Jupiter Academy

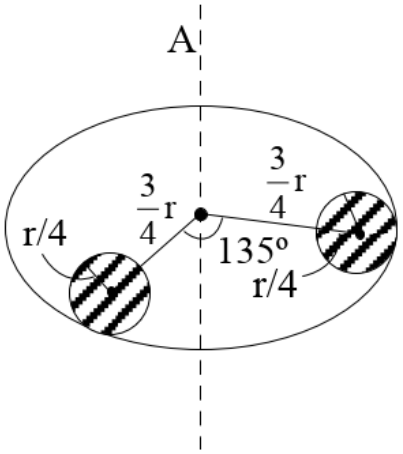
Subjects : Physics , Chemistry , Biology | **Full mock test 01** | **Date : 24-03-2026**

Hours : 3 Hours

Total Marks : 720

Physics

1. Suppose there is a uniform circular disc of mass M kg and radius r m shown in figure. The shaded regions are cut out from the disc. The moment of inertia of the remainder about the axis A of the disc is given by $\frac{x}{256}Mr^2$. The value of x is _____.



A) 100 **B)** 109 **C)** 128 **D)** 156

2. In a hydrogen like ion, the energy difference between the 2^{nd} excitation energy state and ground is 108.8 eV. The atomic number of the ion is

A) 4 **B)** 2 **C)** 1 **D)** 3

3. A wire of resistance 9Ω is bent to form an equilateral triangle. Then the equivalent resistance across any two vertices will be ____ ohm.

A) 4 **B)** 6 **C)** 8 **D)** 2

4. In a transistor $(\beta = 50)$, the voltage across $5\ k\Omega$ load resistance in collector circuit is $5\ V$. The base current is ..... mA

A) 0.02 **B)** 0.03 **C)** 0.08 **D)** 0.09

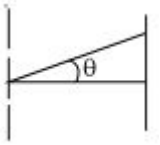
5. The activity of a radioactive sample is $1.6\ curie$ and its half-life is $2.5\ days$. Its activity after $10\ days$ will be ..... $curie$

A) 0.8 **B)** 0.4 **C)** 0.1 **D)** 0.16

6. The photoelectric work function for a metal surface is $4.125\ eV$. The cut-off wavelength for this surface is ..... $\mathring{A}$

A) 4125 **B)** 2062.5
C) 3000 **D)** 6000

7. Two slits are separated by $0.3\,mm$. A beam of $500\ nm$ light strikes the slits producing an interference pattern. The number of maxima observed in the angular range $-30^o < \theta < 30^o$.



A) 300 **B)** 150 **C)** 599 **D)** 149

8. The radii of curvature of the faces of a double convex lens are $10\ cm$ and $15\ cm$. Its focal length is $12\ cm$. What is the refractive index of glass

A) 1.33 **B)** 1.5 **C)** 1.4 **D)** 2

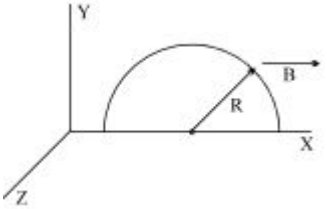
9. Electromagnetic wave consists of periodically oscillating electric and magnetic vectors

A) in mutually perpendicular planes but vibrating with a phase difference of π
B) in mutually perpendicular planes but vibrating with a phase difference of $\frac{\pi}{2}$
C) in randomly oriented planes but vibrating in phase
D) in mutually perpendicular planes but vibrating in phase

10. In a ac circuit of capacitance the current from potential is

A) Forward
B) Backward
C) Both are in the same phase
D) None of these

11. A semicircle conducting ring of radius R is placed in the xy plane, as shown in the figure. A uniform magnetic field is set up along the x -axis. No emf, will be induced in the ring. if

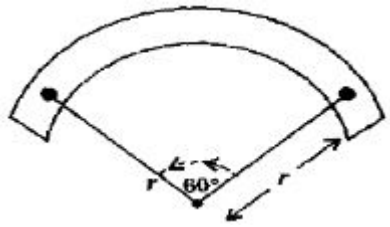


A) it moves along the x -axis
B) it moves along the y -axis

C) it moves along the z -axis

D) All of the above

12. A bar magnet of length $'l'$ and magnetic dipole moment $'M'$ is bent in the form of an arc as shown in figure. The new magnetic dipole moment will be



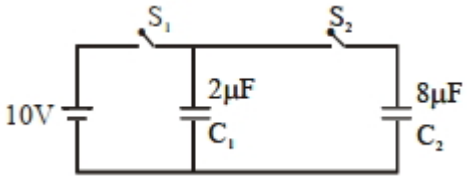
A) M B) $\frac{3}{\pi}M$ C) $\frac{2}{\pi}M$ D) $\frac{M}{2}$

13. Which of the following particle will experience maximum acceleration when projected with same speed in transverse magnetic field

A) He^{+2} B) H^{+}

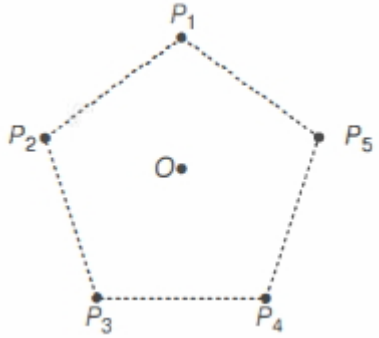
C) Be^{+2} D) Li^{+}

14. A $2\,\mu F$ capacitor C_1 is first charged to a potential difference of $10\ V$ using a battery.Then the battery is removed and the capacitor is connected to an uncharged capacitor C_2 of $8\,\mu F$. The charge in C_2 on equilibrium condition is ... μC. (Round off to the Nearest Integer)



A) 9 B) 25 C) 20 D) 16

15. 5 charges each of magnitude $10^{-5}\,C$ and mass $1\ kg$ are placed (fixed) symmetrically about a movable central charge of magnitude $5\times10^{-5}\,C$ and mass $0.5\ kg$ as shown in the figure given below. The charge at P_1 is removed. The acceleration of the central charge is [Given, $OP_1=OP_2=OP_3=OP_4=OP_5=1m$, $\frac{1}{4\pi\varepsilon_0}=9\times10^9$]



A) $9\,ms^{-2}$ upwards

B) $9\,ms^{-2}$ downwards

C) $4.5\,ms^{-2}$ upwards

D) $4.5\,ms^{-2}$ downwards

16. A whistle sends out 256 waves in a second. If the whistle approaches the observer with velocity $\frac{1}{3}$ of the velocity of sound in air, the number of waves per second the observer will receive

A) 384 B) 192 C) 300 D) 200

17. Two particles A and B of equal masses are suspended from two massless springs of spring constants K_1 and K_2 respectively.If the maximum velocities during oscillations are equal, the ratio of the amplitude of A and B is

A) $\frac{K_2}{K_1}$ B) $\frac{K_1}{K_2}$

C) $\sqrt{\frac{K_1}{K_2}}$ D) $\sqrt{\frac{K_2}{K_1}}$

18. A triatomic, diatomic and monatomic gas is supplied same amount of heat at constant pressure, then

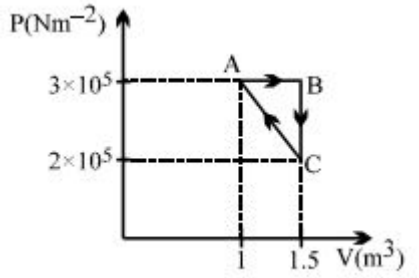
A) Fractional energy used to change internal energy is maximum in monatomic gas

