Time: 200 Minute   **M.M. 480**

ALL INDIA SKY TEST SERIES

Saarthak Batch - Neet

Date : 15/10/2023

SYLLABUS

PHYSICS	CHEMISTRY	BOTANY	ZOOLOGY
Previous + Ray Optics + PEE	Previous + Chemical Kinetics + Haloalkane + Haloarenes	Previous + Environmental Issues	Previous + Animal kingdom up to Arthropoda

Please read the instructions carefully. You are allotted **5** minutes specifically for this purpose.

INSTRUCTIONS:
1. This Question paper is divided in to four parts physics, chemistry, botany, zoology Questions paper you have received contains **ALL THE QUESTIONS** in each Part.
2. **In each part all 30 questions are compulsory**, Each Question has four choices (a), (b), (c), (d) out of which **only one is correct & Carry 4 marks each 1 mark** will be deducted for each wrong answer.
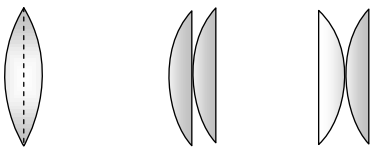
GENERAL INSTRUCTION
1. Use only **blue/black pen (avoid gel pen)** for darkening the bubble.
2. Indicate the correct answer for each question by filling appropriate bubble in your **OMR** answer sheet.
3. The answer sheet will be checked through computer hence, the answer of the question must be marked by –shading the circles against the question by dark **blue/black pen**
4. Blank papers, Clipboards, Log tables, Slide Rule, Calculator, Cellular Phones Papers and Electronic Gadgets in any form are **not** allowed to be carried inside the examination hall.

Name of the candidate:_____

Signature of the candidate: _____**Signature of the invigilator:**_____

PHYSICS
SECTION – A

1. An astronomical telescope has an objective of focal length 100 cm and an eye piece of focal length 5 cm. The final image of a star is seen 25 cm from the eyepiece. The magnifying power of the telescope is
   (a) 20   (b) 22   (c) 24   (d) 26

2. When a telescope is adjusted for normal vision, the distance of the objective from the eyepiece is found to be 80 cm. The magnifying power of the telescope is 19. What are the focal lengths of the lenses?
   (a) 61 cm, 19 cm   (b) 40 cm, 40 cm
   (c) 76 cm, 4 cm   (d) 50 cm, 30 cm

3. The focal lengths of the objective and eye lens of a telescope are respectively 200 cm and 5 cm. The maximum magnifying power of the telescope will be
   (a) – 40   (b) – 48   (c) – 60   (d) – 100

4. A plano convex lens fits exactly into a plano concave lens. Their plane surfaces are parallel to each other. If the lenses are made of different materials of refractive indices μ_1 and μ_2 and R is the radius of curvature of the curved surface of the lenses, then focal length of the combination is
   (a) $\dfrac{R}{\mu_1 - \mu_2}$ (b) $\dfrac{2R}{\mu_2 - \mu_1}$
   (c) $\dfrac{R}{2(\mu_1 - \mu_2)}$ (d) $\dfrac{R}{2 - (\mu_1 - \mu_2)}$

5. Which one of the following spherical lenses does not exhibit deviation?
   (a)   (b)   (c)   (d)

6. An astronomical telescope has an angular magnification of magnitude 5 for distant objects. The separation between the objective and eye-piece is 36 cm and the final image is formed at infinity. Determine the focal length of objective and eye-piece.
   (a) $f_e = 6cm$, $f_o = 30cm$ (b) $f_o = 10cm$, $f_e = 6cm$
   (c) $f_e = 5cm$, $f_o = 8cm$ (d) $f_o = 9cm$, $f_e = 5cm$

7. An astronomical telescope has an eye piece of focal length 5 cm. If the angular magnification of normal adjustment is 10, the distance between the objective and the eye piece is.
   (a) 45 cm   (b) 50cm   (c) 55 cm   (d) 110 cm

8. The least distance of distinct vision is 25 cm. The focal length of a convex lens is 5 cm. It can act as a simple microscope of magnifying power.
   (a) 4   (b) 3   (c) 6   (d) N.O.T.

9. Four convergent lenses have focal lengths 100 cm, 10 cm, 4 cm and 0.3 cm. For a telescope with maximum possible magnification, we choose the lenses of focal lengths.
   (a) 100 cm, 0.3 cm   (b) 10 cm, 0.3 cm
   (c) 10 cm, 4 cm   (d) 100 cm, 4 cm

10. In a plano-convex lens the radius of curvature of the convex lens is 10 *cm*. If the plane side is polished, then the focal length will be (Refractive index = 1.5)
    (a) 10.5 *cm* (b) 10 *cm*   (c) 5.5 *cm*   (d) 5 *cm*

11. The magnification of an object placed in front of a convex lens of focal length 20 cm in +2. To obtain a magnification of – 2, the object has to be moved by a distance equal to.
    (a) 40 cm   (b) 30 cm   (c) 20 cm   (d) 10 cm

12. A thin converging lens of refractive index 1.5 has a power of +5 D. When this lens is immersed in a liquid, it acts as a diverging lens of focal length 100 cm. The refractive index of the liquid is.
    (a) $\dfrac{4}{3}$ (b) $\dfrac{3}{2}$ (c) $\dfrac{5}{3}$ (d) 2

13. Two convex lenses of focal length f_1 and f_2 are mounted coaxially separated by a distance. If the power of the combination is zero, the distance between the lenses is.
    (a) $|f_1 - f_2|$ (b) $f_1 + f_2$ (c) $\dfrac{f_1 f_2}{|f_1 - f_2|}$ (d) $\dfrac{f_1 f_2}{f_1 + f_2}$

14. Two similar plano-convex lenses are combined together in three different ways as shown in the adjoining figure. The ratio of the focal lengths in three cases will be

    (a) 2 : 2 : 1   (b) 1 : 1 : 1   (c) 1 : 2 : 2 (d) 2 : 1 : 1

15. A converging lens is used to form an image on a screen. When upper half of the lens is covered by an opaque screen
    (a) Half the image will disappear
    (b) Complete image will be formed of same intensity
    (c) Half image will be formed of same intensity
    (d) Complete image will be formed of decreased intensity

16. An equiconvex lens of glass of focal length 0.1 metre is cut along a plane perpendicular to principle axis into two equal parts. The ratio of focal length of new lenses formed is

(a) 1 : 1   (b) 1 : 2   (c) 2 : 1   (d) $2 : \dfrac{1}{2}$

17. A convex lens is made of 3 layers of glass of 3 different materials as in the figure. A point object is placed on its axis. The number of images of the object are
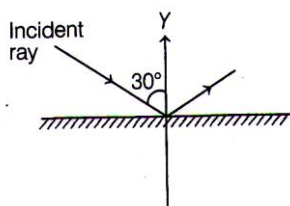(a) 3   (b) 4   (c) 1   (d) 2

18. Two thin lenses of focal lengths f_1 and f_2 are in contact and coaxial. The combination is equivalent to a single lens of power

(a) $f_1 + f_2$

(b) $\dfrac{f_1 f_2}{f_1 + f_2}$

(c) $\dfrac{f_2}{f_2 + f_1}$

(d) $\dfrac{f_1 + f_2}{f_1 f_2}$

19. By what angle, mirror should be rotated to obtain reflected ray along +Y-axis?

(a) 360° clockwise   (b) 15° anti-clockwise
(c) 30° anti-clockwise   (d) 60° anti-clockwise

20. **Statement-1** If there is relative motion between a point object and a plane mirror, then there must be relative motion between object and image formed by mirror.
Statement-2 If the gap between object and mirror will change, the gap between object and image will also change.
   (a) Statement-1 is true, Statement-2 is true; Statement-2 is a correct explanation for Statement1.
   (b) Statement-1 is true, Statement-2 is true; Statement-2 is not a correct explanation for Statement-1.
   (c) Statement-1 is true, Statement-2 is false.
   (d) Statement-1 is false, Statement-2 is true.

