typical angiosperm embryo sac at maturity is

- a) 7 celled - 8 nucleated b) 9 celled - 7 nucleated c) 3 celled - 3 nucleated d) 2 celled - 2 nucleated

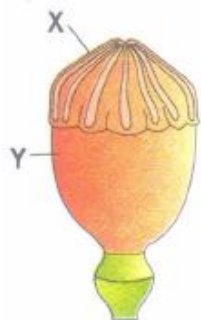
277. the coconut water from tender coconut that you are familiar with is

- a) Nuclear endosperm b) Cellular endosperm c) Helobial endosperm d) All

278. The outermost and innermost wall layers of microsporangium in an anther are respectively

- a) endothecium and tapetum b) epidermis and endodermis c) epidermis and middle layer
d) epidermis and tapetum

279. Refer to the given figure of reproductive structure of Papaver and identify X and Y.



a)

X	Y
Syncarpous ovary	Stigma

b)

X	Y
Stigma	Syncarpous ovary

c)

X	Y
Thalamus	Apocarpous ovary

d)

X	Y
Apocarpous ovary	Thalamus

280. Epicotyl has a shoot apex and few leaf primordia enclosed in a hollow foliar structure known as

- a) Coleoptile b) Coleorrhiza c) Scutellum d) Tigellum

281. The two celled stage at which pollen grains are discharged include

- a) Larger generative cell and smaller vegetative cell b) Larger vegetative cell and smaller body cell
c) Smaller vegetative cell and larger body cell d) Smaller generative cell and larger vegetative cell

282. Pollen grains are shed at 2-celled stage in

- a) 60% angiosperms b) 40% angiosperms c) 20% angiosperms d) 80% angiosperms

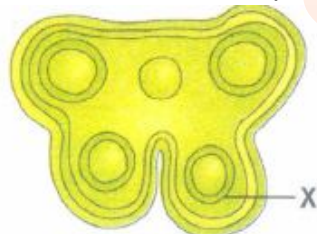
283. The three cells found in a pollen grain when it is shed at 3-celled stage are

- a) 1 vegetative cell, 1 generative cell, 1 male gamete b) 1 vegetative cell, 2 male gametes
c) 1 generative cell, 2 male gametes d) either (a) or (b)

284. Pollen grains of many species cause severe allergies & bronchial afflictions in some people often leading to chronic respiratory disorder such as

- a) Asthma b) Bronchitis c) Both 1 & 2 d) Emphysema

285. The function of labelled part X is



- a) dehiscence b) mechanical c) nutrition d) protection.

286. Protandry is the situation when

- a) Anther matures later than the stigma of flower b) Anther matures earlier than the stigma of flower
c) Anther and Stigma mature at the same time d) All of the above

287. Fragrant flowers with well developed nectaries are an adaptation for

- a) hydrophily b) anemophily c) entomophily d) none of these.

288. Nonessential floral organs in a flower are
a) sepals and petals b) anther and ovary c) stigma and filament d) petals only
289. Ovules are also called
a) Megasporophyll b) Integumented megasporangia c) Seeds d) Nucellus
290. The synergids have special cellular thickening at the micropylar tip called
a) Obturator b) Filiform apparatus c) Egg cell d) Antipodal
291. Among the terms listed below, those that are not technically correct names for a floral whorl are
(i) Androecium
(ii) Carpel
(iii) Corolla
(iv) Sepal
a) (i) and (iv) b) (iii) and (iv) c) (ii) and (iv) d) (i) and (ii)
292. Which of the following statements about sporopollenin is incorrect?
a) Exine is made up of sporopollenin b) Sporopollenin is one of the resistant organic materials
c) Exine has apertures called germ pores where sporopollenin is present
d) Sporopollenin can withstand high temperatures and strong acids
293. Proximal end of the filament of stamen is attached to the
a) Anther b) Connective c) Placenta d) Thalamus or petal
294. An example of a seed with endosperm, perisperm and caruncle
a) Castor b) Cotton c) Coffee d) Lily
295. In angiosperms various stages of reductional division can best be studied in
a) young anthers b) mature anthers c) young ovules d) endosperm cells
296. Assertion: In most angiosperms, microspores of a tetrad grow and separate from one another shortly after meiosis.
Reason: In the members of families Orchidaceae and Asclepiadaceae, all the pollen grains of a sporangium remain united to form a compact structure called pollinium.
a) If both assertion and reason are true and reason is the correct explanation of assertion
b) If both assertion and reason are true but reason is not the correct explanation of assertion
c) If assertion is true but reason is false. d) If both assertion and reason are false.
297. Genetically self but functionally cross-pollination is
a) Autogamy b) Allogamy c) Geitonogamy d) Xenogamy
298. The number of germ pores in dicots and monocots pollen grains are respectively
a) 1, 3 b) 3, 1 c) 2, 3 d) 3, 2
299. Although in most of species fruits are result of fertilisation, there are a few species in which fruit develop without fertilisation - process is known as
a) Parthenocarpy b) Parthenogenesis c) Amphimixis d) Apomixis
300. After pollination viability of pollen grains of when rice is about
a) 30 min b) 60 min c) 70 min d) 90 min
301. Assertion: The decomposition of gaseous ammonia on a hot platinum surface is a zero order reaction at high pressure.
Reason: For a zero order reaction, the rate of reaction is independent of initial concentration.
a) If both assertion and reason are true and reason is the correct explanation of assertion
b) If both assertion and reason are true but reason is not the correct explanation of assertion
c) If assertion is true but reason is false d) If both assertion and reason are false
302. The overall rate of a reaction is governed by
a) the rate of fastest intermediate step b) the sum of the rates of all intermediate steps
c) the average of the rates of all the intermediate steps d) the rate of slowest intermediate step
303. For the reaction $2A + B \rightarrow 3C + D$
which of the following does not express the reaction rate?

a) $-\frac{d[B]}{dt}$ b) $\frac{d[D]}{dt}$ c) $-\frac{1}{2}\frac{d[A]}{dt}$ d) $-\frac{1}{3}\frac{d[C]}{dt}$

304. The activation energy of a reaction can be determined from the slope of which of the following graphs?

a) $\ln k$ vs T b) $\ln k$ vs $\frac{1}{T}$ c) $\frac{\ln k}{T}$ vs T d) $\frac{T}{\ln k}$ vs $\frac{1}{T}$

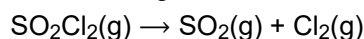
305. Assertion: The reaction



Reason: Change in concentration of H_2O is negligible.