B) Fractional energy used to change internal energy is maximum in diatomic gas

C) Fractional energy used to change internal energy is maximum in triatomic gases

D) Fractional energy used to change internal energy is same in all the three gases

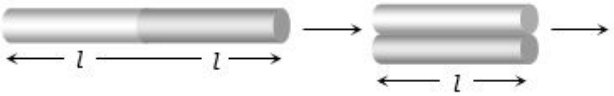
19. Considere the thermodynamics cycle shown on PV diagram. The process $A\to B$ is isobaric, $B\to C$ is isochoric and $C\to A$ is a straight line process. The following internal energy and heat are given : $\Delta U_{A\to B}=+400\ kJ$ and $Q_{B\to C}=-500\ kJ$ The heat flow in the process $Q_{C\to A}$ is ..... kJ



A) -20 B) $+25$

C) -25 D) Data are insufficient

20. Two rods of same length and material transfer a given amount of heat in 12 seconds, when they are joined end to end. But when they are joined lengthwise, then they will transfer same heat in same conditions in ..... sec



A) 24 **B)** 3 **C)** 1.5 **D)** 48

21. If $1\ g$ of steam is mixed with $1\ g$ of ice, then the resultant temperature of the mixture is ..... ^oC

A) 100 **B)** 50 **C)** 230 **D)** 270

22. A glass flask is filled up to a mark with $50\ cc$ of mercury at $18\,°C$. If the flask and contents are heated to $38\,°C$. ..... cc mercury will be above the mark ? (α for glass is $9 \times 10^{-6}\ °C^{-1}$ and coefficient of real expansion of mercury is $180 \times 10^{-6} °C^{-1}$)

A) 0.85 **B)** 0.46 **C)** 0.15 **D)** 0.05

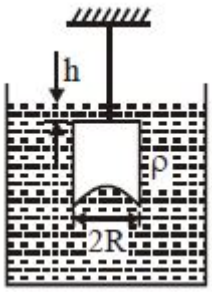
23. In a capillary tube, water rises by $1.2\ mm$. The height of water that will rise in another capillary tube having half the radius of the first, is ..... mm

A) 1.2 **B)** 2.4 **C)** 0.6 **D)** 0.4

24. If the surface tension of a liquid is T, the gain in surface energy for an increase in liquid surface by A is

A) AT^{-1} **B)** AT
C) A^2T **D)** A^2T^2

25. A hemispherical portion of radius R is removed from the bottom of a cylinder of radius R. The volume of the remaining cylinder is V and mass M. It is suspended by a string in a liquid of density ρ, where it stays vertical. The upper surface of cylinder is at a depth h below the liquid surface. The force on the bottom of the cylinder by the liquid is



A) $\rho g(V + \pi R^2)$ **B)** Mg
C) $Mg - V\rho g$ **D)** $\rho g(V + \pi R^2 h)$

26. A tank $5\ m$ high is half-filled with water and then is filled to the top with oil of density $0.85\ g/cm^3$. The pressure at the bottom of the tank, due to these liquids is ..... $g\,dyne/cm^2$

A) 1.85 **B)** 89.25 **C)** 462.5 **D)** 500

27. Given below are two statements: one is labelled as Assertion(A) and the other is labelled as Reason (R).

$Assertion\ (A)$: In Vernier calliper if positive zero error exists, then while taking measurements, the reading taken will be more than the actual reading.

$Reason\ (R)$: The zero error in Vernier Calliper might have happened due to manufacturing defect or due to rough handling.

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

A) Both (A) and (R) are correct and (R) is the correct explanation of (A)
B) Both (A) and (R) are correct but (R) is not the correct explanation of (A)
C) (A) is true but (R) is false
D) (A) is false but (R) is true

28. Two exactly similar wires of steel and copper are stretched by equal forces. If the difference in their elongations is 0.5 cm, the elongation (l) of each wire is $Y_s(\text{steel}) = 2.0 \times 10^{11}\ N/m^2 Y_c(\text{copper}) = 1.2 \times 10^{11}\ N/m^2$

A) $l_s = 0.75\,cm,\ l_c = 1.25\,cm$
B) $l_s = 1.25\,cm,\ l_c = 0.75\,cm$
C) $l_s = 0.25\,cm,\ l_c = 0.75\,cm$
D) $l_s = 0.75\,cm,\ l_c = 0.25\,cm$

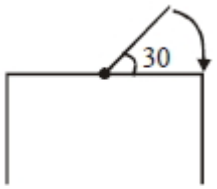
29. Consider a planet in some solar system which has a mass double the mass of earth and density equal to the average density of earth. If the weight of an object on earth is W, then weight of the same object on that planet will be

A) $\sqrt{2}W$ **B)** $2W$
C) W **D)** $2^{\frac{1}{3}}W$

30. Two identical satellites are at R and $7R$ away from earth surface, the wrong statement is (R = Radius of earth)

A) Ratio of total energy will be 4
B) Ratio of kinetic energies will be 4
C) Ratio of potential energies will be 4
D) Ratio of total energy will be 4 but ratio of potential and kinetic energies will be 2

31. One end of a straight uniform $1\ \mathrm{m}$ long bar is pivoted on horizontal table. It is released from rest when it makes an angle 30° from the horizontal (see figure). Its angular speed when it hits the table is given as $\sqrt{\mathrm{n}}\ \mathrm{s}^{-1}$, where n is an integer. The value of n is



A) 10 **B)** 13 **C)** 15 **D)** 18

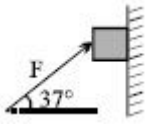
32. A body of mass $5\ kg$ strikes another body of mass $2.5\ kg$ initially at rest. The bodies after collision coalesce and begin to move as a whole with a kinetic energy of $5\ J$. The kinetic energy of the first body before collision is ..... J

A) 7.5 **B)** 5 **C)** 2.5 **D)** 10

33. A particle of mass m is moving in a horizontal circle of radius r under a centripetal force equal to $-K/r^2$, where K is a constant. The total energy of the particle is

A) $\frac{K}{2r}$ **B)** $-\frac{K}{2r}$
C) $-\frac{K}{r}$ **D)** $\frac{K}{r}$

34. A $1\ kg$ block is being pushed against a wall by a force $F = 75\ N$ as shown in the Figure. The coefficient of friction is 0.25. The magnitude of acceleration of the block is ..... m/s^2



A) 10 **B)** 20 **C)** 5 **D)** none

35. A car turns a corner on a slippery road at a constant speed of $10\ m/s$. If the coefficient of friction is 0.5, the minimum radius of the arc in meter in which the car turns is

A) 20 **B)** 10 **C)** 5 **D)** 4

36. In a tug-of-war contest, two men pull on a horizontal rope from opposite sides. The winner will be the man who

A) exerts greater force on the rope
B) exerts greater force on the ground
C) exerts a force on the rope which is greater than the tension in the rope
D) makes a smaller angle with the vertical

37. An object with a mass $10\ kg$ moves at a constant velocity of $10\ m/sec$. A constant force then acts for $4\ second$ on the object and gives it a speed of $2\ m/sec$ in opposite direction, the force acting on the object is ..... N

A) 30 **B)** -30 **C)** 3 **D)** -3

38. Two bodies are thrown up at angles of 45^o and 60^o, respectively, with the horizontal. If both bodies attain same vertical height, then the ratio of velocities with which these are thrown is

A) $\sqrt{\frac{2}{3}}$ **B)** $\frac{2}{\sqrt{3}}$
C) $\sqrt{\frac{3}{2}}$ **D)** $\frac{\sqrt{3}}{2}$

39. A horizontal curve on a racing track is banked at a 45^o angle. When a vehicle goes around this curve at the curve's safe speed (no friction needed to stay on the track), what is its centripetal acceleration?