21. The largest distance of the image of a real object from a convex mirror of focal length 20 cm can be
   (a) 20 cm
   (b) infinite
   (c) 10 cm
   (d) depends on the position of the object

22. An object is placed in front of a convex mirror of radius of curvature 20 cm. Its image is formed 8 cm behind the mirror. The object distance is
(a) 20 cm   (b) 40 cm   (c) 60 cm   (d) 80 cm

23. A convergent beam of light is incident on a convex mirror of radius of curvature R as shown in figure. A real image is formed at a distance 0.4 m from the mirror. The radius of curvature of the mirror is
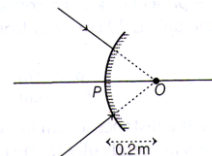
(a) 0.4 m   (b) 1.4 m   (c) 0.8 m   (d) 1.8 m

24. A rod of length 20 cm lies along the principal axis of a concave mirror of focal length 20 cm in such a way that its end closer to the pole is 40 cm away from the mirror. The length of the image is
(a) 50 cm   (b) 70 cm   (c) 20 cm   (d) 10 cm

25. An infinitely long straight conductor is bent into the shape as shown in the figure. It carries a current of *i ampere* and the radius of the circular loop is *r metre*. Then the magnetic induction at its centre will be

(a) $\dfrac{\mu_o}{4\pi}\dfrac{2i}{r}(\pi+1)$ (b) $\dfrac{\mu_o}{4\pi}\dfrac{2i}{r}(\pi-1)$
(c) Zero   (d) Infinite

26. One metre length of wire carries a constant current. The wire is bent to form a circular loop. The magnetic field at the centre of this loop is *B*. The same is now bent to form a circular loop of smaller radius to have four turns in the loop. The magnetic field at the centre of this new loop is
(a) 4 *B*   (b) 16 *B*   (c) B/2   (d) B/4

27. A uniform electric field and a uniform magnetic field are produced, pointed in the same direction. An electron is projected with its velocity pointing in the same direction
   (a) The electron will turn to its right
   (b) The electron will turn to its left
   (c) The electron velocity will increase in magnitude
   (d) The electron velocity will decrease in magnitude

28. Two particles X and Y having equal charges, after being accelerated through the same potential difference, enter a region of uniform magnetic field and describes circular path of radius R_1 and R_2 respectively. The ratio of mass of X to that of Y is

    (a) $\left(\dfrac{R_1}{R_2}\right)^{1/2}$ (b) $\dfrac{R_2}{R_1}$ (c) $\left(\dfrac{R_1}{R_2}\right)^{2}$ (d) $\dfrac{R_1}{R_2}$

29. If the direction of the initial velocity of the charged particle is neither along nor perpendicular to that of the magnetic field, then the orbit will be
    (a) A straight line   (b) An ellipse
    (c) A circle   (d) A helix

30. Particles having positive charges occasionally come with high velocity from the sky towards the earth. On account of the magnetic field of earth, they would be deflected towards the
    (a) North   (b) South
    (c) East   (d) West

31. If a particle of charge 10^{-12} coulomb moving along the $\hat{x}$ - direction with a velocity 10^5 m/s experience a force of 10^{-10} newton in $\hat{y}$ -direction due to magnetic field, then the minimum magnetic field is.
    (a) 6.25×10^3 tesla in $\hat{z}$ direction
    (b) 10^{-15} tesla in $\hat{z}$ - direction
    (c) 6.25×10^{-3} tesla in $\hat{z}$ - direction
    (d) 10^{-3} tesla in $\hat{z}$ - direction

32. A proton and an electron both moving with the same velocity v enter into a region of magnetic field directed perpendicular to the velocity of the particles. They will now move in circular orbits such that
    (a) Their time periods will be same
    (b) The time period for proton will be higher
    (c) The time period for electron will be higher
    (d) Their orbital radii will be same

33. A charge + Q is moving upwards vertically. It enters a magnetic field directed to the north. The force on the charge will be towards
   (a) North   (b) South
    (c) East   (d) West

34. A particle of charge -16×10^{-18} coulomb moving with velocity $10\,ms^{-1}$ along the x-axis enters a region where a magnetic field of induction B is along the y-axis, and an electric field of magnitude $10^4\,V/m$ is along the negative z-axis. If the charged particle continues moving along the x-axis, the magnitude of B is.
    (a) $10^{-3}\,Wb/m^2$ (b) $10^3\,Wb/m^2$
    (c) $10^5\,Wb/m^2$ (d) $10^{16}\,Wb/m^2$

35. A 100 turns coil shown in figure carries a current of 2 amp in a magnetic field $B=0.2Wb/m^2$. The torque acting on the coil is.
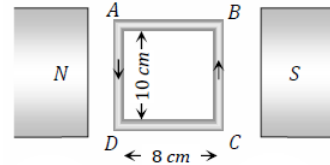

    (a) 0.32 Nm tending to rotate the side AD out of the page
    (b) 0.32 Nm tending to rotate the side AD into the page
    (c) 0.0032 Nm tending to rotate the side AD out of the page
    (d) 0.0032 Nm tending to rotate the side AD into the page

SECTION – B

36. A charged particle is projected in a plane perpendicular to a uniform magnetic field. The area bounded by the path described by the particle is proportional to
    (a) The velocity   (b) The momentum
    (c) The kinetic energy   (d) None of these

37. In figure shows three long straight wires P, Q and R carrying currents normal to the plane of the paper. All three currents have the same magnitude. Which arrow best shows the direction of the resultant force on the wire P
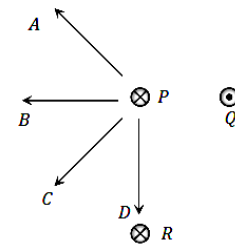
    (a) A   (b) B   (c) C   (d) D

38. Figure shows a straight wire of length l current i. The magnitude of magnetic field produced by the current at point P is
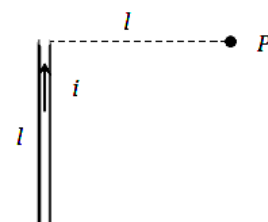
(a) $\dfrac{\sqrt{2}\mu_o i}{\pi l}$ (b) $\dfrac{\mu_o i}{4\pi l}$ (c) $\dfrac{\sqrt{2}\mu_o i}{8\pi l}$ (d) $\dfrac{\mu_o i}{2\sqrt{2}\pi l}$

39. The momentum of a photon is $3.3\times10^{-29}\,kg-m/sec$. Its frequency will be
(a) $3\times10^{3}\,Hz$ (b) $6\times10^{3}\,Hz$
(c) $7.5\times10^{12}\,Hz$ (d) $1.5\times10^{13}\,Hz$

40. The energy of a photon of wavelength λ is given by
(a) $h\lambda$ (b) $ch\lambda$ (c) λ/hc (d) hc/λ

41. The momentum of a photon is $2\times10^{-16}\,gm\text{-}cm/sec$. Its energy is
(a) $0.61\times10^{-26}\,erg$ (b) $2.0\times10^{-26}\,erg$
(c) $6\times10^{-6}\,erg$ (d) $6\times10^{-8}\,erg$

42. The rest mass of the photon is
(a) 0
(b) ∞
(c) Between 0 and ∞
(d) Equal to that of an electron

43. The momentum of the photon of wavelength $5000\mathring{A}$ will be
(a) $1.3\times10^{-27}\,kg\text{-}m/sec$ (b) $1.3\times10^{-28}\,kg\text{-}m/sec$
(c) $4\times10^{29}\,kg\text{-}m/sec$ (d) $4\times10^{-18}\,kg\text{-}m/sec$

44. The momentum of a photon of energy $h\nu$ will be
(a) $h\nu$ (b) $h\nu/c$ (c) $h\nu c$ (d) h/ν

45. A photon in motion has a mass
(a) $c/h\nu$ (b) h/ν (c) $h\nu$ (d) $h\nu/c^2$

46. The energy of a photon is $E=h\nu$ and the momentum of photon $p=\dfrac{h}{\lambda}$, then the velocity of photon will be
(a) E/p (b) Ep
(c) $\left(\dfrac{E}{p}\right)^{2}$ (d) $3\times10^{8}\,m/s$