- a) If both assertion and reason are true and reason is the correct explanation of assertion
 b) If both assertion and reason are true but reason is not the correct explanation of assertion
 c) If assertion is true but reason is false d) If both assertion and reason are false

306. The following data were obtained during the first order thermal decomposition of SO_2Cl_2 at a constant volume.



Experiment	Time/s	Total pressure/atm
1	0	0.5
2	100	0.6

What is the rate of reaction when total pressure is 0.65 atm?

a) 0.35 atm s^{-1} b) $2.235 \times 10^{-3} \text{ atm s}^{-1}$ c) $7.8 \times 10^{-4} \text{ atm s}^{-1}$ d) $1.55 \times 10^{-4} \text{ atm s}^{-1}$

307. The experimental data for the reaction $2A + B_2 \rightarrow 2AB$ is :

Exp.	[A]	[B]	Rate ($M s^{-1}$)
1.	0.50	0.50	1.6×10^{-4}
2.	0.50	1.00	3.2×10^{-4}
3.	1.00	1.00	3.2×10^{-4}

The rate equation for the above data is :

a) $\text{rate} = k[B_2]$ b) $\text{rate} = k[B_2]^2$ c) $\text{rate} = k[A]^2[B]^2$ d) $\text{rate} = k[A]^2[B]$

308. In a first order reaction, the concentration of reactant decreases from 400 mol L^{-1} to 25 mol L^{-1} in 200 seconds.

The rate constant for the reaction is

a) 1.01386 s^{-1} b) $2 \times 10^{-4} \text{ s}^{-1}$ c) $1.386 \times 10^{-2} \text{ s}^{-1}$ d) $3.4 \times 10^{-4} \text{ s}^{-1}$

309. Threshold energy is equal to

- a) activation energy b) activation energy - energy of molecules c) activation energy + energy of molecules
 d) None of these

310. Consider the reaction, $2N_2O_5 \rightarrow 4NO_2 + O_2$ In the reaction NO_2 is being formed at the rate of $0.0125 \text{ mol L}^{-1} \text{ s}^{-1}$.

What is the rate of reaction at this time?

a) $0.0018 \text{ mol L}^{-1} \text{ s}^{-1}$ b) $0.0031 \text{ mol L}^{-1} \text{ s}^{-1}$ c) $0.0041 \text{ mol L}^{-1} \text{ s}^{-1}$ d) $0.050 \text{ mol L}^{-1} \text{ s}^{-1}$

311. Which of the following statements is not correct?

a) For a zero order reaction, $t_{1/2}$ is proportional to initial concentration


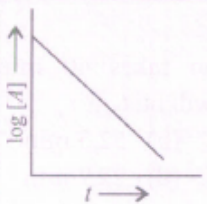
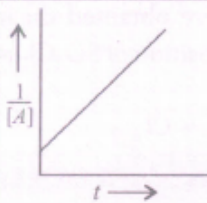
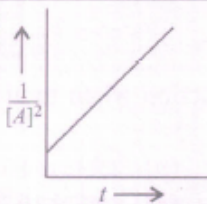
b) The relationship of variation of rate constant with temperature is given by $\frac{k_2}{k_1} = \frac{E_a}{2.303R} \left[\frac{T_2 - T_1}{T_1 T_2} \right]$.

c) The unit of rate constant for a reaction is $\text{mol}^{1-n} \text{L}^{n-1} \text{s}^{-1}$ where n is order of the reaction

d) The unit of rate of reaction changes with order of reaction

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312. Match the graphs given in column I with the order given in column II and mark the appropriate choice.

	Column I	Column II
(A)		(i) Third order
(B)		(ii) First order
(C)		(iii) Zero order
(D)		(iv) Second order

- a) (A) → (i), (B) → (ii), (C) → (iii), (D) → (iv) b) (A) → (iii), (B) → (ii), (C) → (iv), (D) → (i)
 c) (A) → (ii), (B) → (i), (C) → (iii), (D) → (iv) d) (A) → (iv), (B) → (iii), (C) → (i), (D) → (ii)

313. The reaction $A \rightarrow B$ follows first order kinetics. The time taken for 0.8 mole of A to produce 0.6 mole of B is 1 h. What is the time taken for the conversion of 0.9 mole of A to 0.675 mole of B?

- a) 0.25 h b) 2 h c) 1 h d) 0.5 h

314. Assertion: Complex reaction takes place in different steps and the slowest step determines the rate of reaction.
 Reason: Order and molecularity of a reaction are always equal.

- a) If both assertion and reason are true and reason is the correct explanation of assertion
 b) If both assertion and reason are true but reason is not the correct explanation of assertion
 c) If assertion is true but reason is false d) If both assertion and reason are false

315. For a reaction $P + Q \rightarrow 2R + S$. Which of the following statements is incorrect?

- a) Rate of disappearance of P = Rate of appearance of S
 b) Rate of disappearance of Q = 2 x Rate of appearance of R
 c) Rate of disappearance of P = Rate of disappearance of Q
 d) Rate of disappearance of Q = $\frac{1}{2}$ x Rate of appearance of R

316. The decomposition of dimethyl ether is a fractional order reaction. The rate of reaction is given by rate = $k(PCH_3OCH_3)^{3/2}$. If the pressure is measured in bar and time in minutes, then what are the units of rate and rate constant?