A) g **B)** $2g$ **C)** $0.5g$ **D)** none

40. If two vectors $\vec{P} = \hat{i} + 2m\hat{j} + m\hat{k}$ and $\vec{Q} = 4\hat{i} - 2\hat{j} + mk$ are perpendicular to each other. Then, the value of m will be :

A) 1 **B)** -1 **C)** -3 **D)** 2

41. Which of the following is independent of the choice of co-ordinate system

A) $\vec{P} + \vec{Q} + \vec{R}$ **B)** $(P_x + Q_x + R_x)\hat{i}$
C) $P_x\hat{i} + Q_y\hat{j} + R_z\hat{k}$ **D)** None of these

42. A particle is projected with velocity v_0 along $x-$axis. A damping force is acting on the particle which is proportional to the square of the distance from the origin i.e., $ma = -\alpha x^2$. The distance at which the particle stops:

A) $\left(\frac{3v_0^2}{2\alpha}\right)^{\frac{1}{2}}$ **B)** $\left(\frac{2v_0}{3\alpha}\right)^{\frac{1}{3}}$
C) $\left(\frac{2v_0^2}{3\alpha}\right)^{\frac{1}{2}}$ **D)** $\left(\frac{3v_0^2}{2\alpha}\right)^{\frac{1}{3}}$

43. A ball is dropped downwards. After 1 second another ball is dropped downwards from the same point. What is the distance between them after $3\ seconds$.....m

A) 25 **B)** 20 **C)** 50 **D)** 9.8

44. Given below are two statements: One is labelled as Assertion A and the other is labelled as Reason R.
Assertion A : Product of Pressure (P) and time (t) has the same dimension as that of coefficient of viscosity.

Reason R : Coefficient of viscosity $= \frac{\text{Force}}{\text{Velocity gradient}}$

Question : Choose the correct answer from the options given below

A) Both A and R true, and R is correct explanation of A

B) Both A and R are true but R is NOT the correct explanation of A.

C) A is true but R is false.

D) A is false but R is true.

45. The maximum percentage errors in the measurement of mass (M), radius (R) and angular velocity (ω) of a ring are $2\%, 1\%$ and 1% respectively, then find the maximum percenta? error in the measurement of its moment of inertia $\left(I = \frac{1}{2}MR^2\right)$ about its geometric axis.

A) 4 **B)** 5 **C)** 6 **D)** 7

Chemistry

46. For a reaction, $N_2O_{5(g)} \rightarrow 2NO_{2(g)} + \frac{1}{2}O_{2(g)}$ in a constant volume container, no products were present initially. The final pressure of the system when 50% of reaction gets completed is _____.

A) 5 times of initial pressure

B) $5/2$ times of initial pressure

C) $7/2$ times of initial pressure

D) $7/4$ times of initial pressure

47. Dehydrated phosphorus trichloride in water gives

A) HPO_3 **B)** H_3PO_4

C) H_3PO_2 **D)** H_3PO_3

48. The calorific values of fats, carbohydrates and proteins vary in the order

A) Fats > Carbohydrates > Proteins

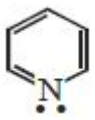
B) Fats > Proteins > Carbohydrates

C) Carbohydrates > Proteins > Fats

D) Proteins > Carbohydrates > Fats

49. Identify the strongest base from the given compounds

A) 

B) 

C) 

D) All have same basic strength

50. The product obtained when acetic acid is treated with phosphorus trichloride is

A) $CH_3COOPCl_3$ **B)** CH_3COOCl

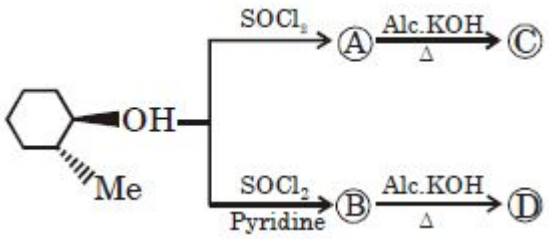
C) CH_3COCl **D)** $ClCH_2COOH$

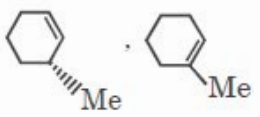
51. When acetone is heated with hydroxylamine, the compound formed is

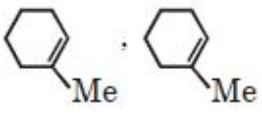
A) Cyanohydrin **B)** Oxime

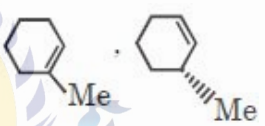
C) Semicarbazone **D)** Hydrazone

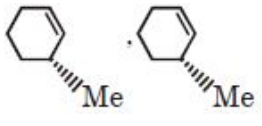
52. Major product (C) and (D) will be respectively



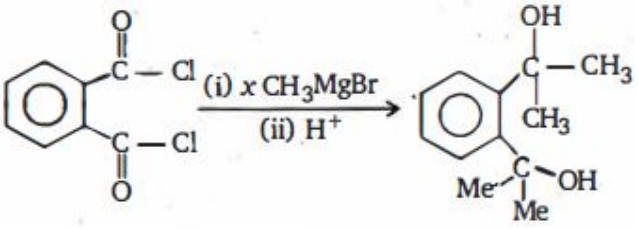
A) 

B) 

C) 

D) 

53. Number of moles of CH_3MgBr consumed in above reaction is



A) 2 **B)** 4 **C)** 6 **D)** 8

54. $26.7\ Qgm$ of a compound of formula $PtCl_2Br_2.6H_2O$ is taken for analysis, this compound shows stereoisomerism and total 3 stereoisomers exist. Then find the loss in the mass (in gm) when the given amount of the compound is treated with the $conc.H_2SO_4$
(molar mass : $PtCl_2Br_2.6H_2O = 534\ g\,mol^{-1}$)

A) 1.80 **B)** 2.70 **C)** 4.47 **D)** 2.31

55. Which of the following is not expected to be a ligand ?

A) NO **B)** NH_4^+ **C)** en **D)** CO

56. The aqueous solution of $CuCrO_4$ is green because it contains

A) green Cu^{2+} ions

B) green CrO_4^{2-} ions

C) blue Cu^{2+} ions and green CrO_4^{2-} ions

D) blue Cu^{2+} ions and yellow CrO_4^{2-} ions

57. Equivalent weight of $KMnO_4$ acting as an oxidant in acidic medium is

A) The same as its molecular weight
B) Half of its molecular weight
C) One-third of its molecular weight
D) One-fifth of its molecular weight