47. The approximate wavelength of a photon of energy 2.48 eV is
(a) $500\,\mathring{A}$ (b) $5000\,\mathring{A}$ (c) $2000\,\mathring{A}$ (d) $1000\,\mathring{A}$

48. The energy of a photon of light of wavelength 450 nm is
(a) $4.4\times10^{-19}\,J$ (b) $2.5\times10^{-19}\,J$
(c) $1.25\times10^{-17}\,J$ (d) $2.5\times10^{-17}\,J$

49. There are n_1 photons of frequency ν_1 in a beam of light. In an equally energetic beam, there are n_2 photons of frequency ν_2. Then the correct relation is
(a) $\dfrac{n_1}{n_2}=1$ (b) $\dfrac{n_1}{n_2}=\dfrac{\nu_1}{\nu_2}$
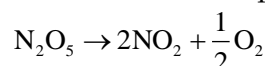(c) $\dfrac{n_1}{n_2}=\dfrac{\nu_2}{\nu_1}$ (d) $\dfrac{n_1}{n_2}=\dfrac{\nu_1^2}{\nu_2^2}$

50. Ultraviolet radiations of $6.2\,eV$ falls on an aluminium surface (work function $4.2\,eV$). The kinetic energy in joules of the fastest electron emitted is approximately
(a) 3.2×10^{-21} (b) 3.2×10^{-19}
(c) 3.2×10^{-17} (d) 3.2×10^{-15}

CHEMISTRY
SECTION – A

51. Consider the decomposition of N_2O_5 as
$$N_2O_5 \rightarrow 2NO_2 + \tfrac{1}{2}O_2$$
The rate of reaction is given by
$$\frac{-d[N_2O_5]}{dt}=\frac{1}{2}\frac{d[NO_2]}{dt}=2\frac{d[O_2]}{dt}=k_1[N_2O_5]$$
Therefore, $\dfrac{-d[N_2O_5]}{dt}=k_1[N_2O_5]$
$$\frac{+d[NO_2]}{dt}=2k_1[N_2O_5]=k_1'[N_2O_5]$$
$$\frac{+d[O_2]}{dt}=\frac{1}{2}k_1[N_2O_5]=k_1''[N_2O_5]$$
Choose the correct option
(a) $k_1=k_1'=k_1''$ (b) $k_1=2k_1'=k_1''$
(c) $4k_1=k_1'=2k_1''$ (d) $2k_1=k_1'=4k_1''$

52. For the reaction $N_2+3H_2\rightarrow2NH_3$, if $\dfrac{d[NH_3]}{dt}=2\times10^{-4}$ mol L⁻¹s⁻¹ the value of $\dfrac{-d[H_2]}{dt}$ would be
(a) 3×10^{-4} mol L⁻¹ s⁻¹   (b) 4×10^{-4} mol L⁻¹s⁻¹
(c) 6×10^{-4} mol L⁻¹s⁻¹   (d) 1×10^{-4} mol L⁻¹s⁻¹

53. Formula for half – life of a zero order reaction is
(a) $\dfrac{C_o}{k}$ (b) $\dfrac{C_o}{2k}$ (c) $\dfrac{2C_o}{k}$ (d) $\dfrac{2C_o}{2k}$

54. A first order reaction is 50% completed in 1.26×10^{36}. How much time would it take for 100% completion?
(a) $1.26\times10^{15}\,s$ (b) $2.52\times10^{14}\,s$
(c) $2.52\times10^{28}\,s$ (d) Infinite

55. Mechanism of a hypothetical reaction,
$X_2 + Y_2 \rightarrow 2XY$ is given below

   (i) $X_2 \rightleftharpoons X + X$ (fast)

   (ii) $X + Y \longrightarrow XY + Y$ (slow)

   (iii) $X + Y \rightarrow XY$ (fast)

   The overall order of the reaction will be.
   (a) 1   (b) 2   (c) 0   (d) 1.5

56. Rat law for the reaction, $A + B \longrightarrow$ product is
   rate $= k[A]^2[B]$. What is the rate constant, if rate of reaction at a given temperature is 0.22 Ms^{-1}, when [A] = 1 M and [B] = 0.25 M?
   (a) 3.25 M^{-2} s^{-1} (b) 0.88 M^{-2} s^{-1}
   (c) 1.136 M^{-2} s^{-1} (d) 0.05 M^{-2} s^{-1}

57. **Assertion (A)** The order of reaction may be defined as the sum of the powers which the concentration terms are raised in order to determine the rate of reaction gives the total order of reaction.
   Reason (R) The number of molecule whose concentration determine the rate of reaction at a given temperature is called order of reaction
   (a) Both A and R are correct and the R is the correct explanation of the A
   (b) Both A and R are correct but the R is not the correct explanation of the A
   (c) A is correct but R is incorrect
   (d) Both A and R are incorrect

58. **Assertion (A)** Acid catalyzed hydrolysis of ethyl acetate is a first order reaction.
   Reason (R) Water does not take part in the reaction.
   (a) Both A and R are correct and the R is the correct explanation of the A
   (b) Both A and R are correct but the R is not the correct explanation of the A
   (c) A is correct but R is incorrect
   (d) Both A and R are incorrect

59. Unit of specific reaction rate for second order reaction
   (a) s^{-1} (b) mol L^{-1} s^{-1}
   (c) L^2 mol^{-2} s^{-1} (d) L mol^{-1} s^{-1}

60. During the kinetic study of the reaction $2A + B \rightarrow C + D$ following results were obtained

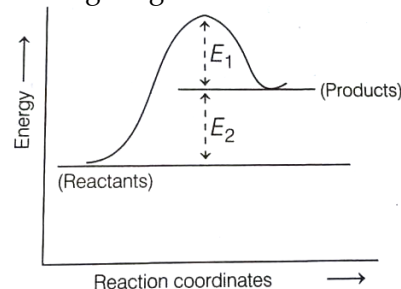|	[A] mol L^{-1}	[B] mol L^{-1}	Rate of formation D/mol L^{-1} min^{-2}
I.	0.1	0.1	6.0×10^{-3}
II.	0.3	0.2	7.2×10^{-2}
III.	0.3	0.4	2.88×10^{-1}
IV.	0.4	0.1	2.40×10^{-2}

Based on the above data, which one of the following is correct?
   (a) Rate $= k[A][B]^2$ (b) Rate $= k[A]^2[B]$
   (c) Rate $= k[A][B]$ (d) Rate $= k[A]^2[B]^2$

61. The order of a reaction with rate equal to $kC_A^{3/2} C_B^{-1/2}$ is
   (a) 1   (b) $-\dfrac{1}{2}$ (c) $-\dfrac{3}{2}$ (d) 2

62. Consider the figure given below.

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

63. Rate constant (k) varies with temperature as given by equation $\log k\ (\text{min}^{-1}) = 5 - \dfrac{2000}{T}$
   Consider the following about this equation :
   I. Pre-exponential factor is 10^5.
   II. E_a is 9.212 kcal.
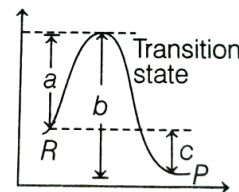   III. Variation of log k with $\dfrac{1}{T}$ is linear.
   Select the correct statement.
   (a) I, II and III   (b) Both I and II
   (c) Both II and III   (d) Both I and III

64. The potential energy diagram for a reaction $R \rightarrow P$ is given below.

ΔH° of the reaction corresponding to the energy
   (a) a (b) b   (c) c   (d) a + b

65. The rate constant k_1 and k_2 for two different reactions are $10^{16}.e^{-2000/T}$ and $10^{15}.e^{-1000/T}$, respectively. The temperature at which $k_1 = k_2$ is

    (a) 1000 K   (b) $\dfrac{2000}{2.303}$ K

    (c) 2000 K   (d) $\dfrac{1000}{2.303}$ K

66. Which equation is true to calculate the energy of activation, if the rate of reaction is doubled by increasing temperature from T_1 K to T_2 K ?

