Aakash
Medical | IIT-JEE | Foundations

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MM : 720 Final Test Series(P2)-2024-25_Test-04D **Time : 180 Min.**

Topics Covered:
Physics: Work, Energy and Power, System of Particles and Rotational Motion, Gravitation, Mechanical Properties of Solid, Mechanical Properties of Fluids
Chemistry: Alcohols, Phenols and Ethers, Aldehydes, Ketones and Carboxylic Acids, Amines, Biomolecules, Principles Related to Practical Chemistry.
Botany: Organisms and Populations, Ecosystem, Biodiversity and Conservation.
Zoology: Biomolecules, Breathing and Exchange of Gases

General Instructions :
Duration of Test is 3 hrs.
The Test consists of 180 questions. The maximum marks are 720.
There are four parts in the question paper consisting of Physics, Chemistry, Botany and Zoology having 45 questions in each part of equal weightage.
Each question carries +4 marks. For every wrong response, –1 mark shall be deducted from the total score. Unanswered/unattempted questions will be given no marks.
Use blue/black ballpoint pen only to darken the appropriate circle.
Mark should be dark and completely fill the circle.
Dark only one circle for each entry.
Dark the circle in the space provided only.
Rough work must not be done on the Answer sheet and do not use white fluid or any other rubbing material on the Answer sheet.

PHYSICS

1. **Statement A:** Work done by non conservative force is path independent.
Statement B: Energy is scalar quantity but power is a vector quantity.
Consider the given statements and choose the **correct** option.

(1) Both statements A and B are correct

(2) Both statements A and B are incorrect

(3) Statement A is correct and B is incorrect

(4) Statement A is incorrect and B is correct

2. How much oil in kg, a 100% efficient pump of 5 kW power can raise to a tower 50 m high every hour? (g = 10 m/s^2)

(1) 7200 kg

(2) 18000 kg

(3) 36000 kg

(4) 72000 kg

3. Two discs of moment of inertia I_1 and I_2 are rotating with angular velocities ω_1 and ω_2 in the same direction around the same axis. If one disc is placed on second disc gently, then the final angular velocity of combination is

(1) $\frac{I_1\omega_1 - I_2\omega_2}{I_1 - I_2}$

(2) $\frac{I_1\omega_1 + I_2\omega_2}{I_1 - I_2}$

(3) $\frac{I_1\omega_1 + I_2\omega_2}{I_1 + I_2}$

(4) $\frac{I_1\omega_1 - I_2\omega_2}{I_1 + I_2}$

4. Given below are two statements labelled as Assertion (A) and Reason (R)
Assertion (A) : For a planet revolving around the sun, its speed is more when it is closer to the sun.
Reason (R) : As there is no external torque on the planet about the sun, its angular momentum remains constant.
Select the most appropriate answer from the options given below:

(1) Both A and (R) are true and (R) is the correct explanation of (A).

(2) Both A and (R) are true but (R) is not the correct explanation of (A).

(3) (A) is true but (R) is false.

(4) (A) is false and (R) is also false.

5. Consider the following statements
Statement A: Escape speed of a particle depends on its own mass.
Statement B : The work required to bring two masses closer slowly is negative
Statement C : Gravitational potential energy decreases as we move away from earth.
The correct option is

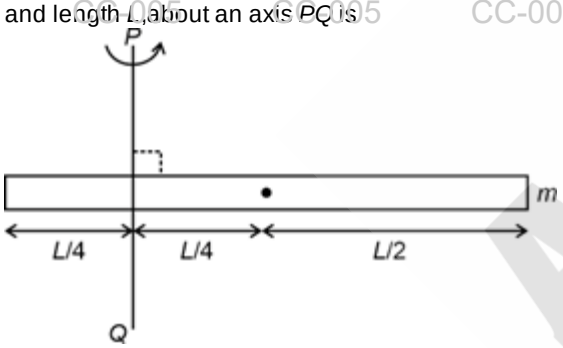
(1) Statement A and statement B are correct only

(2) Statement B is correct only

(3) Statement A and statement C are correct only

(4) All statements are correct

6. The moment of inertia of the given uniform rod of mass m and length *L*, about an axis *PQ* is



(1) $\frac{7}{48}mL^2$

(2) $\frac{5}{48}mL^2$

(3) $\frac{mL^2}{12}$

(4) $\frac{mL^2}{3}$

7. On a cube of edge length 6 cm a tangential force of 12 kN is applied at its upper surface and displaces it by 0.2 mm relative to lower surface. The shear modulus of the material of cube will be

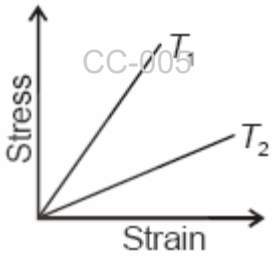
(1) 5.0×10^8 N/m^2

(2) 1.0×10^9 N/m^2

(3) 5.0×10^9 N/m^2

(4) 1.0×10^8 N/m^2

8. If stress versus strain plot for a metal at two different temperatures T_1 and T_2 are shown below, then



(1) $T_1 > T_2$

(2) $T_1 < T_2$

(3) $T_1 = T_2$

(4) $T_1 = \frac{1}{T_2}$

9. Young's modulus of a wire is 3×10^{11} N m^{-2}. The amount of elastic potential energy stored per unit volume of the wire when it is stretched by applying 2 MPa stress will be

(1) $\frac{10}{3}$ J/m^3

(2) $\frac{40}{3}$ J/m^3

(3) $\frac{20}{3}$ J/m^3

(4) $\frac{13}{3}$ J/m^3

10. **Assertion :** The shape of fluid is governed by the shape of its container
Reason : Fluids do not have any resistance to change its shape.

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

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

(3) (A) is true, (R) is false

(4) (A) is false, (R) is true

11. A capillary, of internal radius *R* and having sufficient length, is dipped in water of surface tension *T*. The height of water column inside the capillary is (θ is the angle of contact and ρ is the density of water)

(1) $\frac{2T\cos\theta}{\rho gR}$

(2) $\frac{T\cos\theta}{\rho gR}$

(3) $\frac{2\rho gR}{T\cos\theta}$

(4) $\frac{\rho gR}{T\cos\theta}$

12. The excess pressure inside a soap bubble is equal to an oil column of height 3 cm. The radius of the soap bubble will be (given, density of oil = 0.8 g/cm^3, surface tension of soap solution = 0.02 N/m and g = 10 m s^{-2})

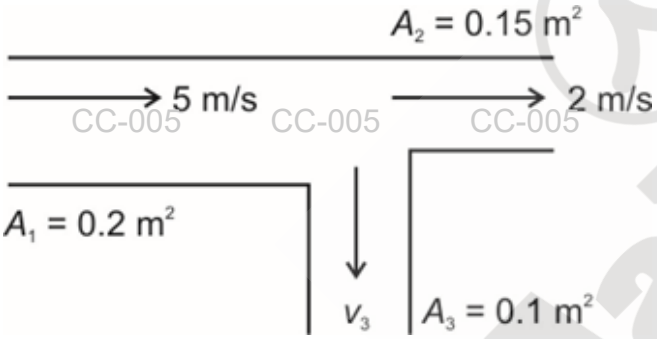
(1) 3.33×10^{-4} m

(2) 10^{-4} m

(3) 10^{-3} m

(4) 1.67×10^{-3} m

13. An ideal fluid is flowing through different cross-section as shown in figure, the velocity v_3 will be



(1) 7 m/s

(2) 3 m/s

(3) 1 m/s

(4) 10 m/s

14. Two particles m_1 = 2 kg and m_2 = 3 kg have position vectors $\vec{r}_1 = t\hat{i} + 2t^2\hat{j} + 2t\hat{k}$ and $\vec{r}_2 = \hat{i} + 2t^3\hat{j} + 2t\hat{k}$ respectively, where t is time in second. Acceleration of centre of mass is

(1) $\left(\frac{36+8t}{5}\right)\hat{j}$

(2) $\left(\frac{8+36t}{5}\right)\hat{i}$

(3) $\left(\frac{8+36t}{5}\right)\hat{j}$

(4) $\left(\frac{2+8t}{7}\right)\hat{j}$

15. The acceleration of centre of mass of a system of particles depends on

(1) External forces

(2) Internal forces

(3) Total mass of system

(4) Both (1) and (3)

16. Ball 1 collides with an another identical ball 2 at rest as shown in figure. For what value of coefficient of restitution e, the velocity of second ball becomes two times that of velocity of ball 1 after collision.