58. Consider the kinetic data given in the following table for the reaction $A + B + C \rightarrow$ Product.

Experiment No.	$[A]$ $(moldm^{-3})$	$[B]$ $(moldm^{-3})$	$[C]$ $(moldm^{-3})$	Rate of reaction $(moldm^{-3}s^{-1})$
1	0.2	0.1	0.1	6.0×10^{-5}
2	0.2	0.2	0.1	6.0×10^{-5}
3	0.2	0.1	0.2	1.2×10^{-4}
4	0.3	0.1	0.1	9.0×10^{-5}

The rate of the reaction for $[A] = 0.15 moldm^{-3}, [B] = 0.25 moldm^{-3}$ and $[C] = 0.15 moldm^{-3}$ is found to be $Y \times 10^{-5} moldmd^{-3}s^{-1}$. The value of Y i. . . . . .

A) 6.75 **B)** 6.80 **C)** 6.85 **D)** 6.90

59. In a first order reaction, the concentration of the reactant, decreases from $0.8\ M$ to $0.4\ M$ in 15 minutes. The time taken for the concentration to change from $0.1\ M$ to $0.025\ M$ is ..... min .

A) 7.5 **B)** 15 **C)** 30 **D)** 60

60. $Co|\ Co^{+2}\ (C_2)\ ||\ Co^{+2}(C_1)|\ Co$ for this cell, ΔG is negative if

A) $C_2 > C_1$ **B)** $C_1 > C_2$
C) $C_1 = C_2$ **D)** Unpredictable

61. On passing electric current through molten aluminium chloride, 11.2 litre of Cl_2 is liberated at NTP at anode. The quantity of aluminium deposited at cathode is ..... g (at. wt. of $Al = 27$)

A) 9 **B)** 18 **C)** 27 **D)** 36

62. The van't Hoff factor 'i' for a compound which undergoes dissociation in one solvent and association in other solvent is respectively

A) Less than one and greater than one
B) Less than one and less than one
C) Greater than one and less than one
D) Greater than one and greater than one

63. $3.65\ gms$ of HCl is dissolved in $16.2\ gms$ of water. The mole fraction of HCl in the resulting solution is

A) 0.4 **B)** 0.3 **C)** 0.2 **D)** 0.1

64. Consider the oxides of group 14 elements $SiO_2, GeO_2, SnO_2, PbO_2, CO$ and GeO. The amphoteric oxides are _____.

A) GeO, GeO_2 **B)** SiO_2, GeO_2
C) SnO_2, PbO_2 **D)** SnO_2, CO

65. $H_3BO_3 \xrightarrow{T_1} X \xrightarrow{T_2} Y \xrightarrow{Red\ hot} B_2O_3$
if $T_1 < T_2$ then X and Y respectively are

A) $X =$ Metaboric Acid, $Y =$ Tetraboric acid
B) $X =$ Tetraboric Acid, $Y =$ Metaboric acid
C) $X =$ Borax, $Y =$ Metaboric acid
D) $X =$ Tetraboric Acid, $Y =$ Borax

66. Which of the following oil is obtained from benzene after fractional distillation of coal tar

A) Light oil **B)** Heavy oil
C) Middle oil **D)** Anthracene oil

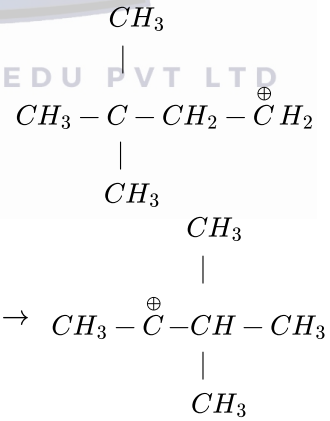
67. Ethylene reacts with ozone to give

A) Formaldehyde **B)** Ethyl alcohol
C) Ozonide **D)** Acetaldehyde

68. The correct order of acidic strength is

A) Chloroacetic acid > Fluoroacetic acid > Phenol > Ethanol
B) Ethanol > Phenol > Chloroacetic acid > Fluoroacetic acid
C) Fluoroacetic acid > Chloroacetic acid > phenol > Ethanol
D) Fluoroacetic acid > Chloroacetic acid > Ethanol > Phenol

69.



How many $H^{\ominus}$ shifts are involved in above rearrangement :

A) 4 **B)** 3 **C)** 2 **D)** 1

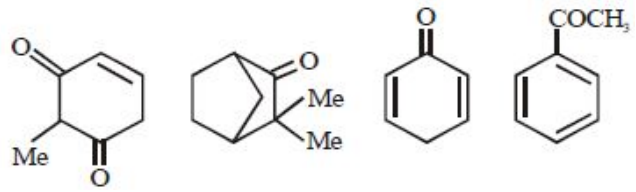
70. The transformation occurring in Duma's method is given below :
$C_2H_7\ N + (2x + \frac{y}{2})\ CuO \rightarrow x\ CO_2 + \frac{y}{2}H_2O + \frac{z}{2}\ N_2 + (2x + \frac{y}{2})\ Cu$
The value of y is ..... .(Integer answer)

A) 2 **B)** 7 **C)** 1 **D)** 15

71. In Carius method $0.099\ g$ organic compound gave $0.287\ g\ AgCl$. The percentage of chlorine in the compound will be

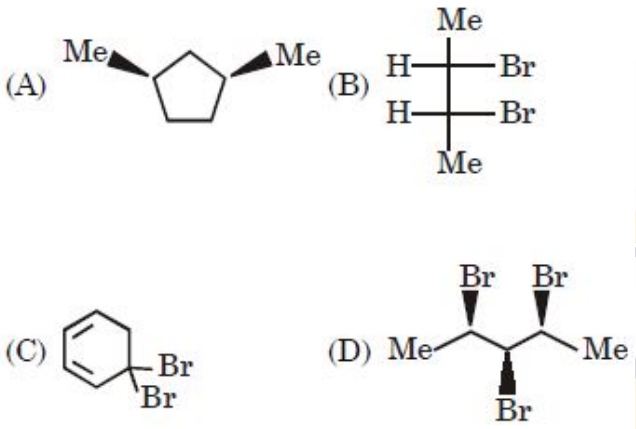
A) 28.6 **B)** 71.7 **C)** 35.4 **D)** 64.2

72. How many of given compounds show Tautomerism



A) 2 **B)** 3 **C)** 4 **D)** 1

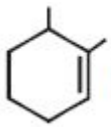
73. Which of the following are meso compound?