    (a) $\log_{10}\dfrac{k_1}{k_2} = \dfrac{E_a}{2.303R}\left[\dfrac{1}{T_1} - \dfrac{1}{T_2}\right]$

    (b) $\log_{10}\dfrac{k_2}{k_1} = \dfrac{E_a}{2.303R}\left[\dfrac{1}{T_2} - \dfrac{1}{T_1}\right]$

    (c) $\log_{10}\dfrac{1}{2} = \dfrac{E_a}{2.303}\left[\dfrac{1}{T_2} - \dfrac{1}{T_1}\right]$

    (d) $\log_{10} 2 = \dfrac{E_a}{2.303R}\left[\dfrac{1}{T_1} - \dfrac{1}{T_2}\right]$

67. Which of these does not influence the rate of reaction ?
    (a) Nature of the reactants
    (b) Concentration of the reactants
    (c) Temperature of the reaction
    (d) Molecularity of the reaction

68. n-propane on dichlorination produced how many different structural product.
    (a) 1   (b) 2   (c) 3   (d) 4

69. Which of the following is not correct ?
    (a) $PhCH_2Br > PhCHBrCH_3 > PhCBr(CH_3)_2 (S_N1)$
    (b) $R-I > R-Br > R-Cl (S_N2)$
    (c) $CH_2 = CH-Cl < CH_2 = CH-CH_2-Cl$ $< PhCH_2 - Cl (S_N1)$
    (d) $R-Cl < R-Br < R-I (S_N1)$

70. Which cannot behave as a nucleophile for S_N2 reaction :
    (a) H_2O (b) CN^- (c) NH_2^- (d) I^-

71. **Assertion (A)** The boiling points of alkyl halides decreases in the order $RI > RBr > RCl > RF$.
    Reason (R) The boiling points of alkyl chlorides, bromides and iodides are considerably higher than that of the hydrocarbon of comparable molecular mass.
    (a) Both Assertion and Reason are true and Reason is the correct explanation of assertion

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

72. An incorrect statement with respect to S_N1 and S_N2 mechanisms for alkyl halide is
    (a) a strong nucleophile in an aprotic solvent increases the rate or favours S_N2 reaction
    (b) competing reaction for an S_N2 reaction is rearrangement
    (c) S_N1 reactions can be catalysed by some Lewis acids
    (d) a weak nucleophile and aprotic solvent increases the rate of S_N1 reaction

73. An alkyl halide with molecular formula $C_6H_{13}Br$ on dehydrohalogenation gave two isomeric alkenes X and Y with molecular formula C_6H_{12}. On reductive ozonolysis, X and Y gave four compounds CH_3COCH_3, CH_3CHO, CH_3CH_2CHO and $(CH_3)_2CHCHO$. The alkyl halide is
    (a) 2-bromohexane
    (b) 2,2-dimethyl-l-bromobutane
    (c) 4-bromo-2-methyl
    (d) 3-bromo-2-methylpentane

74. $CH_3CH_2CH_2Br \xrightarrow[\text{alcohol}]{KOH} CH_3CH = CH_2$
    The above reaction is an example of .... reaction.
    (a) substitution   (b) elimination
    (c) addition   (d) rearrangement

75. The order of reactivities of methyl halide in the formation of Grignard reagent is
    (a) $CH_3Cl > CH_3Br > CH_3I$
    (b) $CH_3I > CH_3Br > CH_3Cl$
    (c) $CH_3Br > CH_3I > CH_3Cl$
    (d) $CH_3Br > CH_3Cl > CH_3I$

76. Hydrolysis of trichloromethane with aqueous KOH gives
    (a) methanol   (b) acetic acid
    (c) ethanol   (d) formic acid

77. The chemical formula of 'tear gas' is
    (a) $COCl_2$ (b) CO_2
    (c) Cl_2 (d) CCl_3NO_2

78. Which is more acidic
    (a) $CHCl_3$ (b) CHF_3
    (c) $CHBr_3$ (d) CHI_3

79. Freon used as refrigerant is
    (a) $CF_2 = CF_2$ (b) CH_2F_2
    (c) CCl_2F_2 (d) CF_4

80. Which of the following represents Wurtz-Fittig reaction?
    (a) $C_6H_5I + 2Na + CH_3I \rightarrow C_6H_5CH_3 + 2NaI$
    (b) $2C_6H_5I + 2Na \rightarrow C_6H_5C_6H_5 + 2NaI$
    (c) $2CH_3CH_2I + 2Na \rightarrow CH_3CH_2CH_3 + 2NaI$
    (d) $CH_3Br + AgF \rightarrow CH_3F + AgBr$

81. **Assertion (A)** Presence of nitro group facilitates nucleophilic substitution reactions in aryl halides.
    Reason (R) The intermediate carbocation is stable due to presence of nitro group.
    (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
    (b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
    (c) Assertion is true but Reason is false.
    (d) Both Assertion and Reason are false.

82. Chlorination of toluene in the presence of light and heat followed by treatment with aqueous KOH gives
    (a) o-cresol   (b) m-cresol
    (c) p-cresol   (d) benzyl alcohol

83. Chlorobenzene is …………. Reactive than benzene towards electrophilic substitution and directs the incoming electrophile to the ……….position.
    (a) more, ortho/para   (b) less, ortho/para
    (c) more, meta   (d) less, meta

84. Gammaxane is chemically known as
    (a) benzene hexachloride
    (b) hexachloro benzene
    (c) hexabromo benzene
    (d) hexabromo benzene
    (e) None of these

85. Among the following, which one has the weakest carbon-halogen bond ?
    (a) Benzyl bromide   (b) Bromobenzene
    (c) Vinyl bromide   (d) Benzyl chloride

SECTION – B

86. Which one of the following statements related to lanthanoids is incorrect ?
    (a) Europium shows +2 oxidation state.
    (b) The basicity decreases as the ionic radius decreases from Pr to Lu.
    (c) All the lanthanons are much more reactive than aluminium.
    (d) Ce (+4) solution are widely used as oxidizing agent in volumetric analysis.

87. Differentiating electron in inner-transition element enters in the ………….orbital.
    (a) s   (b) p   (c) d   (d) f

88. Which of the following compound has same oxidation state of the central metal atom in the cationic and anionic aprt ?
    (a) $[Pt](NH_3)_4][PtCl_6]$
    (b) $[Pt(NH_3)_4Cl_2][PtCl_4]$
    (c) $[Pt(Py)_4][PtCl_4]$
    (d) $K_4[Ni(CN)_6]$

89. The IUPAC name of the complex $[Pt(NH_3)_3Br(NO_2)Cl]Cl$
    (a) triammine chloridobromidonitro platinum (IV) chloride
    (b) triammine bromidochloridonitro platinum (IV) chloride
    (c) triammine bromidochloridonitro platinum (II) chloride
    (d) triammine chloridobromidonitro platinum (II) chloride

90. Which can exist both as diastereoisomer and enantiomer ?
    (a) $[Pt(en)_3]^{4+}$ (b) $[Pt(en)_2ClBr]^{2+}$
    (c) $[Ru(NH_3)_4Cl_2]^0$ (b) $[PtCl_2Br_2]^0$

91. Facial and meridional isomerism will be exhibited by
    (a) $[Co(NH_3)_3Cl_3]$ (b) $[Co(NH_3)_4Cl_2]Cl$
    (c) $[Co(en)_3]Cl_3$ (d) $[Co(NH_3)_5Cl]Cl_2$

92. Which of the following can participate in linkage isomerism?
    (a) NO_2^- (b) $H_2\ddot{N}CH_2CH_2\ddot{N}H_2$
    (c) H_2O (d) $:NH_3$

93. At $25^{o}C,$ the molar conductance at infinite dilution for the strong electrolytes NaOH, NaCl and $BaCl_2$ are $248 \times 10^{-4}, 126 \times 10^{-4}$ and 280×10^{-4} Sm²mol⁻¹ respectively.
    $\lambda^{o}{}_{m}Ba(OH)_2$ Sm² mol⁻¹ is
    (a) 362×10^{-4} (b) 402×10^{-4}
    (c) 524×10^{-4} (d) 568×10^{-4}