- a) bar min^{-1} , $\text{bar}^2 \text{min}^{-1}$ b) bar min^{-1} , $\text{bar}^{1/2} \text{min}^{-1}$ c) $\text{bar}^{-1/2} \text{min}^{-1}$, $\text{bar}^2 \text{min}^{-1}$ d) bar min^{-1} , $\text{bar}^{1/2} \text{min}^{-1}$

317. In acidic medium, the rate of reaction between $[BrO_3^-]$ and $[Br^-]$ ions is given by the expression $-\frac{d[BrO_3^-]}{dt} =$

$$k[BrO_3^-][Br^-][H^+]^2$$

It means

- (i) rate constant of the reaction depends upon the concentration of H^+ ions
 (ii) rate of reaction is independent of the concentration of acid added
 (iii) the change in pH of the solution will affect the rate of reaction
 (iv) doubling the concentration of H^+ ions will increase the reactions rate by 4 times.
 a) Only (ii) b) Only (iii) c) Only (i) and (ii) d) Only (iii) and (iv)

318. Assertion: A catalyst increases the rate of reaction without itself undergoing any permanent chemical change.
Reason: A catalyst changes the Gibbs energy (ΔG) of the reaction and equilibrium constant of the reaction.
- If both assertion and reason are true and reason is the correct explanation of assertion
 - If both assertion and reason are true but reason is not the correct explanation of assertion
 - If assertion is true but reason is false
 - If assertion is true but reason is false
319. For a first-order reaction, the half-life period is independent of :
- initial concentration
 - cube root of initial concentration
 - first power of final concentration
 - square root of final concentration
320. If 60% of a first order reaction was completed in 60 min, 50% of the same reaction would be completed in approximately: ($\log 4 = 0.60$, $\log 5 = 0.69$)
- 50 min
 - 45 min
 - 60 min
 - 40 min
321. The rate law for a reaction, $A + B \rightarrow C + D$ is given by the expression $k[A]$. The rate of reaction will be
- doubled on doubling the concentration of B
 - halved on reducing the concentration of A to half
 - decreased on increasing the temperature of the reaction
 - unaffected by any change in concentration or temperature
322. A substance I decomposes by a first order reaction starting initially with $[A] = 2.00$ m and after 200 min, $[A]$ becomes 0.15 m. For this reaction $t_{1/2}$ is:
- 53.49 min
 - 50.49 min
 - 48.45 min
 - 46.45 min
323. The correct difference between first and second order reactions is that :
- A first-order reaction can catalyzed; a second-order reaction cannot be catalyzed.
 - The half-life of a first-order reaction does not depend on $[A]_0$; the half-life of a second-order reaction does depend on $[A]_0$.
 - The rate of a first-order reaction does not depend on reactant concentrations; the rate of a second-order reaction does depend on reactant concentrations.
 - The rate of a first-order reaction does depend on reactant concentrations; the rate of a secondorder reaction does not depend on reactant concentrations.
324. The rate of the reaction $2 N_2O_5 \rightarrow 4NO_2 + O_2$ can be written in three ways:
- $$\frac{-d[N_2O_5]}{dt} = k[N_2O_5]$$
- $$\frac{d[NO_2]}{dt} = k'[N_2O_5]$$
- $$\frac{d[O_2]}{dt} = k''[N_2O_5]$$
- The relationship between k and k' and between k and k'' are:
- $k' = 2k; k'' = k$
 - $k' = 2k; k'' = k/2$
 - $k' = 2k; k'' = 2k$
 - $k' = k; k'' = k$
325. Which of the following statements about the catalyst is true?
- A catalyst makes the reaction feasible by making ΔG more negative
 - A catalyst makes equilibrium constant more favourable for forward reaction
 - A catalyst accelerate rate of reaction by bringing down the activation energy
 - A catalyst always increases the rate of reaction
326. Nitrogen dioxide (NO_2) dissociates into nitric oxide (NO) and oxygen (O_2) as follows:
 $2NO_2 \rightarrow 2NO + O_2$
If the rate of decrease of concentration of NO_2 is $6.0 \times 10^{-12} \text{ mol L}^{-1} \text{ s}^{-1}$. What will be the rate of increase of concentration of O_2 ?
- $3 \times 10^{-12} \text{ mol L}^{-1} \text{ s}^{-1}$
 - $6 \times 10^{-12} \text{ mol L}^{-1} \text{ s}^{-1}$
 - $1 \times 10^{-12} \text{ mol L}^{-1} \text{ s}^{-1}$
 - $1.5 \times 10^{-12} \text{ mol L}^{-1} \text{ s}^{-1}$
327. The reaction $2X \rightarrow Y + Z$ would be zero order reaction when

- a) rate remains unchanged at any concentration of Y and Z
 b) rate of reaction doubles if concentration of Y is doubled
 c) rate of reaction remains same at any concentration of X
 d) rate of reaction is directly proportional to square of concentration of X

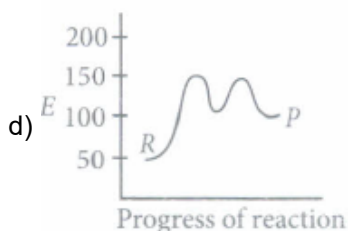
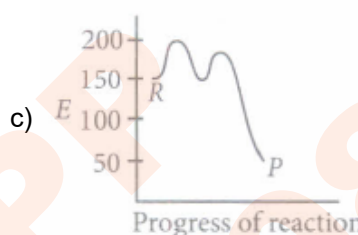
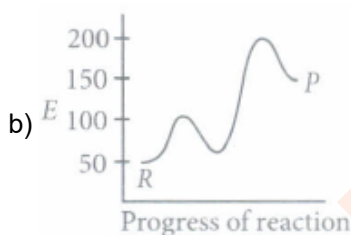
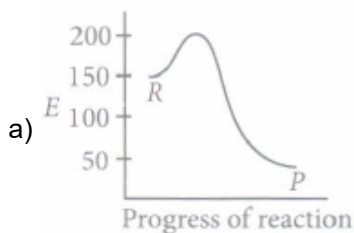
328. For the reaction $A + B \rightarrow \text{products}$, it is observed that:

- on doubling the initial concentration of A only, the rate of reaction is also doubled and
- on doubling the initial concentrations of both A and B, there is a change by a factor of 8 in the rate of the reaction.

The rate of this reaction is given by:

- a) rate = $k[A][B]^2$ b) rate = $k[A]^2[B]^2$ c) rate = $k[A][B]$ d) rate = $k[A]^2[B]$

329. An exothermic chemical reaction proceeds by two stages. Reactants stage Intermediate stage Products The activation energy of state 1 is 50 kJ mol^{-1} . The overall enthalpy change for the reaction is -100 kJ mol^{-1} . Which diagram could represent the energy level diagram for the reaction?