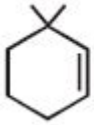


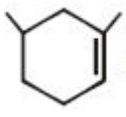
A) A, B, C, D **B)** B, C, D
C) A, C, D **D)** A, B, D

74. Which of the following name is incorrect ?

A)  3,6-Dimethylcyclohexene

B)  1,6-Dimethylcyclohexene

C)  6,6-Dimethylcyclohexene

D)  1,5-Dimethylcyclohexene

75. The $IUPAC$ name of $CH_3-\underset{\underset{Cl}{|}}{CH}-\underset{\underset{Br}{|}}{CH}-\underset{\underset{OH}{|}}{CH}-CH_3$ is

A) 3– Bromo –4– chloropentan –2– ol
B) 3– Bromo –2– chloro –4– hydroxypentane
C) 3– Bromo –2– chloropentane –4– ol
D) none of these

76. Iodine is formed when KI reacts with a solution of

A) $CuSO_4$ **B)** $(NH_4)_2SO_4$
C) $ZnSO_4$ **D)** $FeSO_4$

77. In which pair of species the oxidation number of chlorine is same

A) $ClO^{-1}, HClO_3$ **B)** $ICl, NaCl$
C) $NaCl, NaClO_3$ **D)** ICl, ClF_3

78. According to the reaction $PbCl_2 = Pb^2 + 2Cl^-$, the solubility coefficient of $PbCl_2$ is

A) $[Pb^{2+}]\,[Cl^-]^2$
B) $[Pb^{2+}]\,[Cl^-]$
C) $[Pb^{2+}]^2\,[Cl^-]$
D) None of these

79. The strongest Lewis base in the following

A) $CH_3{}^-$ **B)** F^-
C) $NH_2{}^-$ **D)** OH^-

80. In the reaction $A_{(g)} + B_{(g)} \rightleftharpoons C_{(g)}$, the backward reaction is favoured by

A) Decrease of pressure
B) Increase of pressure
C) Either of the two
D) None of the two

81. Consider the following reactions:
$(i)\ H^+_{(aq)} + OH^- = H_2O_{(l)},\ \ \Delta H = -X_1\ kJ\ mol^{-1}$
$(ii)\ H_{2(g)} + \frac{1}{2}O_{2(g)} = H_2O_{(l)},\ \ \Delta H = -X_2\ kJ\ mol^{-1}$
$(iii)\ CO_{2(g)} + H_{2(g)} = CO_{(g)} + H_2O_{(l)},\ \ \Delta H = -X_3\ kJ\ mol^{-1}$
$(iv)\ C_2H_{2(g)} + \frac{5}{2}O_{2(g)} = 2CO_{2(g)} + H_2O_{(l)},\ \ \Delta H = -X_4\ kJ\ mol^{-1}$
Enthalpy of formation of $H_2O_{(l)}$ is

A) $+X_3\ kJ\ mol^{-1}$ **B)** $-X_4\ kJ\ mol^{-1}$
C) $+X_1\ kJ\ mol^{-1}$ **D)** $-X_2\ kJ\ mol^{-1}$

82. An irreversible process occuring isothermally in an isolated system leads to

A) Zero entropy
B) An increase in the total entropy of the system
C) A decrease in the total entropy of the system
D) None of these

83. The molecule exhibiting maximum number of non-bonding electron pairs $(l.p.)$ around the central atom is

A) $XeOF_4$ **B)** XeO_2F_2
C) XeF_3^- **D)** XeO_3

84. Which of the configuration is correct :-

A) $CO : \sigma ls^2 .....\sigma 2pz^2, \pi 2py^2$

B) $CN^- : \sigma 1s^2 .....\sigma 2pz^2, \pi 2px^2$
C) $NO : \sigma 1s^2 .....\pi^* 2px^1, \pi^* 2py^0$
D) $N_2^+ : \sigma 1s^2 .....\sigma 2pz^2, \pi 2py^1$

85. Element having highest $I.P.$ value is

A) Ne B) He C) Be D) N

86. The outer most shell electronic configuration of transition element is

A) $ns^2\, nd^{1-10}$
B) $(n-1)\, d^{1-10}\, ns^{1-2}$
C) $(n-1)\, d^2\, ns^{0-2}$
D) $(n-1)\, d^{1-10}\, ns^2$

87. How many spectral line of Balmer series present in visible region :

A) 5 B) 4 C) 2 D) 3

88. When the azimuthal quantum number has a value of $l = 1$, the shape of the orbital is

A) Unsymmetrical
B) Spherically symmetrical
C) Dumb-bell
D) Complicated

89. $25\ g$ of a solute of molar mass $250\ g\ mol^{-1}$ is dissolved in $100\ ml$ of water to obtain a solution whose density is $1.25\ g\ ml^{-1}$. The molarity and molality of the solution are respectively

A) 0.75 and 1
B) 0.8 and 1
C) 1 and 0.8
D) 1 and 1

90. What is the weight of oxygen required for the complete combustion of $2.8\ kg$ of ethylene ..... kg

A) 2.8 B) 9.6 C) 6.4 D) 96

Biology - (Zoology)

91. Who proposed that the genetic code for amino acids should be made up of three nucleotides?

A) George Gamow
B) Francis Crick
C) Jacque Monod
D) Franklin Stahl

92. Given below are two statements :
Statement I : Transfer RNAs and ribosomal RNA do not interact with mRNA.
Statement II : RNA interference (RNAi) takes place in all eukaryotic organisms as a method of cellular defence.
In the light of the above statements, choose the most appropriate answer from the options given below :

A) Both statement I and statement II are correct
B) Both statement I and statement II are incorrect
C) Statement I is correct but statement II is incorrect
D) Statement I is incorrect but statement II is correct

93. Which one of the following equations represents the Verhulst-Pearl Logistic Growth of population?

A) $\frac{dN}{dt} = r\left(\frac{K-N}{K}\right)$
B) $\frac{dN}{dt} = rN\left(\frac{K-N}{K}\right)$
C) $\frac{dN}{dt} = rN\left(\frac{N-K}{N}\right)$
D) $\frac{dN}{dt} = N\left(\frac{r-K}{K}\right)$

94. Given below are two statements :
Statement I : Fig fruit is a non-vegetarian fruit as it has enclosed fig wasps in it.
Statement II : Fig wasp and fig tree exhibit mutual relationship as fig wasp completes its life cycle in fig fruit and fig fruit gets pollinated by fig wasp.

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

A) Both statement I and statement II are correct
B) Both statement I and statement II are incorrect
C) Statement I is correct but statement II is incorrect
D) Statement I is incorrect but statement II is correct

95. Epiphytes that are growing on a mango branch is an example of which of the following?

A) Commensalism
B) Mutualism
C) Predation
D) Amensalism

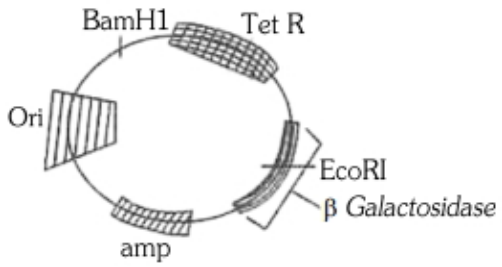
96. Silencing of specific mRNA is possible via RNAi because of...

A) Complementary dsRNA
B) Inhibitory ssRNA
C) Complementary tRNA
D) Non-complementary ssRNA

97. Which of the following genetically engineered organisms was used by Eli Lilly to prepare human insulin?

A) Bacterium
B) Yeast
C) Virus
D) Phage

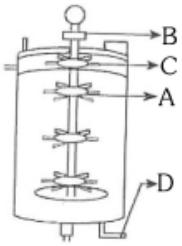
98.