94. Given oxo acids are $H_3PO_2, H_3PO_3, H_3PO_4$ and $H_4P_2O_7$. Which of the above oxoacids results into two series of salts ?
    (a) H_3PO_2 (b) H_3PO_3
    (c) H_3PO_4 (d) $H_4P_2O_7$

95. Products formed on heating $Pb(NO_3)_2$ are
    (a) PbO, N_2, O_3 (b) $Pb(NO_2)_2, O_2$
    (c) PbO, NO_2O_2 (d) Pb, N_2, O_2

96. Which of the following is not correct ? White phosphorus (P_4) has
    (a) six P-P single bond
    (b) four P-P single bonds
    (c) four lone pair of electrons
    (d) P-P-P angle is 60°

97. Kohlrausch's law states that at
    (a) finite dilution, each ion makes definite contribution to the equivalent conductance of an electrolyte, whatever be the nature of the other ion of the electrolyte
    (b) infinite dilution, each ion makes definite contribution to equivalent conductance of an electrolyte of an electrolyte depending on the nature of the other ion of the electrolyte
    (c) infinite dilution, each ion makes definite contribution to conductance of an electrolyte whatever be the nature of the other ion of the electrolyte
    (d) infinite dilution, each ion makes definite definite contribution to equivalent conductance of an electrolyte, whatever be the nature of the other ion of the electrolyte

98. At 300 K two pure liquids A and B have vapour pressures respectively 150 mm Hg and 100 m,m Hg. In an equimolar liquid mixture of A and B, the mole fraction of B in the vapour mixture at this temperature is
    (a) 0.6   (b) 0.5   (c) 0.8   (d) 0.4

99. To observe an elevation of boiling of $0.05^\circ C$, the amount of a solute (molecular weight=100) to be added 100 g of water ($K_b = 05$) is :
    (a) 2 g   (b) 0.05 g   (c) 1 g   (d) 0.75 fg

100. A solution of area (molecular) was 56 g mol^{-1} boils at 100.18°C at the temperapheric the same lowering of vapor same pressure as is produced 1 g of urea the same quantity of water is
    (a) 1 g   (b) 38   (c) 6 g   (d) 18 g

BOTANY
SECTION – A

101. All are the major reasons of global warming **except**
     (a) Use of fossil fuels
     (b) Reforestation
     (c) Enhancing carbon dioxide production
     (d) Deforestation

102. Which of the following gas is a major contributor of the greenhouse effect in quantitative terms after CO_2?
     (a) CFCs   (b) N_2O (c) CH_4 (d) SO_2

103. In India, Water (Prevention and Control of Pollution) Act, came into force in
     (a) 1982   (b) 1975   (c) 1992   (d) 1974

104. In wastewater from domestic sewage, impurities are
     (a) Less than 0.01%
     (b) Mere 0.1%
     (c) Present in 1-5% generally
     (d) Present approximately 10-20%

105. Dissolved oxygen is very high in
     (a) A pond near the city
     (b) A polluted lake
     (c) A fresh water river
     (d) A lake with high BOD

106. Which of the following is **not** true for Terror of Bengal?
     (a) Generally grow in polluted water bodies
     (b) Cannot be removed easily from water bodies
     (c) Generally not found in eutrophic water bodies
     (d) An alien species for India

107. All the following are true for eutrophication **except**
     (a) It is a natural aging of lake by nutrient enrichment
     (b) As the lake's fertility increases, plant and animal life burgeons
     (c) Over the centuries, as silt and organic debris pile up, the lake grows shallower and warmer
     (d) Eutrophication can be stopped by adding phosphates and nitrates

108. Ramesh Chandra Dagar is famous for
     (a) Water pollution control
     (b) Recycled plastic named as polyblend
     (c) e-waste control
     (d) Organic farming

109. Bad ozone is present in
    (a) Troposphere   (b) Stratosphere
    (c) Ionosphere   (d) Mesosphere

110. Which of the following is an effect of UV-B rays?
    (a) Skin cancer
    (b) Various types of blood cancer
    (c) Cataract
    (d) Both (a) and (c)

111. Dobson unit is a measurement unit of
    (a) Sound intensity
    (b) Thickness of ozone
    (c) UV-B light
    (d) CFCs present in atmosphere

112. National Forest Policy of India has recommended 33% forest cover for the plains, but India has___A___of forest by the end of twentieth century.
    Here A is
    (a) 21.54%   (b) 10%
    (c) 30%   (d) 12.54%

113. Montreal protocol was signed in Canada in
    (a) 1989   (b) 1988   (c) 1987   (d) 1986

114. Euro III norms stipulate that sulphur to be controlled at _____ parts-per-million (ppm) in petrol.
    (a) 150   (b) 750   (c) 1000   (d) 500

115. Catalytic converters
    (a) Are used in exhaust of vehicles
    (b) Remove most of the gases from exhaust of thermal plant
    (c) Are used in sewage treatment plant
    (d) Both (a) and (c)

116. In India, the Air (Prevention and Control of Pollution) Act was amended in _____ to include noise as an air pollutant
    (a) 1982   (b) 1975   (c) 1992   (d) 1987

117. FOAM stands for
    (a) Forum of Arcata Marshes
    (b) Friends of Arcata Marshes
    (c) Forest of Arcata Marshes
    (d) Findings of Arcata Marshes

118. CNG is better fuel than diesel or petrol because
    (a) It remains unburnt during combustion
    (b) Can be siphoned off by thieves
    (c) CNG cannot be adulterated and burns efficiently
    (d) It can be distributed very easily via pipeline

119. Plant which is known as Terror of Bengal
    (a) Generally grows in fresh water bodies
    (b) Maintains balance in the ecosystem dynamics of water body
    (c) Grows abundantly in eutrophic water bodies
    (d) Is a native plant of India

120. Ahmad khan is famous for
    (a) Water pollution control
    (b) Recycled plastic named as polyblend
    (c) e-waste control
    (d) Organic farming

121. During the past century, the temperature of Earth has increased by around
    (a) 2^0C (b) 3^0C (c) 1^0C (d) 0.6^0C

122. Which of the following is not a direct effect of UV-B rays?
    (a) Aging of skin
    (b) Various type of blood cancer
    (c) Inflammation of cornea
    (d) Cataract

123. Select the mismatched pair
    (a) Chipko Movement – Started in Garhwal Himalayas
    (b) Joint forest management – Started by the government of India in 1980
    (c) Methane – Contributes maximum to total global warming
    (d) El Nino effect – An effect of global warming

124. Haryana Kisan Welfare Club, with a current membership of 5000 farmers, was created by
    (a) Ramesh Chandra Dagar
    (b) Amrita Devi
    (c) Ahmed Khan
    (d) Govt. of India

125. Electrostatic precipitator
    (a) Is used in exhaust of vehicles
    (b) Removes most of the gases from exhaust of motor vehicles
    (c) Is used in exhaust of thermal plant
    (d) Both (a) and (c)

126. High concentration of phosphorus and nitrates in a water body
    (a) Can lead to biomagnifications
    (b) Can lead to eutrophication
    (c) Can favor the growth of such bacteria which are responsible for algal bloom
   (d) Both (b) and (c)

127. Consider the following statements regarding EcoSan toilets.
(A) Uses water to dispose of human excreta.
(B) Recycles human excreta as a natural fertilizer.
(C) This is a hygienic and efficient solution of human waste disposal.
(D) It is not a cost effective and practical solution.
The **correct** statements are
(a) (A) and (D)   (b) (B) and (C)
(c) (B) and (D)   (d) (A) and (C)

128. Select the **incorrect** statement w.r.t. biomagnification.
(a) The phenomenon is well-known for accumulation of mercury and DDT
(b) Occurs w.r.t. non-biodegradable substances which does not metabolised or excreted and are passed to next trophic level
(c) Causes natural ageing of lakes by enrichment of nutrients
(d) Refers to increase in concentration of a toxicant at successive trophic level

129. Greenhouse gases absorb a major fraction of a form of radiations re-emitted by earth surface which are
(a) UV-radiations
(b) Infrared radiations
(c) Shortwave radiations
(d) Photosynthetically active radiations