330. Which of the following statements is not correct for the catalyst?

- a) It catalyses the forward and backward reaction to the same extent b) It alters ΔG of the reaction
 c) It is a substance that does not change the equilibrium constant of a reaction
 d) It provides an alternate mechanism by reducing activation energy between reactants and products

331. For the reaction, $2A + B \rightarrow 3C + D$ which of the following does not express the reaction rate?

- a) $-\frac{d[C]}{3 dt}$ b) $-\frac{d[B]}{dt}$ c) $\frac{d[D]}{dt}$ d) $-\frac{d[A]}{2 dt}$

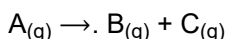
332. Which of the following statements for order of reaction is not correct?

- a) Order can be determined experimentally
 b) Order of reaction is equal to the sum of powers of concentration terms in rate law expression
 c) Order cannot be fractional d) Order is not affected by stoichiometric coefficient of the reactants

333. The plot of concentration of the reactant versus time for a reaction is a straight line with a negative slope. This reaction follows :

- a) zero order rate equation b) first order rate equation c) second order rate equation
 d) third order rate equation

334. Consider a first order gas phase decomposition reaction given below:



The initial pressure of the system before decomposition of A was P_i . After lapse of time 't' total pressure of the system increased by x units and became ' p_t '.

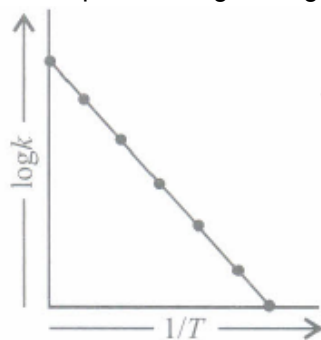
The rate constant k for the reaction is given as _____.

- a) $k = \frac{2.303}{t} \log \frac{P_i}{P_i - x}$ b) $k = \frac{2.303}{t} \log \frac{P_i}{2P_i - P_t}$ c) $k = \frac{2.303}{t} \log \frac{P_i}{2P_i + P_t}$ d) $k = \frac{2.303}{t} \log \frac{P_i}{P_i + x}$

335. The rate of first-order reaction is $0.04 \text{ mol L}^{-1} \text{ s}^{-1}$ at 10 seconds and $0.03 \text{ mol L}^{-1} \text{ s}^{-1}$ at 20 seconds after initiation of the reaction. The half-life period of the reaction is :

- a) 44.1 s b) 54.1 s c) 24.1 s d) 34.1 s

336. A first order reaction is 50% complete in 30 minutes at 27°C and in 10 minutes at 47°C. The reaction rate constant at 27°C and the energy of activation of the reaction are respectively:
 a) $k = 0.0231 \text{ min}^{-1}$, $E_a = 43.848 \text{ kJ mol}^{-1}$ b) $k = 0.017 \text{ min}^{-1}$, $E_a = 52.54 \text{ kJ mol}^{-1}$
 c) $k = 0.0693 \text{ min}^{-1}$, $E_a = 43.848 \text{ kJ mol}^{-1}$ d) $k = 0.0231 \text{ min}^{-1}$, $E_a = 28.92 \text{ kJ mol}^{-1}$
337. The temperature dependence of the rate constant k is expressed as $k = Ae^{-E_a/RT}$. When a plot between $\log k$ and $1/T$ is plotted we get the graph as shown.



What is the value of slope in the graph?

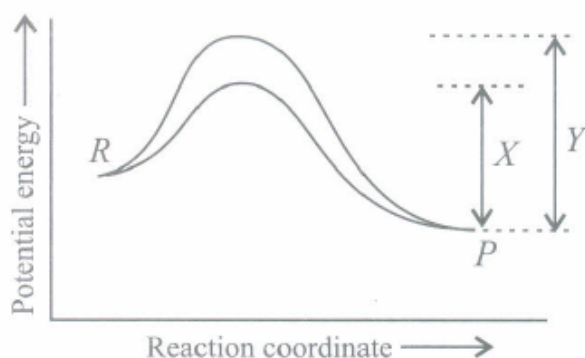
- a) $\frac{E_a}{RT}$ b) $-\frac{E_a}{2.303R}$ c) $-\frac{E_a}{2.303RT} \log A$ d) $-\frac{E_a}{2.303} \frac{R}{T}$
338. The rate of the reaction:
 $\text{CH}_3\text{COOC}_2\text{H}_5 + \text{NaOH} \rightarrow \text{CH}_3\text{COONa} + \text{C}_2\text{H}_5\text{OH}$ is given by the equation,
 $\text{rate} = k[\text{CH}_3\text{COOC}_2\text{H}_5][\text{NaOH}]$
 If concentration is expressed in mol/L, the units of k are
 a) $\text{mol}^{-2} \text{ L}^2 \text{ s}^{-1}$ b) $\text{mol L}^{-1} \text{ s}^{-1}$ c) $\text{L mol}^{-1} \text{ s}^{-1}$ d) s^{-1}
339. For a reaction between A and B the order with respect to A is 2 and the order with respect to B is 3. The concentrations of both A and B are doubled, the rate will increase by a factor of :
 a) 10 b) 12 c) 16 d) 32
340. When a biochemical reaction is carried out in laboratory in the absence of enzyme then rate of reaction obtained is 10^{-6} times, then activation energy of reaction in the presence of enzyme is:
 a) $\frac{6}{RT}$ b) Different from E_a obtained in laboratory c) P is required d) Can't say anything
341. A plot of $\log(a-x)$ against time t is a straight line. This indicates that the reaction is of:
 a) zero order b) first order c) second order d) third order.
342. Two plots are shown below between concentration and time t . Which of the given orders are shown by the graphs respectively



- a) Zero order and first order b) First order and second order c) Zero order and second order
 d) First order and first order
343. In a reaction $2X \rightarrow Y$, the concentration of X decreases from 3.0 moles/litre to 2.0 moles/litre in 5 minutes. The rate of reaction is
 a) $0.1 \text{ mol L}^{-1} \text{ min}^{-1}$ b) $5 \text{ mol L}^{-1} \text{ min}^{-1}$ c) $1 \text{ mol L}^{-1} \text{ min}^{-1}$ d) $0.5 \text{ mol L}^{-1} \text{ min}^{-1}$
344. Assertion: E_a of the forward reaction is higher than that of backward reaction in a reversible endothermic reaction.
 Reason: Increasing the temperature of the substance increases the fraction of molecules which collide with energies greater than E_a .
 a) If both assertion and reason are true and reason is the correct explanation of assertion
 b) If both assertion and reason are true but reason is not the correct explanation of assertion
 c) If assertion is true but reason is false d) If both assertion and reason are false
345. The expression to calculate time required for: completion of zero order reaction is

a) $t = \frac{[R_0]}{k}$ b) $t = [R] - [R_0]$ c) $t = \frac{k}{[R_0]}$ d) $t = \frac{[R_0] - [R]}{[R_0]}$

346. The graph of the effect of catalyst on activation energy is given below. Fill up the blanks X and Y with appropriate statements.