In the above represented plasmid, an alien piece of DNA is inserted at EcoRI site. Which of the following strategies will be chosen to select the recombinant colonies?

A) Using ampicillin & tetracycline containing medium plate.
B) Blue color colonies will be selected.
C) White color colonies will be selected.
D) Blue color colonies grown on ampicillin plates can be selected.

99. Identify the part of a bio-reactor which is used as a foam braker from the given figure.



A) A B) B C) D D) C

100. The blue and white selectable markers have been developed which differentiate recombinant colonies from non-recombinant colonies on the basis of their ability to produce colour in the presence of a chromogenic substrate.

Given below are two statements about this method:
Statement I : The blue coloured colonies have DNA insert in the plasmid and they are identified as recombinant colonies.

Statement II : The colonies without blue colour have DNA insert in the plasmid and are identified as recombinant colonies.

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

A) Both Statement I and Statement II are correct
B) Both Statement I and Statement II are incorrect
C) Statement I is correct but Statement II is incorrect
D) Statement I is incorrect but Statement II is correct

101. Given below are two statements :
Statement I: The DNA fragments extracted from gel electrophoresis can be used in construction of recombinant DNA.

Statement II : Smaller size DNA fragments are observed near anode while larger fragments are found near the wells in an agarose gel.

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

A) Both statement I and statement II are correct
B) Both statement I and statement II are incorrect
C) Statement I is correct but statement II is incorrect
D) Statement I is incorrect but statement II is correct

102. Polymerase chain reaction (PCR) amplifies DNA following the equation.

A) N^2 B) 2^n C) $2n+1$ D) $2\ N^2$

103. Given below are two statements :

Statement I : In the RNA world, RNA is considered the first genetic material evolved to carry out essential life processes. RNA acts as a genetic material and also as a catalyst for some important biochemical reactions in living systems. Being reactive, RNA is unstable.

Statement II: DNA evolved from RNA and is a more stable genetic material. Its double helical strands being complementary, resist changes by evolving repairing mechanism.

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

A) Both statement I and statement II are correct
B) Both statement I and statement II are incorrect
C) Statement I is correct but statement II is incorrect
D) Statement I is incorrect but statement II is correct

104. Which of the following are the post-transcriptional events in an eukaryotic cell?

A. Transport of pre-mRNA to cytoplasm prior to splicing.

B. Removal of introns and joining of exons.

C. Addition of methyl group at 5' end of hnRNA.

D. Addition of adenine residues at 3 ' end of hnRNA.

E. Base pairing of two complementary RNAs.

Choose the correct answer from the options given below :

A) A, B, C only **B)** B, C, D only
C) B, C, E only **D)** C, D, E only

105. Match List I with List II:

List - I	List - II
(a) Alfred Hershey and Martha Chase	(i) Streptococcus pneumoniae
(b) Euchromatin	(ii) Densely packed and dark-stained
(c) Frederick Griffith	(iii) Loosely packed and light-stained
(d) Heterochromatin	(iv) DNA as genetic material confirmation

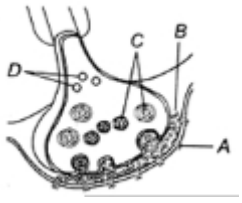
Choose the correct answer from the options given below:

A) A-II, B-IV, C-I, D-III
B) A-IV, B-II, C-I, D-III
C) A-IV, B-III, C-I, D-II
D) A-III, B-II, C-IV, D-I

106. The canal passing through the midbrain is called

A) Medulla oblongata
B) Cerebral aqueduct
C) Eustachian tube
D) Aqueous chamber

107. The figure shows an axon terminal and synapse. Select the option giving correct identification of labels $A-D$.



A) A - Action potential, C - Neurotransmitter
B) B - Neurotransmitter, D - Receptor capsules
C) C - Receptor, D - Synaptic vesicles
D) A - Axon terminal, B - Serotonin complex

108. Nissl's granules are absent in

A) Axon
B) Cyton
C) Dendron
D) Both $'a'$ and $'b'$

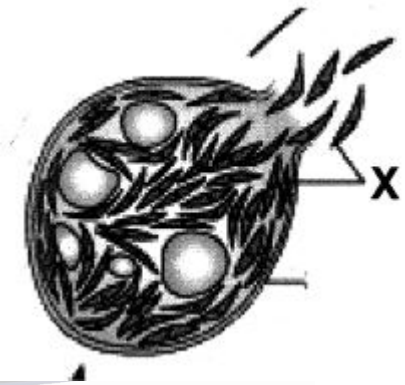
109. Which is correct about human brain

A) It is covered by two membranes
B) There is no blood brain barrier
C) Largest number of cranial nerves originate from cerebral hemisphere
D) Cerebral cortex is highly developed

110. A nerve impulse will travel through a nerve fibre only if the membrane suddenly becomes more permeable to

A) Chloride ions **B)** Potassium ions
C) Sodium ions **D)** Calcium ions

111. Identify X from figure



A) Sporozoites **B)** Salivary gland
C) Mosquito host **D)** Human host

112. ...A... released by LAB during growth coagulate and partially digest ...B.... Here A and B refers to

A) A—Acid; B—milk protein
B) A—Base; B—harmful bacteria
C) A—Enzyme; B—milk protein
D) A—Bacteria; B—other microbes

113. Which of the following are the part or example of symbiotic mutualistic association?

I. Yeast
II. Rhizobium
III. Mycorrhiza
IV. Oscillatoria

A) I and II **B)** I and III
C) II and III **D)** III and IV

114. Trichoderma species, free living fungi, are present in root ecosystems are potentially useful as

A) Biopesticides
B) Biofertilisers
C) Methanogens
D) Vectors for genetic engineering

115. Primary treatment is the

A) Physical removal of large and small particles from sewage
B) Biological removal of large and small particles from sewage
C) Both (a) and (b)
D) Chemical removal of large and small particles from sewage

116. Identify bacteria.

A) Trichoderma polysporum
B) Monascus purpureus
C) Streptococcus
D) Penicillium notatum

117. '$ELISA$' test is done for the diagnosis of

A) Anthrax B) HIV C) Hepatitis D) Malaria

118. Sleep is prevented by

A) Barbiturates B) Benzodiazephines
C) Amphetamines D) Psilocybin

119. Benign tumour is the one which

A) Shows metastasis
B) Differentiated and capsulated
C) Undifferentiated and noncapsulated
D) Differentiated and noncapsulated

120. An antigen is

A) Opposite to an antibody
B) Residue of an antibody
C) Stimulus for antibody formation
D) Result of antibody

121. Organs which have similar origin and developmental plan, but different functions are called

A) Vestigial organs B) Analogous organs
C) Homologous organs D) Physiological organs

122. Which one of the following factors will not affect the Hardy-Weinberg equilibrium?

A) Genetic drift
B) Gene migration
C) Constant gene pool
D) Genetic recombination

123. The Permian period, during which the first most modern orders of insects appeared, occurred approximately

A) $80\ million$ years ago
B) $150\ million$ years ago
C) $280\ million$ years ago
D) $550\ million$ years ago

124. The organisms of earth are well protected from the layer of a gas which covers the earth. It is known as

A) Nitrogen B) Ozone C) CO_2 D) Dust

125. What is the correct chronological sequence of human evolution

A) Ramapithecus $\rightarrow$ Australopithecus $\rightarrow$ Homo erectus$\rightarrow$ Neanderthal $\rightarrow$ Homo sapiens sapiens
B) Ramapithecus $\rightarrow$ Homo habilis $\rightarrow$ Homo sapiens sapiens $\rightarrow$ Homo erectus
C) Australopithecus$\rightarrow$ Ramapithecus$\rightarrow$Homo habilis $\rightarrow$ Homo sapiens sapiens
D) Homo habilis $\rightarrow$ Australopithecus $\rightarrow$ Homo erectus $\rightarrow$ Homo sapiens sapiens

126. A man whose father was colour blind marries a woman who had a colour blind mother and normal father. What percentage of male children of this couple will be colour blind?