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

(2) $\frac{1}{4}$

(3) $\frac{1}{6}$

(4) $\frac{1}{3}$

17. A body of mass 2 kg moving with velocity 5 m s^{-1} collides with a body at rest of mass 3 kg and sticks to it. Now the combined mass starts moving. The final velocity of whole mass is

(1) 1 m s^{-1}

(2) 2 m s^{-1}

(3) 4 m s^{-1}

(4) 3 m s^{-1}

18. Two planets *A* and *B* have same density. The radius of *A* is twice that of *B*. The ratio of escape speeds $V_A : V_B$ is

(1) 2 : 1

(2) $\sqrt{2}$: 1

(3) 1 : $\sqrt{2}$

(4) 1 : 2

19. If two wire of same material and of same length have ratio of their radii 1 : 3, then under the effect of same stretching force, their respective elongation will be in ratio

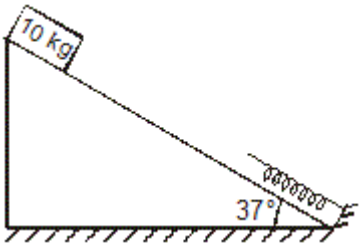
(1) 1 : 3

(2) 3 : 1

(3) 9 : 1

(4) $\sqrt{3}$: 1

20. A block of mass 10 kg is released from the top of an inclined smooth surface as shown. The distance travelled by block before coming to rest is 5 m. The compression of the spring is (Spring constant of spring is 20,000 N/m)



(1) 1 m

(2) 0.141 m

(3) 2.732 m

(4) 0.1732 m

21. **Statement A:** When a body at rest starts falling freely under the action of gravity, the work done by gravity is positive.
Statement B: When a spring is stretched, work done by stretching force is positive.
Consider the given statements and choose the correct option that follows

(1) Statement A is true but B is false

(2) Statement A is false but B is true

(3) Both statements A and B are true

(4) Both statements A and B are false

22. Gravitational potential in a region is given by $V = -(xyz)$ J/kg. Find gravitational intensity at (2, 2, 2) m.

(1) $\left(\hat{i}+\hat{j}+\hat{k}\right)$ N/kg

(2) $2\left(\hat{i}+\hat{j}+\hat{k}\right)$ N/kg

(3) $3\left(\hat{i}+\hat{j}+\hat{k}\right)$ N/kg

(4) $4\left(\hat{i}+\hat{j}+\hat{k}\right)$ N/kg

23. A metal rope of density 5000 kg/m^3 has a breaking stress 9.8×10^8 N/m^2. If the radius of the rope is doubled, then the new breaking stress will be

(1) 39.2×10^8 N/m^2

(2) 9.8×10^8 N/m^2

(3) 6×10^8 N/m^2

(4) 16×10^8 N/m^2

24. A chain of mass 5 kg and length 36 m is held on a frictionless table in such a way that $\left(\frac{1}{6}\right)^{\text{th}}$ part of its length is hanging below the edge of table. The work done to pull the hanging part of chain up the table is

(1) 10 J

(2) 20 J

(3) 25 J

(4) 45 J

25. Match List- I with List-II and choose the correct option (where symbols have their usual meaning).

	List-I		List-II
A	Work done by all the forces	p.	$\frac{\text{Area under } P-t \text{ graph}}{\text{Total time interval}}$
B	Work done by conservative forces	q.	Change in kinetic energy
C	Average power	r.	Negative of change in potential energy
D	Instantaneous power	s.	Slope of *W*-*t* graph

(1) A → r, B → q, C → s, D → p

(2) A → q, B → r, C → s, D → p

(3) A → q, B → r, C → p, D → s

(4) A → r, B → q, C → p, D → s

26. Choose the incorrect statement regarding centre of mass.

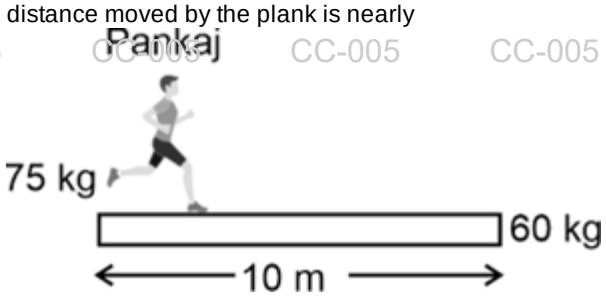
(1) There may or may not be any mass present physically at the centre of mass

(2) Position of centre of mass depends on the shape of the body

(3) Centre of mass is independent of the co-ordinate system

(4) For symmetrical bodies having homogeneous distribution of mass centre of mass is always at certain distance from geometrical centre.

27. Pankaj (*m* = 75 kg) is standing on left end of a plank of length 10 m and the plank is placed on a frictionless surface. If Pankaj moves to the other end of plank, then distance moved by the plank is nearly



(1) 2.4 m

(2) 5.6 m

(3) 6.5 m

(4) 7.2 m

28. A bomb of mass 12 kg is projected upward with velocity of 50 m/s. It explodes after 2 s into two fragments, 3 kg and 9 kg. If 9 kg mass comes to rest, then velocity of other fragment is

(1) 60 m/s

(2) 120 m/s

(3) 100 m/s

(4) 80 m/s

29. Two identical spheres of radius *R* made of the same material are kept at a distance *d* apart. Then the gravitational attraction between them is proportional to

(1) d^{-2}

(2) d^2

(3) d

(4) d^4

30. If the position vector $\left(\vec{r}\right)$ of a particle is $\left(\hat{i}+2\hat{j}+3\hat{k}\right)\text{m}$ and its angular velocity $\left(\vec{\omega}\right)$ is $\left(\hat{i}-\hat{j}+\hat{k}\right)$ rad/s, then the linear velocity of the particle is

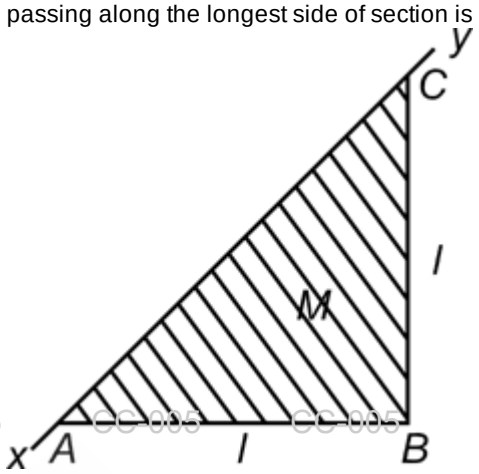
(1) $\left(2\hat{i}-2\hat{j}-3\hat{k}\right)$ m/s

(2) $\left(-2\hat{i}-4\hat{j}-3\hat{k}\right)$ m/s

(3) $\left(-5\hat{i}-2\hat{j}+3\hat{k}\right)\text{m/s}$

(4) $\left(-2\hat{i}-3\hat{j}+4\hat{k}\right)$ m/s

31. Consider a section of a square plate of mass *M* and length *l* as shown in figure. The moment of inertia about the axis *xy* passing along the longest side of section is



(1) $\frac{ML^2}{12}$

(2) $\frac{ML^2}{4}$

(3) $\frac{ML^2}{3}$

(4) $\frac{ML^2}{5}$

32. Work done in taking a mass from one point to another in a gravitational field without changing its kinetic energy

(1) Depends on initial and final position of mass

(2) Depends on the path followed

(3) Is equal to the change in gravitational potential energy between those points

(4) Both (1) and (3)

33. The escape velocity of a body from the earth is V_e. If the radius of earth contracts to $\left(\frac{1}{16}\right)$ of its value keeping the mass of earth constant, the escape velocity will be

(1) Tripled

(2) Doubled

(3) Quadrupled

(4) Remains same

34. A satellite launching station should be

(1) Near the equatorial region

(2) Near the polar region

(3) On the polar axis

(4) All of these

35. A particle is projected vertically upward from the surface of earth (radius R_e) with speed equal to one-fourth of escape velocity. The maximum height attained by it is

(1) $\frac{R_e}{7}$

(2) $\frac{R_e}{15}$

(3) $15R_e$

(4) $\frac{16R_e}{15}$

36. If *P*, *Q* and *R* represents bulk modulus of elasticity for solid, liquid and gas respectively, then

(1) $P = Q = R$

(2) $P < Q < R$

(3) $P > Q > R$

(4) $P < Q = R$

37. A liquid of bulk modulus *B* is compressed by applying an external pressure such that its density increases by 0.04%. The pressure applied on the liquid is

(1) $\frac{B}{1000}$

(2) $\frac{B}{2500}$

(3) $\frac{B}{3000}$

(4) $\frac{B}{100}$

38. The ratio of tensile stress to the longitudinal strain is defined as

(1) Bulk modulus

(2) Young's modulus

(3) Shear modulus

(4) Compressibility

39. A force $\vec{F} = \left(2t\hat{i} + 8\hat{j}\right)$ N acts on a body and position of body varies with time t as $\vec{r} = \left(t^2\hat{i} - 4\hat{j}\right)$ m. Work done by the force in first 3 second is