130. For laying roads, polyblend is mixed with
(a) Benzene hexachloride   (b) Bitumen
(c) Polyethene   (d) PVC

131. Choose the odd one w.r.t. carries of male gametes:
(a) Gymnosperms and angiosperms
(b) Algae
(c) Bryophytes
(d) Pteridophytes

132. Plants obtained through vegetative propagation are
(a) Better adapted to changing environment
(b) Do not get easily decayed
(c) Shows genetic uniformity
(d) Could not be transgenic

133. Arrange the following w.r.t. increasing life span:
Rose, Fruit fly, Rice
(a) Fruit fly, Rice, Rose
(b) Rose, Rice, Fruit fly
(c) Rice, Rose, Fruit fly
(d) Fruit fly, Rose, Rice

134. Parameters of old age are?
(a) End of reproductive phase
(b) Concomitant changes in our body
(c) Slowing down of vital processes
(d) All of the above

135. What is the main aim of animal breeding in animal husbandry:
(a) Increasing the yield of animals
(b) Increasing the number of animals
(c) Improving the desirable qualities of the produce
(d) Both (a) and (c)

SECTION – B

136. How many fishes in the list given below are marine?
Catla, Pomfret, Common carp, Hilsa, Rohu, Mackerel, Sardine
(a) Six   (b) Three   (c) Four   (d) Five

137. Resistance to yellow mosaic virus and powdery mildew in mungbean is developed by which method?
(a) Tissue culture
(b) Somatic hybridisation
(c) Genetic engineering
(d) Mutation breeding

138. Choose incorrect statement:
(a) SCP is one of the alternate source of proteins for animals and human nutrition
(b) Microbes because of their high rate of biomass production and growth can produces large amounts of proteins
(c) *Spirulina* can use as food rich in protein but not in minerals, fats, carbohydrate and vitamins
(d) Microbial growth on starch, straw, molasses, sewage also reduces environmental pollution

139. In a fertilised embryo sac, the haploid, diploid and triploid structures are
(a) Synergid, zygote and primary endosperm, nucleus
(b) Synergid, antipodal and polar nuclei
(c) Antipodal, synergid and primary endosperm nucleus
(d) Synergid, polar nuclei and zygote

140. Autogamy can occur in a chasmogamous flower if
    (a) Pollen matures before maturity of ovule
    (b) Ovules mature before maturity of pollen
    (c) Both pollen and ovules matuer simultaneoulsy
    (d) Both anther and stigma are of equal lengths

141. Emasculated :
    (a) Nitrocellulose   (b) Polythene
    (c) Butter paper   (d) All of the above

142. **Statement A:** Pollen grains of some plants remain viable for months.
    Statement B: Double fertilization is absent where pollen is shed in 2-celled stage.
    (a) Statement B is correct and statement A is wrong
    (b) Both the statement A and B are correct
    (c) Statement A is correct and statement B is wrong
    (d) Both the statement A and B are wrong

143. About genotype Rr, select out incorrect statement:
    (a) Allelic gene pair
    (b) They control common character
    (c) They share common locus
    (d) Can be present on non−homologous chromosome

144. How many different kinds of gametes will be produced by a plant having genotype AABbCCdd?
    (a) 16   (b) 32   (c) 4   (d) 2

145. Blue eye colour is recessive to brown eye colour. A brown eye man whose mother was blue eye marries a blue-eye women. The children shall be
    (a) Both blue eye and brown eye 1 : 1
    (b) All brown eye
    (c) All blue eye
    (d) Blue eye and brown eye 3 : 1

146. Genetic variation in a population arises due to
    (a) Mutations only
    (b) Recombination only
    (c) Mutations as well as recombination
    (d) Reproductive isolation and selection

147. If the base sequnece of a codon in mRNA is 5'-AUG-3', the sequence of tRNA pairing with it must be
    (a) 5'-UAC-3'   (b) 5'-CAU-3'
    (c) 5'-AUG-3'   (d) 5'-GUA-3'

148. Recognise the figure given below and select the correct option:
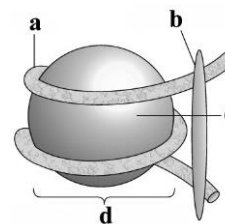
    (a) b-H_1 histone, c-Histone octamer, a-DNA, d-core of histone molecules
    (b) c-H_1 histone, b-Histone octamer, d-DNA, a-Core of histone octamer
    (c) a-H_1 histone, c-Histone octamer, b-DNA, d-Core of histone octamer
    (d) b-H_1 histone, d-Histone octamer, c-DNA, a-Core of histone molecules

149. Sequence of nitrogen bases in non-template strand of DNA was found to be CAT GTT TAT CGC. What would be sequence of nitrogen bases in RNA synthesised over the corresponding in region of template strand?
    (a) CAU GUU UAU CGC
    (b) CAA GAA TAU GCC
    (c) GUA CAA AUA GCC
    (d) GTA CAA ATA GCC

150. The transforming principle of Pneumococcus as find out by Avery, MacLeod and McCarty was
    (a) mRNA   (b) DNA
    (c) Protein   (d) Polysaccharide

ZOOLOGY
SECTION – A

151. Match the column I and II, and chose the correct combination from the options given.

	Column – I		Column – II
A.	Forest	1.	Terrestrial ecosystem
B.	Estuary	2.	Aquatic ecosystem
C.	Grassland	3.	Man – made ecosystem
D.	Wetland		
E.	Aquarium		

	A	B	C	D	E
(a)	1	2	1	1	3
(b)	1	1	2	2	3
(c)	3	2	1	1	2
(d)	1	2	1	2	3

152. Which is incorrect about a small pond ecosystem?
    (a) This is fairly a self – sustainable unit
    (b) All the four basic components of an ecosystem are well exhibited
    (c) The abiotic component is the water with all the dissolved organic and inorganic substances and the rich soil deposit at the bottom of the pond
    (d) This ecosystem performs all the functions of any ecosystem except the unidirectional flow of energy

153. The functional components of the ecosystem are
    A. Productivity   B. Decomposition
    C. Nutrient cycling   D. Energy flow
    E. Succession   F. Stratification
    (a) A, B and C   (b) A, B, C and D
    (c) A, B, C, D and E   (d) A, B, C, D and F

154. Primary production is defined as the amount of biomass or organic matter produced per unit area over a time period by plants during photosynthesis. It is expressed in terms of
    A. Weight (g^{-2})   B. Weight ($g^{-2} yr^{-1}$)
    C. Energy ($kcal\ m^{-2}$)   D. Energy ($kcal\ m^{-2}\ yr^{-1}$)
    (a) A and B   (b) C and D
    (c) A and C   (d) B and D

155. Which is correct about GPP and NPP in ecosystem?
    (a) NPP = GPP – Plant respiration
    (b) NPP = GPP + Plant respiration
    (c) NPP = GPP – Animal respiration
    (d) NPP = GPP + Animal respiration

156. Of the incident solar radiation PAR is
    (a) < 50%   (b) > 50%   (c) 2- 10%   (d) 1 – 5%

157. The unidirectional flow of energy from Sun to producers and then to consumers is keeping with the
    (a) First Law of thermodynamics
    (b) Second Law of thermodynamics
    (c) Both Laws of thermodynamics
    (d) None of the above

158. Match the column I, II and III, and choose the correct combination from the options given

	Column – I		Column – II		Column – III
A.	1º Producer	1.	T_1	K.	Grasshopper
B.	1º Consumer	2.	T_2	L.	Wolf
C.	2º Consumer	3.	T_3	M.	Man
D.	3º Consumer	4.	T_4	N.	Phytoplankton

(a) A – 1 – K, B – 2 – L, C – 3 – M, D – 4 - N
(b) A – 1 – N, B – 2- M, C – 3 – K, D – 4 – L
(c) A – 1 – N, B – 2 – K, C – 3 – L, D – 4 – M
(d) A – 2 – N, B – 3 – K, C – 4 – L, D – 1 – M