- a) X = energy of activation without catalyst, Y = energy of activation with catalyst
 b) X = path of reaction with catalyst, Y = path of reaction without catalyst
 c) X = energy of activation with catalyst, Y = energy of activation without catalyst
 d) X = energy of endothermic reaction, Y = energy of exothermic reaction
347. A reaction is 50% completed in 2 hours and 75% completed in 4 hours. The order of reaction is
 a) 0 b) 1 c) 2 d) 3
348. Which of the following statements is incorrect about the collision theory of chemical reaction?
 a) It considers reacting molecules or atoms to be hard spheres and ignores their structural features
 b) Number of effective collisions determines the rate of reaction
 c) Collision of atoms or molecules possessing sufficient threshold energy results into the product formation
 d) Molecules should collide with sufficient threshold energy and proper orientation for the collision to be effective
349. The rate of the reaction $2\text{NO} + \text{Cl}_2 \rightarrow 2\text{NOCl}$ is given by the rate equation $\text{rate} = k[\text{NO}]^2[\text{Cl}_2]$
 The value of the rate constant can be increased by:
 a) increasing the concentration of NO b) increasing the temperature
 c) increasing the concentration of the Cl_2 d) doing all of these
350. A reaction in which reactants (R) are converted into products (P) follows second order kinetics. If concentration of R is increased by four times, what will be the increase in the rate of formation of P?
 a) 9 times b) 4 times c) 16 times d) 8 times
351. Which of the following compound will undergo self ~ aldol condensation in the presence of cold dilute alkali?
 a) $\text{CH} = \text{C} - \text{CHO}$ b) $\text{CH}_2 = \text{CHCHO}$ c) $\text{C}_6\text{H}_5\text{CHO}$ d) $\text{CH}_3\text{CH}_2\text{CHO}$
352. Which of the following is a correct statement?
 a) $\text{CCl}_3 - \text{CHO}$ gives aldol condensation
 b) When mixture of ethanal and propanal is treated with aqueous NaOH, the product contains four aldols
 c) Mixture of HCHO and CH_3CHO will not give aldol condensation.
 d) HCHO is least reactive towards oxidation.
353. A compound (X) having molecular formula $\text{C}_4\text{H}_8\text{O}_2$ is hydrolysed by water in presence of an acid to give a carboxylic acid (Y) and an alcohol (Z). (Z) on oxidation with chromic acid gives (Y), (X), (Y) and (Z) are:
- a)
- | X | Y | Z |
|-----------------------------|--------------------------|------------------------|
| $\text{CH}_3\text{COOCH}_3$ | CH_3COOH | CH_3OH |
- b)
- | X | Y | Z |
|--------------------------------------|--------------------------|---------------------------------|
| $\text{CH}_3\text{COOC}_2\text{H}_5$ | CH_3COOH | $\text{C}_2\text{H}_5\text{OH}$ |
- c)
- | X | Y | Z |
|--------------------------------------|-----------------------------------|---------------------------------|
| $\text{C}_2\text{H}_5\text{COOCH}_3$ | $\text{C}_2\text{H}_5\text{COOH}$ | $\text{C}_2\text{H}_5\text{OH}$ |
- d)
- | X | Y | Z |
|--------------------------------------|-----------------------------------|------------------------|
| $\text{CH}_3\text{COOC}_2\text{H}_5$ | $\text{C}_2\text{H}_5\text{COOH}$ | CH_3OH |

354. Reaction between benzaldehyde and acetophenone in presence of dilute NaOH is known as _____.

- a) Cross Aldol condensation b) Aldol condensation c) Cannizzaro's reaction
d) Cross Cannizzaro's reaction

355. Match the column I with column II and mark the appropriate choice

Column I	Column II
(A) $\text{>C=O} \xrightarrow{\text{LiAlH}_4}$	(i) $-\text{COONa}$
(B) $\text{>C=O} \xrightarrow[\text{conc. HCl}]{\text{Zn/Hg}}$	(ii) $-\text{COOH}$
(C) $\text{>C=O} \xrightarrow{\text{Ag}_2\text{O/OH}^-}$	(iii) >CH_2
(D) $\text{>C=O} \xrightarrow{\text{NaOX}}$	(iv) $-\text{CH}_2\text{OH}$

- a) (A) \rightarrow (i), (B) \rightarrow (ii), (C) \rightarrow (iii), (D) \rightarrow (iv) b) (A) \rightarrow (iv), (B) \rightarrow (iii), (C) \rightarrow (ii), (D) \rightarrow (i)
c) (A) \rightarrow (ii), (B) \rightarrow (iv), (C) \rightarrow (iii), (D) \rightarrow (i) d) (A) \rightarrow (iii), (B) \rightarrow (i), (C) \rightarrow (ii), (D) \rightarrow (iv)

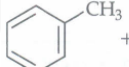
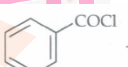
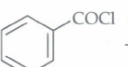

356. The condensation product of benzaldehyde and acetone is

- a) $\text{C}_6\text{H}_5\text{CH}=\text{C}(\text{CH}_3)_2$ b) $\text{C}_6\text{H}_5\text{CH}_2-\overset{\text{O}}{\parallel}\text{C}-\text{CH}=\text{CH}_2$ c) $\text{C}_6\text{H}_5-\overset{\text{O}}{\parallel}\text{C}-\text{CH}=\text{CH}-\text{CH}_3$
d) $\text{C}_6\text{H}_5-\text{CH}=\text{CH}-\overset{\text{O}}{\parallel}\text{C}-\text{CH}_3$

357. Addition of water to alkynes occurs in acidic medium and in the presence of Hg^{2+} ions as a catalyst. Which of the following products will be formed on addition of water to but-1-yne under these conditions?