(1) 20 J

(2) 36 J

(3) 16 J

(4) 24 J

40. For a perfectly rigid body, the strain produced by the applied force is

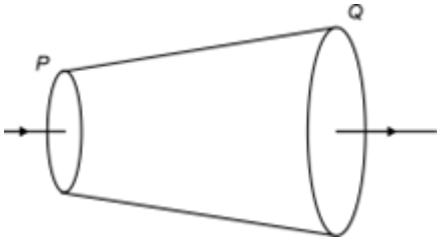
(1) Zero

(2) Infinite

(3) Finite

(4) Between 0 and 1

41. An ideal fluid flows through a pipe of circular cross-section with diameter 10 cm and 25 cm at *P* and *Q* respectively as shown. The ratio of velocities of fluid at *P* and *Q* is



(1) 25 : 1

(2) 25 : 2

(3) 25 : 4

(4) 25 : 6

42. Two capillary tubes of different diameters are dipped in water. The rise of water is

(1) Same in both tubes

(2) Greater in tube of larger diameter

(3) Greater in tube of smaller diameter

(4) Independent of diameter of tube

43. A liquid is filled upto a height of 80 cm in a cylindrical vessel. The speed of liquid coming out of a small hole at the bottom of vessel is ($g = 10\ m/s^2$)

(1) 2 m/s

(2) 4 m/s

(3) 6 m/s

(4) 8 m/s

44. An open *U* - tube of same cross-sectional area contains Hg. If 108.8 cm of water column is poured into one limb of tube, then how high does the Hg surface rise in the other limb from initial level?
[Assume density of water $\rho_W = 1$ gm/cc, $\rho_{Hg} = 13.6$ gm/cc]

(1) 2 cm

(2) 5 cm

(3) 4 cm

(4) 6 cm

45. In a horizontal pipe, the flowing oil pressure falls by 8 N/m^2 between two points separated by 1 m. The change in kinetic energy per unit mass of oil at these points is
($\rho_{oil} = 800\ kg/m^3$)

(1) 0.04 J/kg

(2) 0.03 J/kg

(3) 0.01 J/kg

(4) 0.05 J/kg

CHEMISTRY

46. Cation that gives brown residue on charcoal cavity test is

(1) Pb^{2+}

(2) Cd^{2+}

(3) As^{3+}

(4) Zn^{2+}

47. Consider the following statements:
Statement-I: Aqueous solution of $ZnCl_2$ reacts with NaOH solution to form white precipitate of $Zn(OH)_2$.
Statement-II: $Zn(OH)_2$ is soluble in excess of NaOH solution on heating.
In the light of above statements choose the correct option.

(1) Both statement I and statement II are true

(2) Statement I is true but statement II is false

(3) Statement I is false but statement II is true

(4) Both statement I and statement II are false

48. Anion that gives smell of rotten egg with warm dil H_2SO_4 is

(1) SO_3^{2-}

(2) NO_2^-

(3) Cl^-

(4) S^{2-}

49. The oxidation state of Fe in its brown ring complex is

(1) +1

(2) +2

(3) +3

(4) +4

50. Consider the following ions
(a) Co^{+2}
(b) Ba^{2+}
(c) Mn^{2+}
(d) Al^{3+}
In qualitative analysis, Group-IV cations are

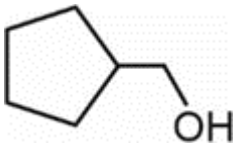
(1) (a) and (b) only

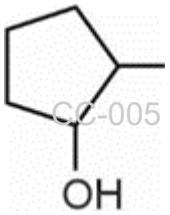
(2) (c) and (d) only

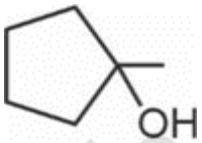
(3) (a) and (c) only

(4) (b) and (d) only

51. The compound which gives blue colouration in Victor Meyer's test is

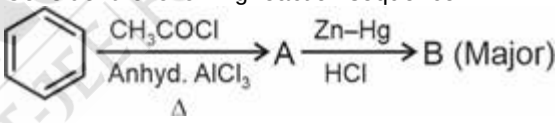
(1) 

(2) 

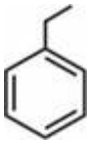
(3) 

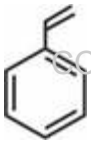
(4) 

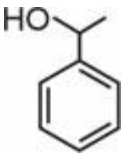
52. Consider the following reaction sequence

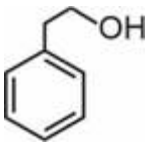


Major product B is

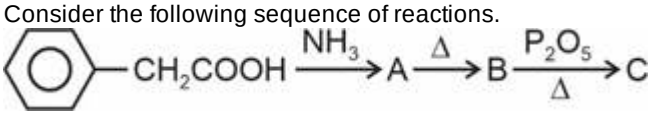
(1) 

(2) 

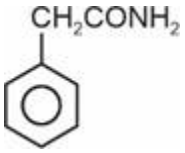
(3) 

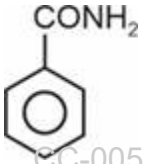
(4) 

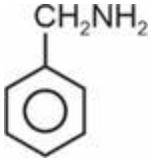
53. Consider the following sequence of reactions.



Major product C is

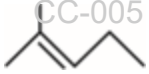
(1) 

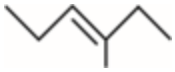
(2) 

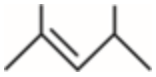
(3) 

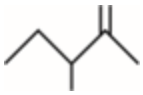
(4) 

54. On reductive ozonolysis of compound 'X' yields Butan-2-one as one of the products. Compound 'X' is:

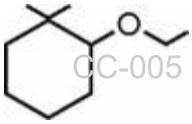
(1) 

(2) 

(3) 

(4) 

55. IUPAC name of the given compound is



(1) 2-Ethoxy-1, 1-dimethylcyclohexane

(2) 1-Ethoxy-2, 2-dimethylcyclohexane

(3) 1, 1-Dimethyl-2-ethoxycyclohexane

(4) 2, 2-Dimethyl-2-ethoxycyclohexane

56. Which of the following carbohydrates cannot be hydrolysed further to give simpler unit of polyhydroxy aldehyde or ketone?

(1) Sucrose

(2) Glucose

(3) Cellulose

(4) Starch

57. Basic amino acid among the following is

(1) Alanine

(2) Isoleucine

(3) Lysine

(4) Valine

58. Which of the following is not a pyrimidine base?

(1) Cytosine

(2) Thymine

(3) Guanine

(4) Uracil

59. Match the hormones given in List I with their respective functions given in List II.

	List I		List-II
(a)	Glucagon	(i)	Controls the carbohydrate metabolism
(b)	Glucocorticoids	(ii)	Controls the level of excretion of water and salt by kidney
(c)	Mineralocorticoids	(iii)	Increase the blood sugar level
(d)	Insulin	(iv)	Keep blood sugar level within the narrow limits

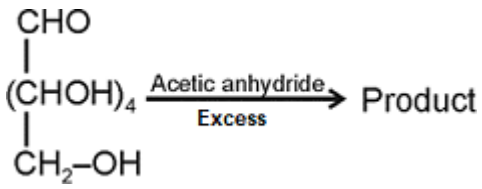
Choose the correct option

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

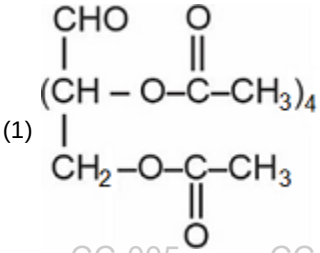
(2) (a)-(iii), (b)-(i), (c)-(ii), (d)-(iv)

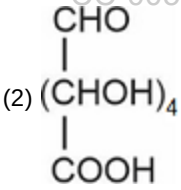
(3) (a)-(iv), (b)-(i), (c)-(ii), (d)-(iii)

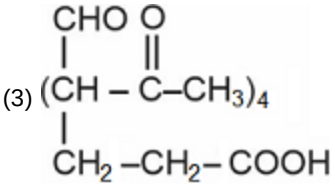
(4) (a)-(i), (b)-(iii), (c)-(iv), (d)-(ii)

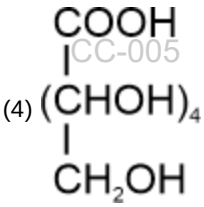
60. 