159. Read the following statements regarding ecological pyramids and choose the correct answer
    A. Relationship between organisms at different trophic levels is expressed in terms of number, biomass and energy
    B. Any calculations of energy content, biomass or number has to include one group of organisms at that trophic level
    C. In most ecosystems, all the pyramids of number, biomass and energy are upright
    D. The pyramid of biomass in sea is generally inverted
    E. Pyramid of energy is always inverted and can never be upright
    (a) A, C and D are wrong
    (b) A is wrong
    (c) B and C are wrong
    (d) A and E are wrong

160. Primary succession starts in an area where
    (a) No living organisms ever existed
    (b) All the living organisms that existed there, lost due to any reason
    (c) No living organisms are there
    (d) Both (a) and (c)

161. Identify the correct sequence of the stages in 1º hydrarch succession
    A. Reed – swamp stage
    B. Submerged plant stage
    C. Scrub stage
    D. Forest
    E. Marsh – meadow stage
    F. Phytoplankton
    G. Submerged free floating plant stage
    (a) A, B, C, D, E, F, G   (b) F, B, E, G, A, C, D
    (c) F,G, B, A, C, E, D   (d) F,B, G, A, E, C, D

162. Identify the correct sequence of the stage in xerarch succession
    A. Lichen   B. Bigger plants
    C. Forest   D. Bryophytes
    (a) A, B, C, D   (b) B, A, D, C
    (c) A, D, B, C   (d) A, B, D, C

163. Fill in the blanks.
    1. …..A….. also represent a reservoir of carbon.
    2. ……B…. also contribute substantially to CO_2 pool by their processing of waste materials and dead organic matter of land or oceans.
    3. Some amount of the fixed carbon is lost to ….C…. and removed from circulation.
    (a) A – Decomposers, B – fossil fuel, C – sediment
    (b) A – fossil fuel, B – decomposers, C – sediment
    (c) A – sediment, B – fossil fuel, C – decomposers
   (d) A – fossil fuel, B – sediment, C – decomposers

164. Match the column I and II, and choose the correct combination from the options given

	Column – I (Ecosystem Service)		Column – II (Cost)
A.	Climate regulation	1.	50%
B.	Nutrient cycling	2.	< 10%
C.	Soil formation	3.	~ 60%
D.	Recreation	4.	> 10%

	A	B	C	D	E
(a)	2	3	1	3	2
(b)	3	2	4	2	3
(c)	3	2	1	2	3
(d)	4	2	3	3	2

165. Fill in the blanks:
    1. India has greater…..A…… diversity than a Scandinavian country like Norway.
    2. The western Ghats have a greater …..B….. diversity than the eastern Ghats
    3. It has taken millions of years of evolution to accumulate the rich diversity in nature, but we could lose all the wealth in less than ……C….. if the present rates of species losses continue
    4. For many taxonomic groups, species inventories are more complete in …..D…... than in ……E…. countries
    (a) A – ecological, B – amphibian species, C – two centuries, D – temperate in, E – tropical
    (b) A – amphibian species, B – ecological, C – three decades, D – temperate, E – tropical
    (c) A – ecosystem, B – amphibian species, C – 100 years, D – tropical, E – temperate
    (d) A – amphibian species, B – ecosystem, C – two centuries, D – tropical, E – temperate

166. Recognise the figure and find out the current matching according to the globle biodiversity of vertebrates
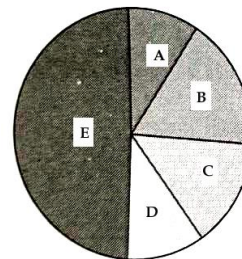
    (a) A – fishes, B – amphibians, C – reptiles, D – birds, E - mammals
    (b) E – fishes, D – amphibian, B – reptiles, C – birds, A – mammals
    (c) E – fishes, D – amphibians, C – reptiles, B – birds, A – mammals
    (d) B – fishes, A – amphibians, D – reptiles, E – birds, C – mammals

167. The pattern of biodiversity is affected by
    (a) Latitudinal gradients
    (b) Species area relationship
    (c) Both (a) and (b)
    (d) None of the above

168. The greatest biodiversity on Earth is found in
    (a) Tropical Amazonian rain forest in South America
    (b) Temperate Amazonian rain forest in North America
    (c) Tropical Amazonian rain forest in South Africa
    (d) Temperate Amazonian rain forest in South America

169. Match the column I and II, and choose the correct combination from the options given

	Column – I (Locality)		Column – II (Number of bird species)
1.	India	A.	56
2.	Amazon rain forest	B.	105
3.	Greenland	C.	1200
4.	Colombia	D.	1300
5.	New York	E.	1400

	1	2	3	4	5
(a)	D	C	A	E	B
(b)	C	E	D	B	A
(c)	E	D	C	A	B
(d)	C	D	A	E	B

170. Species – Area relationship was given by
(a) British zoological and geographer David Tilman
(b) German botanist and geographer Alexander von Humboldt
(c) German natural and geographer Alexander von Humboldt
(d) British naturalist and geographer Alexander von Huboldt

171. The hyperbolic equation for the species area relationship is
(a) $\log C = \log S + Z \log A$
(b) $\log S = \log C = Z \log A$
(c) $\log S = \log A + Z \log C$
(d) $S = CA^Z$

172. Fruit eating birds are called
(a) Insectivorous   (b) Carnivorous
(c) Frugivorous   (d) Detrivorous

173. What does the mean of stability in context to a biological community?
(a) A stable community should not show too much variation in productivity from year to year
(b) A stable community must be either resistant or resilience to occasional disturbances (natural or man – made)
(c) A stable community must be resistant to invasion by alien species
(d) All of the above

174. In a comparative analogy between the airplane and ecosystem (the river popper hypothesis) used by Stanford ecological Paul Ehrlich, find out the correct matching.

	Column – I		Column – II
A.	Rivets	1.	Ecosystem
B.	Airplane	2.	Species
C.	Popping a rivet	3.	Key species
D.	Rivets on the wings	4.	Proper functioning of ecosystem
E.	Flight safety	5.	A species to become extinct

	A	B	C	D	E
(a)	1	2	3	4	5
(b)	2	1	4	5	3
(c)	2	1	5	4	3
(d)	2	1	5	3	4

175. The loss of biodiversity in a region may lead to
(a) Decline in plant production
(b) Lowered resistance to environmental perturbations such as drought
(c) Increased variability in certain ecosystem processes such as plant product, water use and pest and disease cycle
(d) All of the above

176. Which of the following is referred as "Evil Quartet" with reference to loss of biodiversity?
(a) Species richness, extinctions, deforestation, erosion
(b) Habitat loss and fragmentation, over – exploitation, alien species invasion, co – extinction
(c) Overexploitation, grazing, decomposition, extinction
(d) Habitat destruction, co – extinction, deforestation, species richness

177. The organization which has published 'Red Data Book' is
(a) International Union for Conservation of Nature and Natural Resources
(b) National Environment Engineering Research Institute
(c) National Wildlife Action Plan
(d) Convention on International Trade in Endangered Species of Wild Fauna and Flora

178. The function of the male sex accessory duct is
(a) Storage of sperm
(b) Transport of sperms
(c) Formation of sperms
(d) Both (a) and (b)

179. The function of ovary is
A. To produce female gamete
B. To provide the site for fertilization
C. To provide the site for implantation
D. To produce several steroid hormones
(a) A and B   (b) A, B and D
(c) A, B and C   (d) A and D

180. Select the correct combination about contraceptives.

	Column – I		Column – II
A.	Pill	I.	Prevents sperm reaching cervix
B.	Condom	II.	Prevent implantation
C.	Vasectomy	III.	Prevent ovulation
D.	Copper – T	IV.	Semen

	A	B	C	D
(a)	III	IV	IV	II
(b)	II	III	I	IV
(c)	III	I	IV	II
(d)	IV	I	II	III

181. Which ones are all sexually transmitted diseases?
(a) AIDS, Syphilis, Cholera
(b) Trichomoniasis, Malaria, HIV
(c) Gonorrhoea, Hepatitis – B, Chlamydia
(d) Hepatitis – B, AIDS, Haemophilia

182. A person with Klinefelter's syndrome has chromosomes
(a) XX   (b) XY   (c) XYY   (d) XXY

183.