- a) $\text{CH}_3-\text{CH}_2-\text{CH}_2-\overset{\text{O}}{\parallel}\text{C}-\text{H}$ b) $\text{CH}_3-\text{CH}_2-\overset{\text{O}}{\parallel}\text{C}-\text{CH}_3$ c) $\text{CH}_3-\text{CH}_2-\overset{\text{O}}{\parallel}\text{C}-\text{OH} + \text{CO}_2$
d) $\text{CH}_3-\overset{\text{O}}{\parallel}\text{C}-\text{OH} + \text{H}-\overset{\text{O}}{\parallel}\text{C}-\text{H}$

358. Reaction by which benzaldehyde cannot be prepared?

- a)  + CrO_2Cl and CS_2 followed by H_3O^+ b)  + H_2 in pressure of Pd-BaSO₄ c)  + H_2 in pressure of Pd-BaSO₄
d)  + $\text{CO} + \text{HCl}$ in presence of anhy. AlCl_3

359. Match the reagents in column I with products formed by reactions with acetone in column II and mark the appropriate choice.

Column I	Column II
(A) Hydrazine	(i) $(\text{CH}_3)_2\text{C}=\text{NNHCONH}_2$
(B) Semicarbazide	(ii) $(\text{CH}_3)_2\text{C}=\text{NOH}$
(C) Phenylhydrazine	(iii) $(\text{CH}_3)_2\text{C}=\text{NNH}_2$
(D) Hydroxylamine	(iv) $(\text{CH}_3)_2\text{C}=\text{NNHC}_6\text{H}_5$

- a) (A) \rightarrow (1), (B) \rightarrow (ii), (C) \rightarrow (iii), (D) \rightarrow (IV) b) (A) \rightarrow (iv), (B) \rightarrow (iii), (C) \rightarrow (ii), (D) \rightarrow (i)
c) (A) \rightarrow (iii), (B) \rightarrow (i), (C) \rightarrow (iv), (D) \rightarrow (ii) d) (A) \rightarrow (ii), (B) \rightarrow (iv), (C) \rightarrow (i), (D) \rightarrow (iii)

360. Which of the following is incorrect?

- a) NaHSO_3 is used in detection of carbonyl compound b) FeCl_3 is used in detection of phenolic group
c) Tollens reagent is used in detection of unsaturation d) Fehling solution is used in detection of glucose

361. Iodoform test is not given by _____.

- a) 2-pentanone b) ethanol c) ethanal d) 3-pentanone

362. When propional reacts with 2-methylpropanal in presence of NaOH, four different products are formed. The reaction is known as

- a) aldol condensation b) cross aldol condensation c) Cannizzaro reaction d) HVZ condensation

363. Which of the following aldehydes will show Cannizzaro reaction?

- a) HCHO b) $\text{C}_6\text{H}_5\text{CHO}$ c) $(\text{CH}_3)_2\text{CCHO}$ d) All of these

364. **Assertion:** Acetaldehyde can be prepared by addition of water to ethyne in the presence of H_2SO_4 and $HgSO_4$.

Reason: Higher alkynes give higher aldehydes

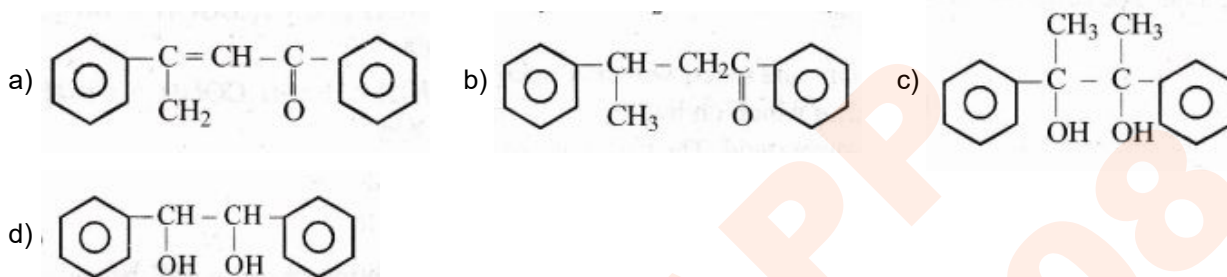
- a) If both assertion and reason are true and reason is the correct explanation of assertion.
 b) If both assertion and reason are true but reason is not the correct explanation of assertion
 c) If assertion is true but reason is false d) If both assertion and reason are false.

365. **Assertion:** In the presence of alkaline $KMnO_4$ 4-methylacetophenone is oxidised to benzoic acid.

Reason: Keto group is oxidised to $-COOH$ group.

- a) If both assertion and reason are true and reason is the correct explanation of assertion
 b) If both assertion and reason are true but reason is not the correct explanation of assertion
 c) If assertion is true but reason is false d) If both assertion and reason are false.

366. Acetophenone when reacted with a base, C_2H_5ONa , yields a stable compound which has the structure.



367. Clemmensen reduction of a ketone is carried out in the presence of which of the following?

- a) Zn-Hg with HCl b) $LiAlH_4$ c) H_2 and Pt as catalyst d) Glycol With KOH

368. **Assertion :** Aromatic aldehydes and ketones undergo electrophilic substitution reaction at metaposition.

Reason: Carbonyl group activates the ring towards electrophilic substitution reactions.

- a) If both assertion and reason are true and reason is the correct explanation of assertion
 b) If both assertion and reason are true but reason is not the correct explanation of assertion.
 c) If assertion is true but reason is false d) If both assertion and reason are false.

369. **Assertion:** Acetaldehyde is more reactive than acetone in nucleophilic addition reactions.

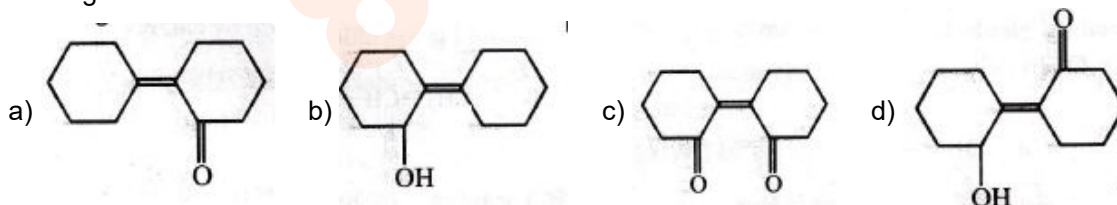
Reason : Two alkyl groups in acetone reduce the electrophilicity of the carbon.