The product is

(1) 

(2) 

(3) 

(4) 

61. Consider the following statements
(a) Glucose does not give Schiff's test.
(b) Nitric acid oxidises gluconic acid to saccharic acid.
(c) Glucose does not reduce Fehling's solution.
The correct statements are

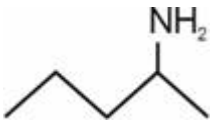
(1) (a) and (b) only

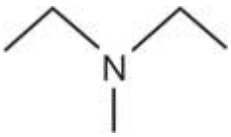
(2) (b) and (c) only

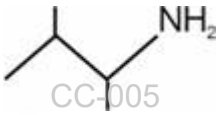
(3) (a) and (c) only

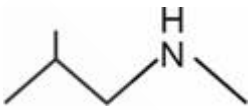
(4) (a), (b) and (c)

62. Compound (A) having molecular formula $C_5H_{13}N$ on reaction with Hinsberg's reagent gives compound (B) which is insoluble in aqueous alkali. The compound (A) could be

(1) 

(2) 

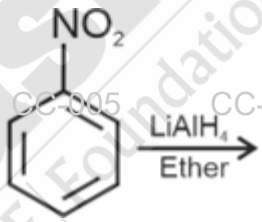
(3) 

(4) 

63. Consider the following reactions,

(a) $CH_3CH_2CONH_2 \xrightarrow[(ii)\ H_2O]{(i)\ LiAlH_4}$

(b) $CH_3CH_2CN \xrightarrow{Na(Hg)/C_2H_5OH}$

(c) 

The reactions which will result in the formation of primary amines are

(1) (a) and (b) only

(2) (b) and (c) only

(3) (a) and (c) only

(4) (a), (b) and (c)

64. Electrophilic substitution of aniline with Br_2/H_2O majorly gives

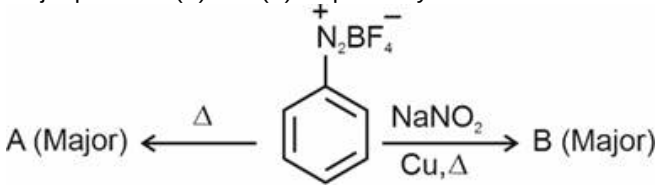
(1) 2, 4, 6 – Tribromoaniline

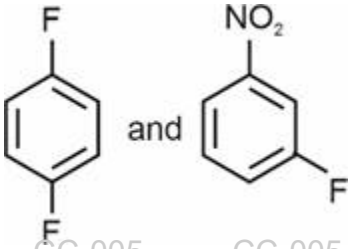
(2) 2 – Bromoaniline

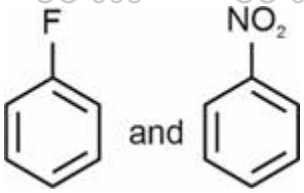
(3) 4 – Bromoaniline

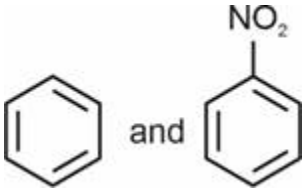
(4) 2, 4 – Dibromoaniline

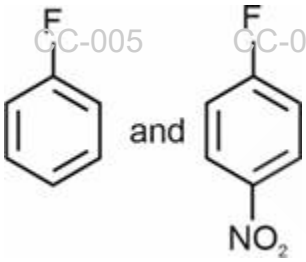
65. Major products (A) and (B) respectively are



(1) 

(2) 

(3) 

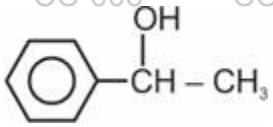
(4) 

66. Alcohol which will react at slowest rate with $ZnCl_2$ and conc. HCl is

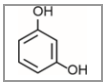
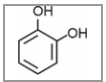
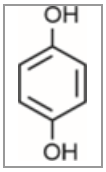
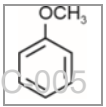
(1) CH_3CH_2OH

(2) $(CH_3)_3C - OH$

(3) $(CH_3)_2CH - OH$

(4) 

67. Match List-I (Compounds) with List-II (Common name)

	List I		List II
(a)		(i)	Hydroquinone
(b)		(ii)	Anisole
(c)		(iii)	Resorcinol
(d)		(iv)	Catechol

Select the correct option.

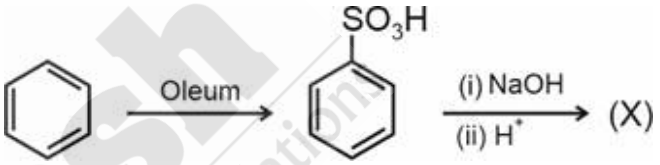
(1) (a) (iv); (b) (iii); (c) (i); (d) (ii)

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

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

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

68.



Compound (X) is

(1) Anisole

(2) Benzaldehyde

(3) Benzoic acid

(4) Phenol

69. Order of reactivity of hydrogen halides towards ethers is

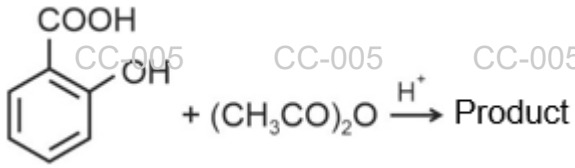
(1) HCl > HBr > HI

(2) HI > HBr > HCl

(3) HBr > HI > HCl

(4) HBr > HCl > HI

70.



In the above reaction, product formed is

(1) Salicylaldehyde

(2) Aspirin

(3) Benzophenone

(4) Picric acid

71. Given below are two statements,
Statement I : Amylose is water soluble component of starch.
Statement II : In amylose, α-D-(+)-glucose units are held by C1 – C4 glycosidic linkage.
In the light of above statements, choose the correct answer from the options given below.

(1) Both statement I and statement II are correct

(2) Both statement I and statement II are incorrect

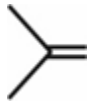
(3) Statement I is correct but statement II is incorrect

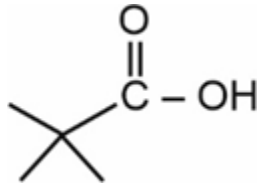
(4) Statement I is incorrect but statement II is correct

72. Consider the following reaction and predict product (A)

$(CH_3)_3C-OH \xrightarrow[573\,K]{Ca} (A)$ Major

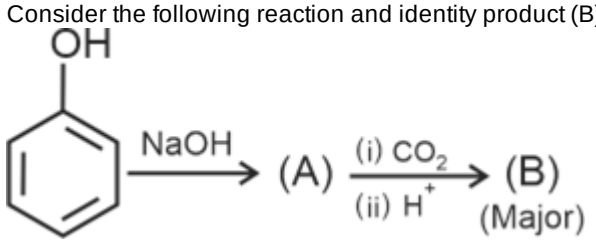
(1) 

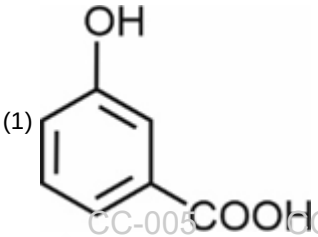
(2) 

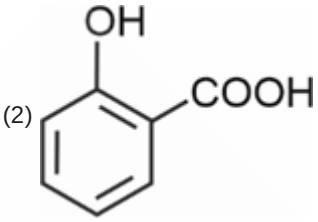
(3) 

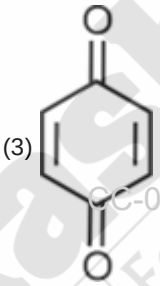
(4) 

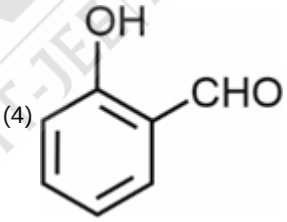
73. Consider the following reaction and identity product (B)



(1) 

(2) 

(3) 

(4) 

74. Addition of potassium thiocyanate solution to the ferric chloride solution, results in the appearance of blood red colouration due to

(1) $Fe_4[Fe(CN)_6]_3$

(2) $[Fe(CN)_5NOS]^{4-}$

(3) $[Fe(SCN)]^{2+}$

(4) $[Fe(CN)_6]^{3-}$

75. Given below are two statements,
Statement I : Reaction of benzene diazonium chloride with aniline in acidic medium gives p-aminoazobenzene (yellow dye).
Statement II : Reaction of ethanol with benzene diazonium chloride gives phenol.
In the light of above statements, choose the correct answer from the options given below.