	Column – I		Column – II
A.	*Haemophilus influenza*	P.	Virus
B.	*Entamoeba histolytica*	Q.	Bacteria
C.	*Plasmodium falciparum*	R.	Protozoan
D.	*Wuchereria bancrofti*	S.	Nematode
E.	*Salmonella typhi*	T.	Fungus

	A	B	C	D	E
(a)	P	T	R	Q	S
(b)	Q	R	R	S	Q
(c)	T	P	R	S	Q
(d)	P	R	T	Q	S

184. Antigen binding site in an antibody is found between
(a) Two light chains
(b) Two heavy chains
(c) One heavy and one light chains
(d) Either between two light chains or between one heavy and one light chain depending upon the nature of antigen

185. Which of the following immune responses is responsible for rejection of kidney graft?
(a) Humoral immune response
(b) Inflammatory immune response
(c) Cell – mediated immune response
(d) Auto – immune response

SECTION – B

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

186. **Assertion:** Humus serves as a reservoir of nutrients.
Reason: Humus is colloidal in nature
(a)   (b)   (c)   (d)

187. **Assertion:** All organisms are dependent for their food on producers either directly or indirectly
Reason: All animals are called consumers or heterotrophs.
(a)   (b)   (c)   (d)

188. **Assertion:** Biodiversity exists at al the levels of biological organization ranging from macromolecules within cells to biomes
Reason: The term 'biodiversity' describe the combined diversity at all the levels of biological organization
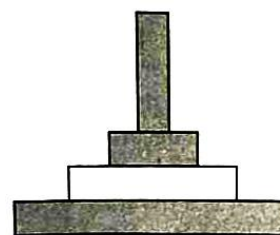(a)   (b)   (c)   (d)

189. **Assertion:** India is one of the 12 mega diversity countries of the world
Reason: India has only 2.4 per cent of world's land area, but its share of the global species diversity is an impressive 8.1 per cent
(a)   (b)   (c)   (d)

190. The given ecological pyramid is

TC (tertiary consumer) SC (Secondary consumer) PP (Primary producer)
(a) Pyramid of energy for grassland and pyramid of biomass for a lake
(b) Pyramid of biomass for grass and pyramid of number for tree
(c) Pyramid of number for sea and pyramid of biomass for grassland
(d) Pyramid of energy and biomass for a pond

191. Identify the correct number of food chains in the given food web.
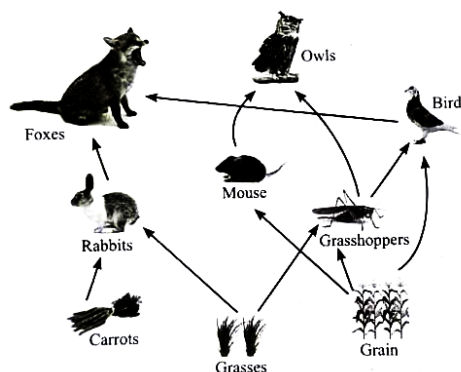
(a) Five   (b) Four   (c) Six   (d) Seven
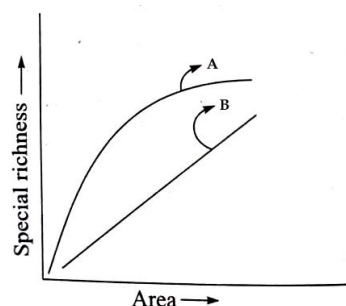
192. Identify development stage and place of occurrence.
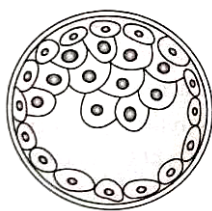
(a) Blastocyst, uterine wall
(b) 8 – celled morula, starting point of fallopian tube
(c) Late morula, middle part of fallopian tube
(d) Blastula, end part of fallopian tube

193. What is the correct sequence of sperm formation?
(a) Spermatogonia, Spermatozoa, Spermatocytes, Spermatids
(b) Spermatogonia, Spermatocytes, Spermatids, Spermatozoa
(c) Spermatids, Spermatocytes, Spermatogonia, Spermatozoa
(d) Spermatogonia, Spermatocytes, Spermatozoa, Spermatids

194. Haemophilia is more common in males than females, be-cause it is
(a) Dominant autosomal
(b) Dominant X – linked
(c) Recessive – X – linked
(d) X – linked

195. Identify the molecules (A) and (B) shown below and select the right option giving their source and use
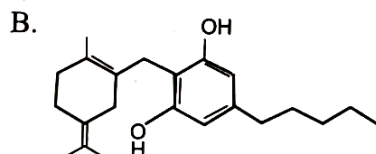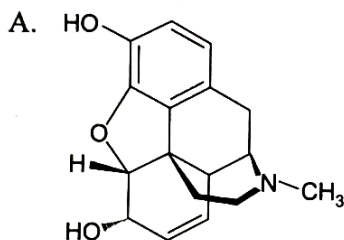
		Molecule	Source	Uses
(a)	A.	Cocaine	Erythroxylum coca	Accelerates the transport of dopamine
(b)	B.	Heroin	Cannabis sativa	Depressant and slows down body functions
(c)	B.	Cannabinoid	Airopabellad ona	Produces hallucinations
(d)	A.	Morphine	Papaver somniferum	Sedative and pain killer

196. Recognise the figure and find out the correct matching.

	A	B
(a)	$S = CA^2$	Log C = log S + Z log A
(b)	Log S = log C + Z log A	$S = CA^z$
(c)	$S = CA^z$	Log S = log C + Z log A
(d)	$C = SA^z$	Log S = log C + Z log A

197. Fill in the blanks:
1. In general, species diversity …..A…..as we move away from equator towards the poles
2. With very few exceptions, tropics harbour….B… species than temperate or polar areas
3. A forest in a torpical region like Equador has up to ….C…. as many species of ……D…… as a forest of equal area in a temperate region like the Midwest of the USA
(a) a – increases, B – less, C – two time, D – amphibians
(b) A – decreases, B – more, C – ten time, D – vascular plants
(c) A – increases, B – less, C – two times, D – vascular plants
(d) A – decreases, B – less, C – two times, D – vascular plants

198. In the diagram of pBR 322, which identical components correctly?
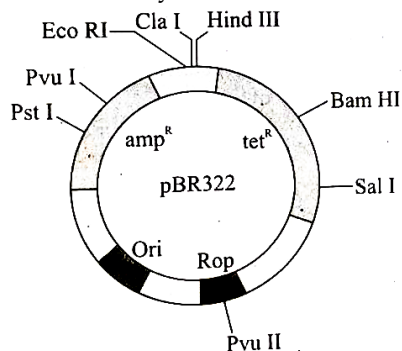
(a) Rop – reduced osmotic pressure
(b) Hind III, EcoRI – selectable markers
(c) amp^R, tet^R – antibiotic resistance genes
(d) ori – original restriction enzyme

199. Which of the following is not a feature of the plasmids?
(a) Transferable
(b) Single – stranded
(c) Independent replication
(d) Circular structure

200. Gel electrophoresis is used for
(a) Construction of recombinant DNA by joining with cloning vectors
(b) Isolation of DNA into fragments
(c) Cutting of DNA into fragments
(d) Separation of DNA fragments according to their size

TEST ASSESMENT AND ANALYSIS SHEET

Name…………...……………………Test topic - …………………………………………….Date ………………

Physics	Marks per question	Total Ques.	Attempted	Unattempted	Correct	Incorrect	Net score
Multiple choice questions							
Q. No. (Incorrect)							
Q. No. (Unattempted)							
Chemistry	Marks per question	Total Ques.	Attempted	Unattempted	Correct	Incorrect	Net score
Multiple choice questions							
Q. No. (Incorrect)							
Q. No. (Unattempted)							
Biology	Marks per question	Total Ques.	Attempted	Unattempted	Correct	Incorrect	Net score
Multiple choice questions							
Q. No. (Incorrect)							
Q. No. (Unattempted)							
Total net score							