- a) If both assertion and reason are true and reason is the correct explanation of assertion.
 b) If both assertion and reason are true but reason is not the correct explanation of assertion.
 c) If assertion is true but reason is false d) If both assertion and reason are false

370. Which of the following compounds will give a yellow precipitate with iodine and alkali?

- a) Acetophenone b) Methyl acetate c) Acetamide d) 2-Hydroxypropane

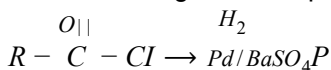
371. Of the following, which is the product formed when cyclohexanone undergoes aldol condensation followed by heating?



372. Which of the following will not give aldol condensation?

- a) Phenyl acetaldehyde b) 2-Methylpentanal c) Benzaldehyde d) I-Phenylpropanone

373. In the following reaction, product (P) is



- a) RCHO b) RCH_3 c) RCOOH d) RCH_2OH

374. Ketones $[R - \overset{O}{\parallel} C - R_1]$, where $R = R_1 =$ alkyl group, can be obtained in one step by:

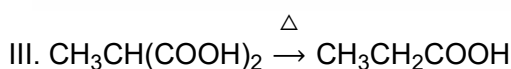
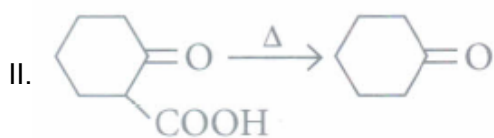
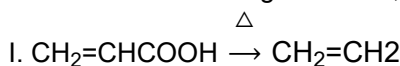
- a) hydrolysis of esters b) oxidation of primary alcohol c) oxidation of tertiary alcohol
d) reaction of acid halide with alcohol

375. Match the column I with column II and mark the appropriate choice.

Column I	Column II
(A) $RCOCH_3 \xrightarrow{Zn-Hg} HClRCH_2CH_3$	(i) Wolff- Kishner reduction
(B) $2C_6H_5CHONaOHC_6H_5COONa + C_6 + H_5CH_2OH \rightarrow$	(ii) Clem mens en reduction
(C) $C_6H_6 + CH_3COCl \xrightarrow{Anh.} AlCl_3C_6H_5COCH_3$	(iii) Friedel-Crafts reaction
(D) $C_6H_{10}O \xrightarrow{(i)NH_2NH_2} C_6H_{12} + N_2$ $\xrightarrow{KOH/ethyleneglycol, \Delta}$	(iv) Cannizzaro reaction

- a) (A) \rightarrow (ii), (B) \rightarrow (iv), (C) \rightarrow (iii), (D) \rightarrow (i) b) (A) \rightarrow (i), (B) \rightarrow (iii), (C) \rightarrow (ii), (D) \rightarrow (iv)
c) (A) \rightarrow (iii), (B) \rightarrow (ii), (C) \rightarrow (i), (D) \rightarrow (iv) d) (A) \rightarrow (iv), (B) \rightarrow (i), (C) \rightarrow (ii), (D) \rightarrow (iii)

376. Consider the following reactions,



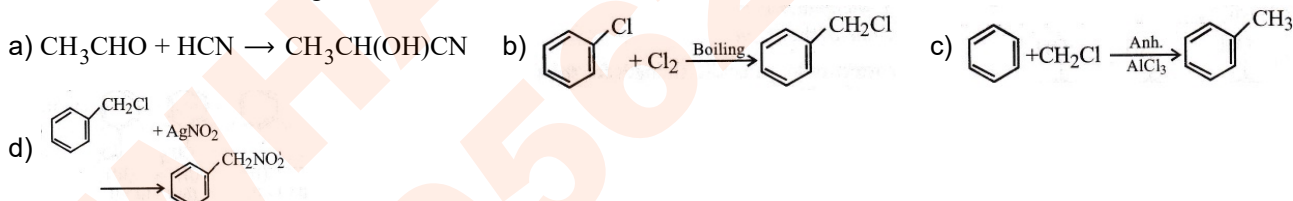
In which cases, parent compound loses its functional group in preference?

- a) I,II b) I,II,III c) II,III d) I,III

377. If on adding $FeCl_3$ solution to acidified Lassaigne solution, a blood red colouration is produced, it indicates the presence of

- a) S b) N c) N and S d) S and Cl

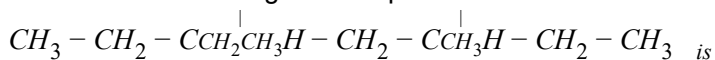
378. Which one of the following is a free-radical substitution reaction?



379. Which of the following is a false statement?

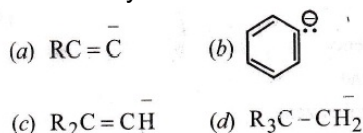
- a) Free radicals, carbonium ions or carbanions are reaction intermediates
b) Reaction between methane and chlorine in presence of sunlight proceeds via free radical
c) The electronegative atom in the carbon chain produces +I effect.
d) Homolytic fission of C - C bonds gives free radicals

380. Correct name for the given compound



- a) 3-ethyl-5-methylheptane b) 5-ethyl-3-methylheptane c) 1, 1-diethyl-3-methylpentane
d) 3-methyl-5, 5-diethylpentane.

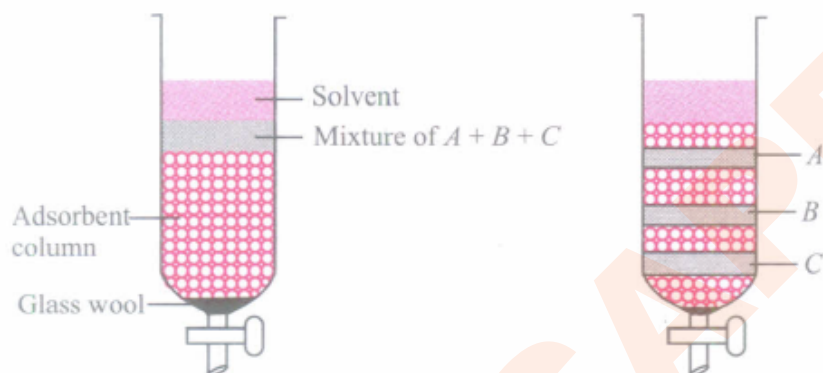
381. The stability of carbanions in the following:



- a) (a) > (b) > (c) < (d) b) (b) > (c) > (d) < (a) c) (d) > (b) > (c) < (a) d) (a) > (c) > (b) < (d)

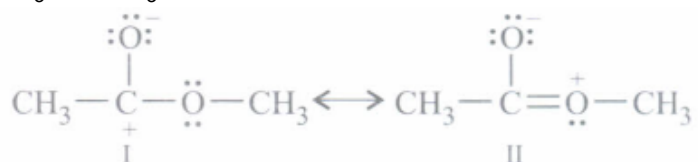
382. Which of the following is an isomer of ethanol?