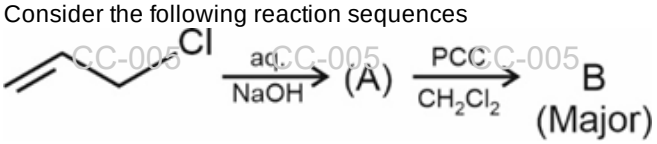
(1) Both statement I and statement II are correct

(2) Both statement I and statement II are incorrect

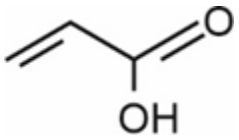
(3) Statement I is correct but statement II is incorrect

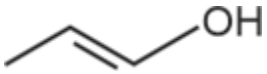
(4) Statement I is incorrect but statement II is correct

76. Consider the following reaction sequences

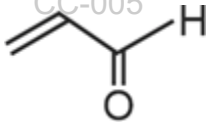


Major product (B) is

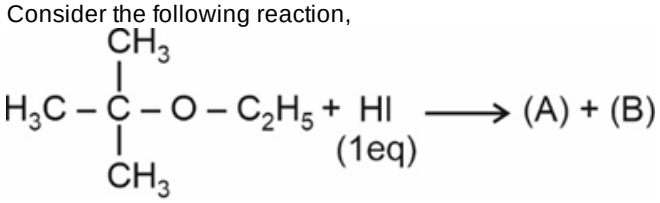
(1) 

(2) 

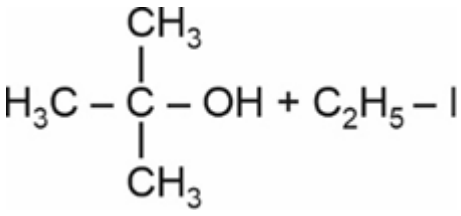
(3) 

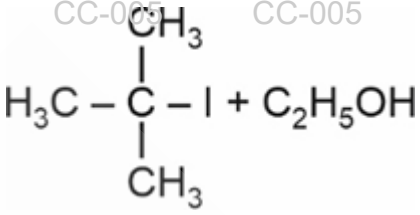
(4) 

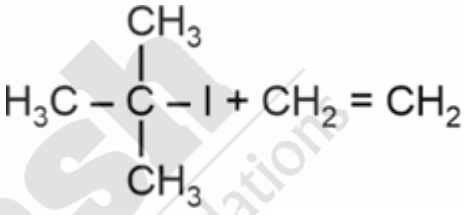
77. Consider the following reaction,

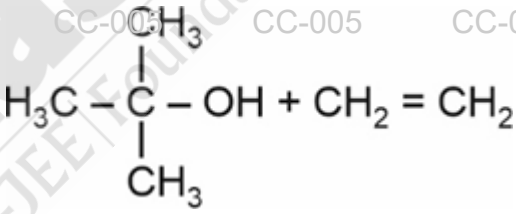


Major products A & B are

(1) 

(2) 

(3) 

(4) 

78. Lactose is composed of

(1) α – D-Glucose and β–D– Fructose

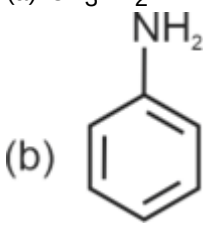
(2) α – D-Glucose and α–D– Glucose

(3) β – D-Galactose and β–D– Glucose

(4) α – D-Galactose and α–D– Glucose

79. The amines which cannot be synthesised by using Gabriel phthalimide synthesis are

(a) CH_3NH_2

(b) 

(c) $CH_3CH_2NH_2$

(d) $(CH_3)_3N$

(1) (a), (b) and (c) only

(2) (a) and (b) only

(3) (c) and (d) only

(4) (b) and (d) only

80. Given below are two statements one is labelled as assertion (A) and other is labelled as reason (R).

Assertion (A): To the solution of $PbCl_2$, addition of alcohol followed by the treatment of dil. H_2SO_4 solution, it gives the black precipitate of $PbSO_4$.

Reason (R): Lead sulphate is insoluble in ammonium acetate solution.

In the light of the above statements, choose the correct answer from the options given below:

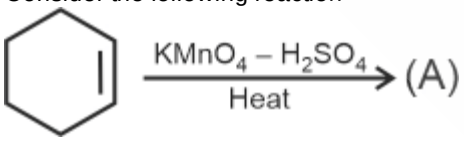
(1) Both (A) and (R) are true and (R) is the correct explanation of (A)

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

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

81. Consider the following reaction



Major product (A) is

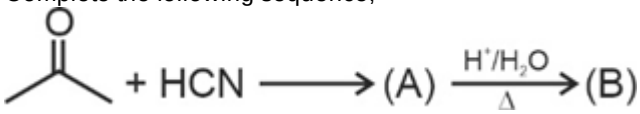
(1) Terephthalic acid

(2) Succinic acid

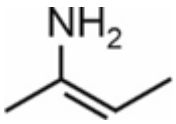
(3) Malonic acid

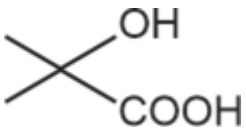
(4) Adipic acid

82. Complete the following sequence,

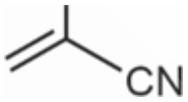


Major product (B) is

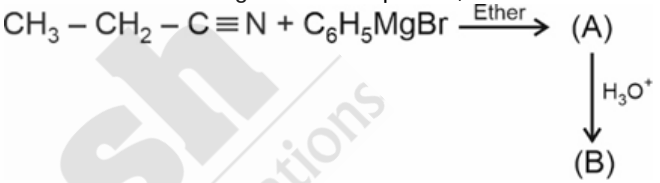
(1) 

(2) 

(3) 

(4) 

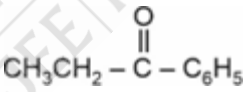
83. Consider the following reaction sequence,



Major product (B) is

(1) C_6H_5CHO

(2) C_6H_5COOH

(3) 

(4) $CH_3 - CH_2 - COOH$

84. Given below are two statements,

Statement I : Fehling solution A is aqueous copper sulphate and Fehling solution B is aqueous sodium hydroxide.

Statement II : Benzaldehyde on reaction with Fehling reagent, a reddish brown precipitate is obtained.

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

(1) Both statement I and statement II are correct

(2) Both statement I and statement II are incorrect

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

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

85. Correct decreasing order of basic strength of given amines in aqueous solution is

$\underset{(a)}{CH_3NH_2}$ $\underset{(b)}{(CH_3)_2NH}$ $\underset{(c)}{(CH_3)_3N}$ $\underset{(d)}{NH_3}$

(1) (d) > (c) > (b) > (a)

(2) (b) > (a) > (c) > (d)

(3) (c) > (b) > (a) > (d)

(4) (b) > (c) > (a) > (d)

86. Match **List-I** with **List-II**

	List-I		List-II
a.	Vitamin C	(i)	Riboflavin
b.	Vitamin B_1	(ii)	Pyridoxine
c.	Vitamin B_2	(iii)	Thiamine
d.	Vitamin B_6	(iv)	Ascorbic acid

Choose the correct option

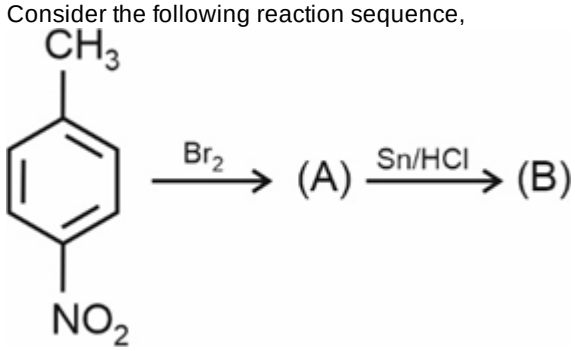
(1) a(iv), b(iii), c(ii), d(i)

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

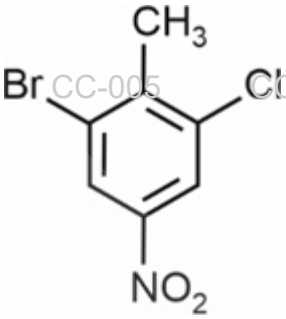
(3) a(iv), b(iii), c(i), d(ii)

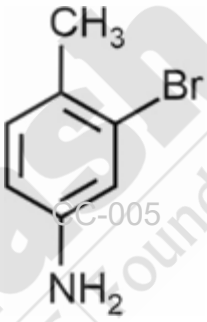
(4) a(iii), b(iv), c(i), d(ii)

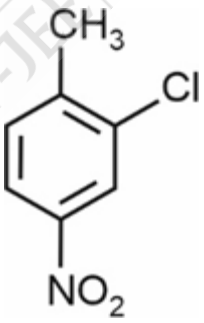
87. Consider the following reaction sequence,

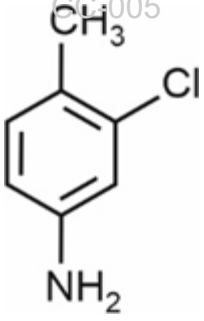


Major product (B) is

(1)


(2)


(3)


(4)