A) 0.25 B) 0 C) 0.5 D) 0.75

127. Primary source of allelic variation is

A) Independent assortment B) Recombination
C) Mutation D) Polyploidy

128. In man sometime during gametogenesis sex chromosomes are not separated themselves on account of which chromosome number becomes $45, 47$ or 48. In this condition which of the following genotype and phenotype is correct

A) 22 pairs $+$ XXY males
B) 22 pairs $+$ XX females
C) 22 pairs $+$ $XXXY$ females
D) $22+$ Y females

129. The blood of AB group donor can be transfused to a person with the blood group

A) A B) B C) AB D) O

130. In F_2 generation, a phenotypic ratio of $1:1:1:1$ exhibits

A) Back cross B) Monohybrid test cross
C) Lethality D) Dihybrid test cross

131. Progestasert and $LNG-20$ are the examples of

A) Non-mediated $IUDs$

B) Copper releasing $IUDs$
C) Hormonal releasing $IUDs$
D) All of the above

132. Periodic abstinence is avoiding sex during

A) Luteal phase **B)** Ovulatory phase
C) Menstrual phase **D)** None of these

133. $ICSI$ stands for

A) Isolated Cytoplasmic Semen Injection
B) Intra Cytoplasmic Sperm Injection
C) Inter Cytoplasmic Semen Injection
D) In Cytoplasmic Semen Injection

134. Population of India in early 21st century may be

A) 105 crore **B)** 125 crore
C) 95 crore **D)** 155 crore

135. Which of the following is not a sexually transmitted disease?

A) Trichomoniasis
B) Encephalitis
C) Syphilis
D) Acquired Immuno Deficiency Syndrome $(AIDS)$

136. Arrange the events of menstrual cycle as they occur
I. Secretion of FSH
II. Growth of corpus luteum
III. Growth of follicle and oogenesis
IV.Ovulation
V. Sudden increase in level of LH

A) I, III, V, IV, II
B) II, I, III, IV, V
C) III, I, IV, V, II
D) I, IV, III, V, II

137. When male ejaculates sperms during coitus of which for normal fertility at least..... percent sperms must have normal shape and size and at least .....per cent of them must show vigorous motility

A) $40, 60$ **B)** $50, 50$
C) $60, 40$ **D)** $52, 48$

138. The Leydig's cells as found in the human body are the secretory source of

A) progesterone **B)** intestinal mucus
C) glucagon **D)** androgens.

139. Blastocyst is a modified blastula of

A) Placenta mammals **B)** Frog **C)** Fish **D)** Birds

140. Fallopian tube is the part of

A) Uterus **B)** Ureter **C)** Oviduct **D)** Vas deferens

141. A : Oxytocin stimulates contraction of uterine muscles during birth and initiates ejection of milk.
R : It is synthesized in the posterior lobe of pituitary.

A) Assertion and Reason both are correct and also correct explanation.
B) Assertion and Reason both are correct but not explanation of assertion.
C) Assertion is correct, but Reason is incorrect.
D) Both Assertion and Reason are incorrect.

142. The two glands located in the neck region are

A) Thyroid gland and parathyroid gland
B) Pituitary gland and pineal gland
C) Adrenal gland and thymus
D) Pineal gland and thyroid gland

143. How does steroid hormone influence the cellular activities?

A) Changing the permeability of the cell membrane.
B) Binding to DNA and forming a gene-hormone complex.
C) Activating cyclic AMP located on the cell membrane
D) Using aquaporin channels as second messenger

144. If a person takes iodine then it will be stored in

A) Thyroid **B)** Liver cells
C) Brain cells **D)** Pancreas

145. Which one of the following hormone is antiinflamatory

A) Secretin **B)** Epinephrin
C) Glucoprotein **D)** Glucocorticoid

146. Relaxation of the muscle takes place due to
I. pumping of Ca^{2+ii} ions in sarcoplasmic reticulum
II. presence of ATP
III. confirmational changes in troponin and masking the actin filament
Option containing correct statement is

A) $I \; and \; III$
B) $I \; and \; II$
C) $II \; and \; III$
D) $I, II \; and \; III$

147. Which of the following statements is true with reference to the structure of a muscle fibre?

A) $H-$zone is present in the middle of $A-$band
B) $A-$band is present in the middle of sarcomere
C) $M-$Line is present in the middle of $H-$zone
D) All of the above

148. Select the correct option.

A) 8^{th} , 9^{th} and 10^{th} pairs of ribs articulate directly with the sternum.
B) 11^{th} and 12^{th} pairs of ribs are connected to the stemum with the help of hyaline cartilage.
C) Each rib is a flat thin bone and all the ribs are connected dorsally to the thoracic vertebrae and ventrally to the sternum.
D) There are seven pairs of vertebrostemal, three pairs of vertebrochondral and two pairs of vertebral ribs.

149. Which of the following are involved in the formation of coxal bone ?
(1) ilium (2) Pubis Freitag
(3) Ischium (4) Femur

A) 1 and 2 only
B) 2 and 4 only
C) $1, 2$ and 3
D) $1, 3$ and 4

150. Ball and socket joints can be seen in

A) Wrist B) Fingers
C) Neck D) Shoulders

151. Juxta glomerular apparatus is modification in the

A) Afferent atriole and PCT
B) Afferent atriole and DCT
C) Efferent atriole and DCT
D) Efferent atriole and PCT

152. The characteristic that is shared by urea, uric acid and ammonia is/are
I. They are nitrogenous wastes.
II. They all need very large amount of water for excretion.
III. They are all equally toxic.
IV. They are equally in the kidneys.