- a) Methanol b) Acetone c) Diethylether d) Dimethylether
383. In the following question, a statement of assertion is followed by a statement of reason. Mark the correct choice as :
- Assertion:** Nitroalkanes and alkyl nitrites exhibit functional isomerism.
Reason : Compounds having same molecular formula but different functional groups are called functional isomers
- a) If both assertion and reason are true and reason is the correct explanation of assertion
 b) If both assertion and reason are true but reason is not the correct explanation of assertion
 c) If assertion is true but reason is false d) If both assertion and reason are false
384. Given below is a column of adsorbent in which the mixture of compounds A + B + C is placed. When the solvent is poured through the column, the components are separated depending upon the degree of adsorption. Which of the given statements is correct?



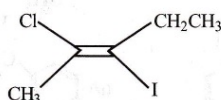
- a) A is the most weakly adsorbed component hence remains near the top
 b) A is the most strongly adsorbed component hence remains near the top.
 c) C is the most strongly adsorbed component hence is found near the bottom.
 d) B is the most strongly adsorbed component hence is found in the centre of the column.
385. In the following question, a statement of assertion is followed by a statement of reason. Mark the correct choice as :
- Assertion:** Glycerol is purified by distillation under reduced pressure.
Reason : Method of distillation under reduced pressure is used to purify liquids having very high boiling points and those, which decompose at or below their boiling points.
- a) If both assertion and reason are true and reason is the correct explanation of assertion
 b) If both assertion and reason are true but reason is not the correct explanation of assertion
 c) If assertion is true but reason is false d) If both assertion and reason are false
386. Which one of the following is most reactive towards electrophilic reagent?
- a) Cc1cc(OC)ccc1 b) Cc1cc(O)ccc1 c) Cc1cc(NC(=O)C)ccc1 d) Cc1cc(CO)ccc1
387. Which is the most reactive towards nucleophilic addition reactions?
- a) O=Cc1ccccc1 b) CC(=O)c1ccccc1 c) O=Cc1ccc(C)cc1 d) O=Cc1ccc([N+](=O)[O-])cc1
388. The principle involved in paper chromatography is:
 a) adsorption b) partition c) solubility d) volatility
389. A strong base can abstract an α -hydrogen from
 a) alkene b) amine c) ketone d) alkane
390. The order of decreasing reactivity towards an electrophilic reagent, for the following would be
 a) benzene b) toluene c) chlorobenzene d) phenol

391. 1-Butene and cyclobutane show
a) position isomerism b) ring-chain isomerism c) functional isomerism d) metamerism
392. Which one of the following compounds is resistant to nucleophilic attack by hydroxyl ions?
a) Methyl acetate b) Acetonitrile c) Dimethyl ether d) Acetamide
393. Which of the following species is not electrophilic in nature?
a) NO_2^\oplus b) Cl^\oplus c) BH_3 d) $\text{H}_3\text{O}^\oplus$
394. The substance which can be used as adsorbent in column chromatography is
a) Na_2O b) Na_2SO_4 c) Al_2O_3 d) NaCl
395. Assertion: The following structures (I) and (II) cannot be the major contributors to the real structure of $\text{CH}_3\text{COOCH}_3$.



Reason: Both the structures involve charge separation and structure (I) contains a carbon atom with an incomplete octet.

- a) If both assertion and reason are true and reason is the correct explanation of assertion
b) If both assertion and reason are true but reason is not the correct explanation of assertion
c) If assertion is true but reason is false d) If both assertion and reason are false.
396. Base strength of:
(A) $\text{H}_3\text{C}-\text{CH}^-$
(B) $\text{H}_2\text{C} = \text{CH}^-$ and
(C) $\text{H}-\text{C} \equiv \text{C}^-$
is in the order of
a) (B)>(A)>(C) b) (C)>(B)>(A) c) (A)>(C)>(B) d) (A)>(B)>(C)
397. Glycerine can be purified by
a) vacuum distillation b) simple distillation c) steam distillation d) fractional distillation
398. Which of the following intermediates contains three pairs of electrons in its valence shell?
a) Carbocations b) Carbanions c) Free radicals d) Both (a) and (b)
399. Which of the following is the most correct electron displacement for a nucleophilic reaction to take place?
a) $\text{H}_3\text{C} \leftarrow \text{C} \begin{matrix} \text{H} \\ \uparrow \\ \text{C} \end{matrix} \begin{matrix} \text{H} \\ \uparrow \\ \text{C} \end{matrix} \text{Cl}$ b) $\text{H}_3\text{C} \rightarrow \text{C} \begin{matrix} \text{H} \\ \uparrow \\ \text{C} \end{matrix} \begin{matrix} \text{H} \\ \uparrow \\ \text{C} \end{matrix} \text{Cl}$ c) $\text{H}_3\text{C} \rightarrow \text{C} \begin{matrix} \text{H} \\ \uparrow \\ \text{C} \end{matrix} \begin{matrix} \text{H}_2 \\ \uparrow \\ \text{C} \end{matrix} \text{Cl}$ d) $\text{H}_3\text{C} \rightarrow \text{C} \begin{matrix} \text{H} \\ \uparrow \\ \text{C} \end{matrix} \begin{matrix} \text{H}_2 \\ \uparrow \\ \text{C} \end{matrix} \text{Cl}$
400. The IUPAC name of the following compound is



- a) trans-2-chloro-3-iodo-2-pentene b) cis-3-iodo-4-chloro-3-pentene c) trans-3-iodo-4-chloro-3-pentene
d) cis-2-chloro-3-iodo-2-pentene

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