88. On addition of β-naphthol to benzene diazonium salt, dye formed is of

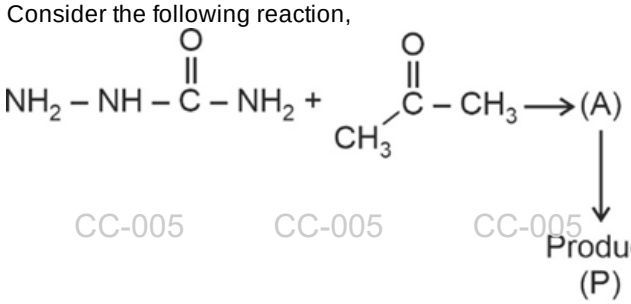
(1) Yellow colour

(2) Scarlet red colour

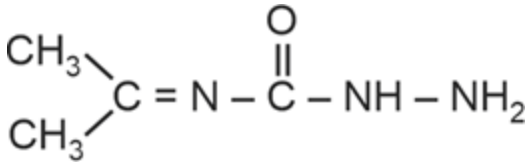
(3) Purple colour

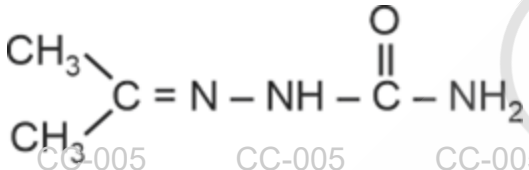
(4) Apple green colour

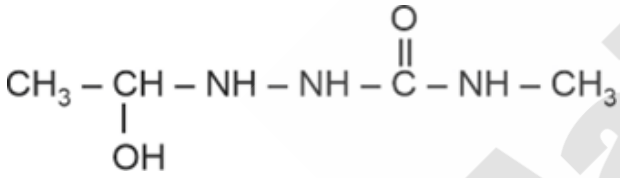
89. Consider the following reaction,

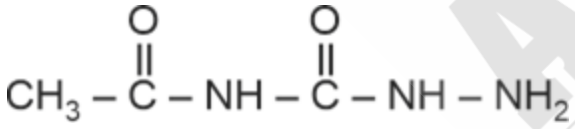


Major product (P) is

(1) 

(2) 

(3) 

(4) 

90. Total number of chiral carbon in β-D-(+)-glucopyranose structure is

(1) 4

(2) 6

(3) 3

(4) 5

BOTANY

91. Select the **incorrect** statement w.r.t. humus.

(1) It is formed by process of decomposition of detritus

(2) It is highly resistant to microbial action

(3) It undergoes decomposition rapidly

(4) It is slightly acidic, colloidal and functions as reservoir of nutrients

92. Ecological pyramid does not accommodate all, **except**

(1) Food web

(2) Insectivorous plants

(3) Saprophytes

(4) Herbivores

93. Standing crop is the amount of

(1) All organic and inorganic substances in an ecosystem per unit area

(2) Organic matter present in crop plants only

(3) Living material present in different trophic levels at a given time

(4) Inorganic substances present in soil per unit area at a given time

94. Net primary productivity

(1) Does not depend on environmental factors

(2) Of ocean is higher than terrestrial ecosystems

(3) Is the available biomass for the consumption to heterotrophs

(4) Is the rate of formation of new organic matter by consumers

95. Predators play important roles in ecosystem. Select the **incorrect** one from the following w.r.t given statement.

(1) Transfer of energy across trophic levels

(2) Increase prey population in community

(3) Maintain species diversity in a community

(4) Predators in nature are prudent

96. Read the given statements and select the **correct** option.
(A) Sparrow can be primary as well as secondary consumer.
(B) Occurrence of food web provides stability to the ecosystem.

(1) Only (A) is correct

(2) Only (B) is correct

(3) Both (A) and (B) are correct

(4) Both (A) and (B) are incorrect

97. Match the following columns and select the **correct** option.

Column I	Column II
a. Primary producer	(i) Goat
b. Second trophic level	(ii) Tree
c. Secondary consumer	(iii) Lion
d. Top carnivore	(iv) Wolf

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

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

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

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

98. Which of the following statements is **not** true for grassland ecosystem but that is generally true for sea ecosystem?

(1) More number of producers than consumers

(2) Producers have less total biomass than that of consumers

(3) Maximum amount of energy exists at the producer level

(4) Ultimate source of energy is the sun

99. In a food chain if 40 kcal of energy is trapped by grass then what amount of energy would be available for birds that feeds on the grass eating insects?

(1) 4 kcal

(2) 4 cal

(3) 0.04 kcal

(4) 400 cal

100. World Summit on Sustainable Developement of 2002 was held in

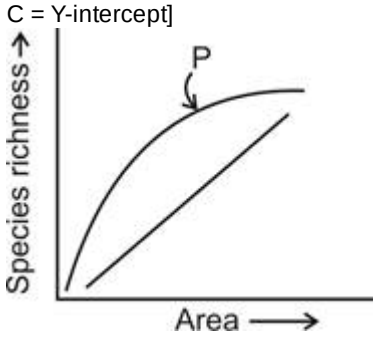
(1) Johannesburg, South Africa

(2) Washington, United States of America

(3) Rio de Janeiro, Brazil

(4) Geneva, Switzerland

101. Select the **correct** statement(s) w.r.t. graph given below.
[Here, S = species; A = area; Z = regression coefficient and C = Y-intercept]



(a) Curve P is explained by equation
logS = logC + Z logA.
(b) Higher value of Z is obtained when the explored area is very small.
(c) The graph explains an unlimited increase in species richness with increase in area explored.
(d) Value of Z will be 0.1 to 0.2 when analysis is done among small areas.

(1) (a), (b) & (d)

(2) Only (b) & (d)

(3) Only (d)

(4) (a) & (c)

102. How many of the following are *ex-situ* conservation methods?
(a) Biosphere reserves (b) National parks
(c) Wildlife safari parks (d) Seed banks
(e) Sacred groves

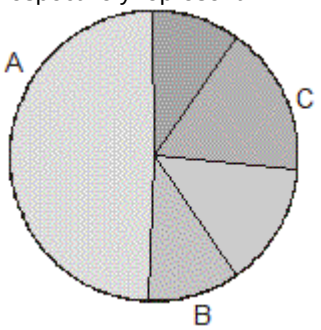
(1) Two

(2) Four

(3) Five

(4) Three

103. Given below pie chart is representation of global biodiversity of vertebrates. In this pie chart A, B and C respectively represent



	A	B	C
(1)	Fishes	Amphibians	Birds
(2)	Birds	Reptiles	Mammals
(3)	Mammals	Reptiles	Amphibians
(4)	Reptiles	Amphibians	Birds

(1) (1)

(2) (2)

(3) (3)

(4) (4)

104. Arrange the following regions in order of increasing diversity of birds and choose the **correct** option.
A. Greenland
B. New York
C. Columbia
D. India

(1) B < A < C < D

(2) A < B < D < C

(3) B < C < D < A

(4) C < A < D < B

105. Biodiversity is minimum in the __A__ regions and maximum in __B__ regions.
A and B respectively are

(1) Temperate and arctic

(2) Tropical and temperate

(3) Arctic and tropical

(4) Tropical and arctic

106. How many of the following should be considered broadly utilitarian ecosystem services that biodiversity play?

Firewood, Oxygen, Flood control, Drugs, Fibre, Food, Pollination, Erosion control

(1) Three

(2) Four

(3) Six

(4) Five

107. Identify the **correctly** matched pair.

	(Extinct species)		(Native place)
(1)	Dodo	–	Russia
(2)	Quagga	–	Mauritius
(3)	Steller's sea cow	–	Africa
(4)	Thylacine	–	Australia

(1) (1)

(2) (2)

(3) (3)

(4) (4)

108. The transition zone is the A part of the biosphere reserve which is an area of active cooperation between B and the C.

	A	B	C
(1)	Outermost	Reserve Management	Local people
(2)	Outermost	Refugees	Local people
(3)	Innermost	Local people	Refugees
(4)	Innermost	Local people	Reserve Management

(1) (1)

(2) (2)

(3) (3)

(4) (4)

109. **Assertion (A) :** Species with small body size are more susceptible to extinction.
Reason (R) : Species which are more susceptible to extinction are mostly at lower trophic levels in food chain.
In the light of the above statements, select the **correct** option.

(1) Both Assertion & Reason are true and the reason is the correct explanation of the assertion.

(2) Both Assertion & Reason are true but the reason is not the correct explanation of the assertion.

(3) Assertion is true statement but Reason is false.

(4) Both Assertion and Reason are false statements.

110. The relation between net primary productivity (NPP) and gross primary productivity (GPP) is represented by

(1) NPP = GPP – R

(2) NPP = GPP + R

(3) NPP = GPP × R

(4) NPP = $\frac{GPP}{R}$

111. Read the following statements and select the option having **correct** set of statements.
(i) Producers are also known as converters or transducers.
(ii) In terrestrial ecosystem, major producers are herbaceous and woody plants.
(iii) Primary consumers are also called key industry animals.
(iv) Decomposers in an ecosystem are natural scavengers.

(1) (i), (ii), (iii) and (iv)

(2) All except (ii)

(3) All except (i)

(4) Only (i), (ii) and (iii)

112. In a forest, stratification is seen. It involves vertical subdivisions of vegetations. Which of the following statements regarding such vegetation is **incorrect**?