A) I and III B) I and IV
C) I, III and IV D) I only

153. A fall in the GFR rate activates the

A) JG cells to release reni
B) JG cells to release aldosterone
C) JG cells to release epinephrine
D) JG cells to release nor-epinephrine

154. Angiotensin-II activates the ....A.... and release ..... B.....
Choose the correct option for A and B to complete the given statement

A) $A-$adrenal cortex; $B-$aldosterone
B) $A-$adrenal medulla; $B-$aldosterone
C) $A-$adrenal capsule; $B-$aldosterone
D) $A-$adrenal medulla; $B-$oxytocin

155. Match the excretory functions of section I with the parts of the excretory system in section II. Choose the correct combinations from among the answers given

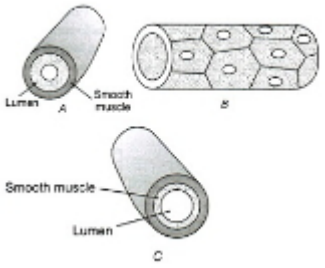
Section I	Section II
(i) Ultrafiltration	(a) Henle's loop
(ii)Concentration of urine	(b) Ureter
(iii) Transport of urine	(c) Urinary bladder
(iv) Storage of urine	(d) Malpighian corpuscles
	(e) Proximal convoluted tubules

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

156. Reabsorption of substances according to the needs of body is called

A) Obligatory reabsorption
B) Facultative reabsorption
C) Glomerular reabsorption
D) None of the above

157. Identify A, B and C in the given diagram



A) $A-$Artery, $B-$Capillary, $C-$Vein
B) $A-$Artery, $B-$Vein, $C-$Capillary
C) $A-$Vein, $B-$Artery, $C-$Capillary
D) $A-$Capillary, $B-$Artery, $C-$Vein

158. Grouping of ABO blood is based on the

A) Surface antigens present on $RBCs$

B) Surface lipids present on the cell membrane
C) Nature of all constituents
D) Nature of RBC and WBC

159. Clotting disorders is occurred because

A) Number of platelets become reduce
B) Number of platelets become increase
C) Number of platelets become constant
D) Number of WBC increase

160. Which is correct path for pulmonary circulation ?

A) Left atria (oxygenated blood) $\rightarrow$ lungs (deoxygenated blood) $\rightarrow$ Right atria
B) Left atria (deoxygenated blood) $\rightarrow$ lungs y(oxygenated blood) $\rightarrow$ right atria
C) Left atria (oxygenated blood) $\rightarrow$ lungs(deoxygenated) $\rightarrow$ left atria
D) Right atria (deoxygenated blood) $\rightarrow$ lungs (oxygenated blood) $\rightarrow$ left atria

161. Systole refers to the contraction of

A) SA node
B) AV node
C) Major arteries
D) Atria and ventricles

162. Systolic pressure is higher than diastolic pressure because

A) Arteries are contracting during systole
B) Blood is pumped with a pressure in the arteries by the heart during systole but not during diastole.
C) Arteries resist during systole only.
D) Volume of blood is higher in systole than that of diastole in the heart

163. What is the value of tidal volume in a normal healthy man?

A) Approximately $6000-8000$ ml/min
B) $1000-1100$ ml/min
C) $2500-3000$ ml/min
D) Approximately $8000-12000$ ml/min

164. Which of the following statements are not correct?
I. Diffusion membrane is made up of 3 layers
II. Solubility of CO_2 in blood is higher than O_2 by 25 times
III. Breathing volumes are estimated by spirometer
IV. High H^+ in blood favours oxygen dissociation
Choose the correct option

A) I and III
B) III and IV
C) I and IV
D) None of these

165. Arrange the given steps of expiration in the sequence of event occurring first
I. Relaxation of the diaphragm and sternum
II. Reduction of the pulmonary volume
III. Expulsion of air from the lungs
IV. Increase in intra pulmonary pressure
Choose the correct option

A) $I \rightarrow II \rightarrow III \rightarrow IV$
B) $I \rightarrow II \rightarrow IV \rightarrow III$
C) $IV \rightarrow III \rightarrow II \rightarrow I$
D) $IV \rightarrow II \rightarrow III \rightarrow I$

166. During swallowing, glottis can be covered by a thin elastic cartilaginous flap called ...A... to prevent the entry of food into laryn x. Trachea is a straight tube extending up to ...B... cavity, which divides at the level of $5th$ thoracic vertebra into right and left primary ...C...
Choose the correct option for A, B and C from the given four options to complete the above statement with reference to NCERT textbook

A) $A-$ epiglottis, $B-$ bronchi, $C-$ bronchioles
B) $A-$ epiglottis, $B-$ mid thoracic, $C-$ bronchi
C) $A-$ epiglottis, $B-$ hind thoracic, $C-$ bronchi
D) $A-$ epiglottis, $B-$ pre thoracic, $C-$ bronchi

167. Carbonic anhydrase is found in

A) RBCs
B) Plasma
C) Both (a) and (b)
D) None of these

168. High percentage of CO_2 is transported in dissolved form as compared to O_2. This is because

A) O_2 has high solubility in plasma
B) CO_2 has high solubility in plasma
C) pCO_2 is high in blood than pO_2
D) CO_2 has low solubility in plasma

169. Which of the following type of muscle tissue is being described on the basis of given statements?
(i) These muscle fibres taper at both ends and do not show striations.
(ii) The wall of internal organs such as the blood vessels, stomach and intestine contain this type of muscle tissue.
(iii) They are 'involuntary' as their function cannot be directly controlled.

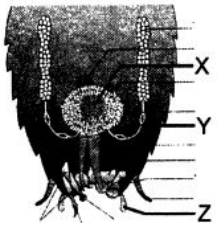
A) Skeletal muscle
B) Smooth muscle
C) Cardiac muscle
D) All of these

170. Select the incorrect option for compound epithelium?

A) It is made of more than one layer of cells

B) Main function is to provide protection against chemical and mechanical stress
C) Cover the dry surface of skin
D) Cells secrete modified polysaccharides

171. Identify X, Y and Z given figure. $X - Y - Z$



A) Anal cercus - Caudal style - Small tubules
B) Small tubules - Vas deferens - Caudal style
C) Vas deferens - phallic gland - Caudal style
D) Caudal style - small tubules - phallic gland

172. Which is not correct about bones?

A) Ground substance is hard and non pliable.
B) It is connective tissue.
C) Bones support and protect softer tissuesand organs.
D) Bone marrow is not site for production of blood cells.

173. The adult frog is

A) Carnivorous
B) Herbivorous
C) Omnivorous
D) None of these

174. Parotid glands are found in

A) Bufo
B) Hyla
C) Rana
D) Alytes

175. A coelom is a

A) cavity between inner and outer gut wall
B) body cavity lined by mesoderm
C) body cavity not lined by mesoderm
D) body cavity lined by endoderm

176. Match the following group of organisms with their respective distinctive characteristics and select the correct option:

Organisms	Characteristics
(a) Platyhelminthes	(i) Cylindrical body with no segmentation
(b) Echinoderms	(ii) Warm blooded animals with direct development
(c) Hemichordates	(iii) Bilateral symmetry with incomplete digestive system
(d) Aves	(iv) Radial symmetry with indirect development

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

177. Chordates are distinguished from non-chordates by the presence of

A) Ventral nerve cord
B) Dorsal nerve cord
C) Brain
D) Dorsal tubular nerve cord

178. Which of the following is an insect

A) Moth
B) Mites
C) Prawn
D) Scorpion

179. Which of the following is not found in Hydra

A) Epithelio-muscular cells
B) Cnidocyte
C) Choanocyte
D) Nerve cells

180. Animals devoid of respiratory, excretory and circulatory organs are

A) Tapeworms
B) Sponges
C) Thread worms
D) Live Fluke