(1) Top layer is formed by big tress

(2) Bottom layer includes grasses and herbs

(3) Shrubs form the second layer of the subdivisions

(4) Upper most layer is composed of heterotrophs only

113. Pyramid of energy is always upright because

(1) Some energy is lost at each step, from particular trophic level to next trophic level

(2) A given species may occupy more than one trophic level in the same ecosystem at the same time

(3) Producers are always more in number at first trophic level in each ecosystem

(4) Energy at higher trophic level is always more than that at a lower trophic level

114. Which of the following is the **correct** expression for primary production?

(1) $\frac{\text{Biomass produced by producers}}{\text{Area}}$

(2) $\frac{\text{Biomass produced by producers}}{\text{Area} \times \text{Time}}$

(3) $\frac{\text{Primary productivity}}{\text{Time}}$

(4) Primary productivity × Area

115. The term which is used to describe the combined diversity at all the levels of biological organisation right from macromolecules within the cells, genes, species, ecosystem and biomes was popularised by

(1) Alexander von Humboldt

(2) Paul Ehrlich

(3) Edward Wilson

(4) David Tilman

116. The _____ drive major ecosystem functions for the stability of the ecosystem.
Choose the option to fill in the blank **correctly**

(1) Alien species

(2) Key species

(3) Endemic species

(4) Exotic species

117. Information or data of which type of organisms are enlisted in Red list?

(1) Marine vertebrates only

(2) All economically important plants

(3) Plants whose products are in international trade

(4) Threatened species

118. According to David Tilman's long term ecosystem experiment using outdoor plot showed that

(1) Species richness contributes to the well being of an ecosystem

(2) Increased diversity contributed to higher productivity

(3) Ecosystem with more species diversity is not resilient to alien species invasion

(4) The reduction in species diversity is due to seasonal and predictable changes

119. Which of the given contributes to an increase in population density?

(1) Natality and Immigration

(2) Mortality and Emigration

(3) Immigration and Emigration

(4) Mortality and Immigration

120. Which of the following statements is/are **correct**?
(a) Annual net primary productivity of oceans are more than that of terrestrial ecosystem.
(b) Temperature does not affect the primary productivity of the ecosystem.
(c) The rate of formation of new organic matter by consumers is called secondary productivity.

(1) All (a), (b) & (c)

(2) Only (a) & (c)

(3) Only (a)

(4) Only (c)

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

	Column-I		Column-II
a.	Competition	(i)	It is an association between individuals of two species, each of which is benefited by the presence of the other but can live equally well without association
b.	Protocooperation	(ii)	An interaction between two organism of different species in which one species inhibit the growth of other species by secreting certain chemicals
c.	Predation	(iii)	It is the interaction of two organisms striving for the same resources
d.	Amensalism	(iv)	In an interaction between organism where only one species get benefits and interaction is detrimental to other

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

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

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

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

122. Read the following statements and choose the correct option.
Assertion: Conventional taxonomic methods are not suitable for identifying microbial species.
Reason : Almost all microbial species can be simply cultured under laboratory conditions.

(1) Both Assertion & Reason are true and the reason is the correct explanation of the assertion

(2) Both Assertion & Reason are true but the reason is not the correct explanation of the assertion

(3) Assertion is true statement but Reason is false

(4) Both Assertion and Reason are false statements

123. Sexual deceit is associated with
a. Pseudocopulation.
b. Mating act by female wasp/bees with a flower.
c. Mimicry where a male wasp resembles a flower.
d. Entomophily.

(1) a, b & c

(2) a & d

(3) c & d

(4) a, b, c & d

124. What should be the birth rate per snail per year if there were 550 snails in a pond and within a year their number increased to 3850 by reproduction?

(1) 5

(2) 7

(3) 8

(4) 6

125. Study the four statements (a-d) and select the **correct** set of statements

a. Intrinsic rate of natural increase (r) is a very important parameter for assessing impacts of any biotic and abiotic factor on population growth.

b. Nearly 55 percent of all insects are known to be phytophagous.

c. In some South American lakes visiting flamingoes and resident fishes competes for their common food, the phytoplankton in the lake.

d. Many parasites have evolved to be host-specific in such a way that both host and the parasite tend to co-evolve.

(1) a and d

(2) a and b

(3) c and d

(4) b and c

126. According to Mac Arthur the five closely related species of Warbler living on the same tree were able to avoid competition and co-exist due to

(1) Counteracting and neutralising the mechanism of foraging

(2) Behavioural differences in their foraging activities

(3) Reducing their feeding times

(4) Change in their food resources

127. Read the following statements and select the **correct** option

Statement A : The human liver fluke depends on two intermediate host, *i.e.,* a snail and a fish to complete its life cycle.

Statement B : In a population when the prereproductive individuals are only marginally more than the reproductive individuals then population is said to be expanding.

(1) Only statement A is correct

(2) Only statement B is correct

(3) Both statements A and B are correct

(4) Both statements A and B are incorrect

128. Which of the following is **true** with respect to the process of mineralization that occurs during decomposition of detritus?

(1) It is the release of organic matter from degraded humus

(2) This process occurs when digestive enzymes from saprotrophic microbes act on organic matter

(3) This is the process in which water-soluble substances get precipitated as unavailable salts

(4) This process occurs only in anaerobic conditions

129. Read the given statements and choose the **correct** option.

Statement (A) : Humans derive countless direct economic benefits from nature.

Statement (B) : The broadly utilitarian argument suggests that the biodiversity plays a major role in ecosystem services that nature provides.

(1) Only (A) is correct

(2) Both (A) & (B) are correct

(3) Only (B) is correct

(4) Both (A) & (B) are incorrect

130. A forest in a topical region like Equador has upto 10 times as many species of vascular plants as a forest of equal area in a temperate region like the Midwest of the USA.

Most probable reason for having high diversity in tropical region and less diversity in temperate region is that

(1) Tropical environments unlike temperate ones are less seasonal

(2) There is more solar energy in temperate regions

(3) Temperate regions have remained relatively undisturbed for million of years

(4) Temperate environment is more constant and predictable

131. A biologist studies the population of cats in an area. He found that the average natality was 200, average mortality was 250, immigration is 70 and emigration is 20. The net increase in population is

(1) 540

(2) 30

(3) 50

(4) Zero

132. According to an analogy 'Rivet popper Hypothesis' used by Paul Ehrlich, "passengers starts popping a rivet to take home"

What does it infer w.r.t. ecosystem?

(1) Stabilisation of ecosystem

(2) Extinction of species

(3) Expansion of species

(4) Immigration of species into the ecosystem

133. Gause's principle of competitive exclusion states that

(1) The less abundant species will exclude the more abundant species through competition when the resources is unlimited

(2) Larger organisms exclude smaller ones through competition as in the case of large trees controlling underbush

(3) Competition for the same resources excludes those species which have different feeding habits

(4) Two closely related species competing for the same resources cannot co-exist indefinitely and the competitively inferior one will be eliminated eventually

134. As we move from low to high latitude, the biodiversity

(1) Increases

(2) Remains constant

(3) Decreases

(4) First increase and then decreases

135. The integral form of exponential growth equation for a population is

(1) $N_t - N_0 = e^{rt}$

(2) $N_t + N_0 = e^{rt}$

(3) $N_t = N_0 e^{rt}$

(4) $\frac{N_t}{N_0} = \frac{1}{e^{rt}}$

ZOOLOGY

136. Which of the following statements is **incorrect** w.r.t. uracil?

(1) It is a heterocyclic compound

(2) It is present in RNA

(3) It forms uridylic acid when it combines with deoxyribose sugar and phosphate

(4) It forms glycosidic bond with sugar

137. A basic amino acid among the following is

(1) Valine

(2) Methionine

(3) Lysine

(4) Tryptophan

138. Peptide bond formation during protein synthesis involves the loss of

(1) Amino acid

(2) CO_2

(3) NH_2

(4) Water

139. Succinate dehydrogenase is inhibited by which of the following substances, that closely resembles succinate in the structure?

(1) Fumarate

(2) Malonate

(3) Oxalate

(4) Acetate

140. Which among the following bonds are **absent** in a single nucleotide?

(a) Hydrogen bond
(b) Ester bond
(c) Glycosidic bond
(d) Phosphodiester bond

Choose the correct option.

(1) (a), (b)

(2) (b), (c)

(3) (a), (d)

(4) (b), (d)

141. Cholesterol is an important component of animal cell membrane. It is classified under the category of

(1) Proteins

(2) Lipids

(3) Nucleic acids

(4) Carbohydrates

142. Two strands in B-DNA are held together in their helical structure by

(1) Phosphodiester bonds

(2) Ester bonds

(3) Hydrogen bonds

(4) Ether bonds

143. If the inspiratory capacity is 3000 mL, expiratory capacity is 1500 mL and tidal volume is 500 mL, find out the vital capacity of a person.

(1) 4000 mL

(2) 4500 mL

(3) 2000 mL

(4) 5000 mL

144. Select a membrane that is **not** a part of the diffusion membrane present in human lungs.

(1) Thin squamous epithelium of alveoli

(2) Endothelium of alveolar capillaries

(3) Cellular basement membrane between epithelium of alveoli and capillaries

(4) Acellular basement substance between epithelium of alveoli and capillaries

145. Lungs do not collapse in between breaths because some air always remains in the lungs which is called

(1) Inspiratory reserve volume

(2) Expiratory capacity

(3) Expiratory reserve volume

(4) Residual volume

146. Arrange the following in increasing order w.r.t. their values in a healthy adult human under normal resting conditions.
A. Tidal volume
B. Residual volume
C. Inspiratory reserve volume
D. Vital capacity

(1) A < C < B < D

(2) A < D < B < C

(3) A < D < C < B

(4) A < B < C < D

147. In humans, lungs are covered by a ___ layered pleura.
Fill the blank with a suitable option.

(1) Single

(2) Double

(3) Triple

(4) Tetra

148. Complete the analogy w.r.t. percentage of gases transported by RBCs and select the **correct** option.
O_2 : 97% : : CO_2 : _____

(1) 3%

(2) 70%

(3) 20-25%

(4) 7%

149. **Assertion (A):** Neural signals from pneumotaxic centre can reduce the duration of inspiration.
Reason (R): Pneumotaxic centre present in the medulla region of brain can moderate the functions of the respiratory rhythm centre.
In the light of above statements, select the **most appropriate** option.

(1) Both (A) and (R) are true; (R) is the correct explanation of (A)

(2) Both (A) and (R) are true; (R) is not the correct explanation of (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

150. After holding the breath for a while, we feel the urge to breath due to the

(1) Increase in concentration of oxygen

(2) Increase in the pH of blood

(3) Increase in the carbon dioxide concentration

(4) Decrease in H^+ concentration

151. The dry weight of a living tissue includes the weight of all, **except**

(1) Stored starch

(2) Stored glycogen

(3) Water molecules

(4) Proteins

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

	Column I		Column II
a.	Starch	(i)	Peptide bond
b.	Insulin	(ii)	Ester bond
c.	Diglyceride	(iii)	Phosphodiester bond
d.	RNA	(iv)	Glycosidic bond

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

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

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

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

153. Select the **mismatch** w.r.t. secondary metabolite listed and its description.

(1) Alkaloid – Morphine

(2) Toxin – Carotenoid

(3) Drug – Vinblastine

(4) Essential oil – Lemon grass oil

154. A substance which does not possess cyclic structure is

(1) Ribose

(2) Glycine

(3) Uracil

(4) Tryptophan

155. Oils generally have _____ melting point than saturated fats, hence remain _____ at room temperature.

(1) Higher, solid

(2) Lower, liquid

(3) Higher, liquid

(4) Lower, solid

156. Forced expiration involves

(1) Relaxation of diaphragm and relaxation of abdominal muscles

(2) Contraction of diaphragm and relaxation of abdominal muscles

(3) Relaxation of diaphragm and contraction of abdominal muscles

(4) Contraction of diaphragm and contraction of abdominal muscles

157. How many of the structures given in the box below is/are supported by incomplete cartilaginous rings in humans?

Trachea, Secondary bronchi, Tertiary bronchi, Initial bronchioles, Alveoli, Terminal bronchioles

Select the **correct** option.

(1) Four

(2) Three

(3) Five

(4) One

158. Given below is a list of animals with their corresponding respiratory organs.

(a) Frogs - Moist skin
(b) Earthworm - Book gills
(c) Dolphin - Gills
(d) Scorpion - Book lungs

The **correct** pairs are

(1) (a) and (b)

(2) (a), (c) and (d)

(3) (a) and (d)

(4) (b) and (c)

159. The co-factor in enzyme peroxidase is same as that present in

(1) Catalase

(2) NAD

(3) Carboxypeptidase

(4) Carbonic anhydrase

160. The protein part of an enzyme is called _____ whereas the non-portein part is called _____.
Select the correct option to fill in the blanks respectively.

(1) Co-factor; Apoenzyme

(2) Holoenzyme; Apoenzyme

(3) Apoenzyme; Co-factor

(4) Prosthetic group; Holoenzyme

161. The factor which does not affect the catalytic activity of an enzyme is

(1) Temperature above the optimum temperature

(2) Temperature below the optimum temperature

(3) Concentration of its substrate

(4) Activation energy of the enzyme

162. Read the following steps carefully.
a. The substrate binds to the active site of the enzyme, fitting into the active site.
b. Breaking of the chemical bonds of the substrate and the formation of new enzyme-product complex
c. Binding of the substrate induces the enzyme to alter its shape, fitting more tightly around the substrate.
d. The enzyme releases the product of the reaction and the free enzyme is ready to bind to another molecule of the substrate
Arrange the above given steps in correct sequence w.r.t. catalytic cycle of an enzyme action and choose the correct option.

(1) a-c-b-d

(2) a-b-d-c

(3) a-d-b-c

(4) c-b-a-d

163. The structure of RNA contains

(1) A hexose sugar

(2) Thymine as one of the pyrimidines

(3) 2-deoxyribose sugar

(4) Same purine bases as that in DNA

164. In a B-DNA molecule, cytosine is 28%. Calculate the amount of thymine in the given B-DNA molecule and select the correct option.

(1) 22%

(2) 36%

(3) 56%

(4) 44%

165. Select the correct match

(1) Serine – Alcoholic amino acid

(2) Thymine-Purine derivative

(3) Lecithin-Part of micromolecular fraction

(4) Palmitic acid-$CH_3(CH_2)_{16}$ COOH

166. Choose the correct option to complete the analogy.
Alkaloid : Codeine : :_____ : Concanavalin A

(1) Drug

(2) Terpenoid

(3) Lectin

(4) Pigment

167. In the primary structure of a protein, the first amino acid is present at

(1) N-terminal

(2) C-terminal

(3) Next to N-terminal

(4) Next to C-terminal

168. In the tertiary structure of a protein, which of the following would not be seen?

(1) Alpha helix part

(2) β-pleated sheet part

(3) Intermolecular hydrogen bond

(4) Presence of more than one protein subunits

169. According to the general rule of thumb, if the rate of reaction becomes one-fourth of the initial, then what would be the new temperature of the reaction, if initially it was T?

(1) T + 20°C

(2) T – 20°C

(3) T – 10°C

(4) T + 10°C

170.

$$CO_2 + H_2O \xrightleftharpoons{\text{Carbonic anhydrase}} H_2CO_3 \xrightleftharpoons{\text{Carbonic anhydrase}} HCO_3^- + H^+$$

The enzyme that catalyses the above reaction has enzyme commission number starting with 4. This enzyme is placed in which class of enzymes?

(1) Dehydrogenases

(2) Lyases

(3) Ligases

(4) Isomerases

171. In humans, the respiratory disorder named asthma may attributed to

(1) Reduced respiratory surface of alveoli

(2) Lung fibrosis

(3) Exaggerated inflammation of bronchioles

(4) Increased surface area of lungs

172. One of the most common and obvious disorder that occurs in the people who are involved in grinding or stone-breaking industries for a long period of time is

(1) Cystic fibrosis

(2) Emphysema

(3) Pneumonia

(4) Lung fibrosis

173. The respiratory pigment present in the most abundant formed element in the human blood

(1) Binds irreversibly with O_2

(2) Contains iron in it

(3) Can carry maximum of four atoms of oxygen

(4) Binds irreversibly with CO_2

174. **Assertion (A) :** The amount of CO_2 that can diffuse through the diffusion membrane per unit difference in partial pressure is much higher compared to that of O_2.
Reason : The solubility of CO_2 is 20-25 times higher than that of O_2.
In the light of above statements, choose the correct option.

(1) Both (A) and (R) are true but (R) is not the explanation of (A).

(2) Both (A) and (R) are true and (R) is the correct explanation of (A).

(3) Both (A) and (R) are false.

(4) (A) is true but (R) is false.

175. Read the following statements.
Statement A : Humans cannot directly alter the pulmonary volume.
Statement B : The anatomical setup of human lungs in thorax is such that any change in the volume of the thoracic cavity will be reflected in the lung cavity.
Choose the correct option

(1) Both statements (A) and (B) are incorrect

(2) Only statement (A) is incorrect

(3) Both statements (A) and (B) are correct

(4) Only statement (B) is incorrect

176. Which of the following have a network of tubes (tracheal tubes) to transport atmospheric air within the body?

(1) Prawn

(2) *Betta*

(3) *Rana tigrina*

(4) *Periplaneta*

177. The process that utilizes O_2 to break down food and results in the production of ATP is

(1) Diffusion

(2) Respiration

(3) Breathing

(4) Ventilation

178. The zone of human respiratory system which humidifies inhaled air, is not responsible for

(1) Transporting the atmospheric air to the alveoli

(2) Clearing it from foreign particles

(3) Actual diffusion of O_2 and CO_2 between blood and atmospheric air

(4) Bringing down the temperature of inhaled air to body temperature

179. The minute volume of respiration in humans is equal to

(1) 2500-3000 mL

(2) 6000-8000 mL

(3) 500 mL

(4) 1000-1100 mL

180. In humans, H^+ concentration of deoxygenated blood in pulmonary artery is higher than that of blood present in

(1) Systemic vein

(2) Pulmonary vein

(3) Superior vena cava

(4) Inferior vena cava