MATRIX

MATRIX OLYMPIAD 2021–22

Class 12th (PCB)

Total Questions : 90 **Maximum Marks : 360** **Time : 3 Hrs.**

PAPER PATTERN & MARKING SCHEME					
Subject	Physics		Chemistry		Biology
Question type	MCQ	INT	MCQ	INT	MCQ
No. of ques.	20	10	20	10	30
Marks per ques.	4	4	4	4	4
Negative marks per ques.	1	0	1	0	1
"SCQ - Single correct answer type questions & INT - Integer answer					

INSTRUCTIONS – 1:

A. The question paper consists of **3 parts (1. Physics 2. Chemistry 3. Biology).**
Please fill the **OMR** answer Sheet accordingly and carefully.

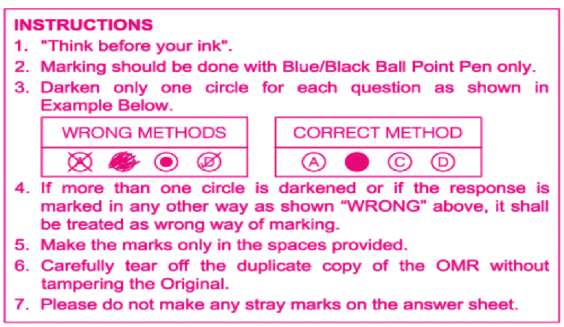
B. This questions paper contains **70 single correct type questions** and **20 Integer answer type questions.**

C. Please ensure that the Question Paper you have received contains All the questions in each Section and Pages.
If you found some mistake like missing questions or pages then contact immediately to the Invigilator.

INSTRUCTIONS – 2:

1. Part – 1 & 2 contains 20 **Single correct type questions** and 10 **Integer type questions.**
2. Part – 3 contains 30 **Single correct type questions.**
3. Indicate the correct answer for each question by filling appropriate bubble in your answer sheet.
4. Use of Calculator, Log Table, Slide Rule and Mobile is not allowed.

OMR filling instructions for SCQ. **OMR filling instructions for INT.**



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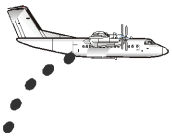
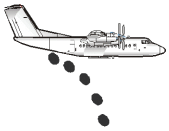
Part – 1 contains 20 Single correct type questions and **10 Integer type questions.**

Question No. 1 – 20 are of Single Correct Answer Type Question.

Four options are given in each question out of which only **one** option is correct.

1. Figure shows a still photograph from a war movie. Bombs have been dropped from the plane B-52 at regular intervals. Air plane moves with constant speed in horizontal direction. Which figure may be true still photograph. [Assume that there is no wind.]

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

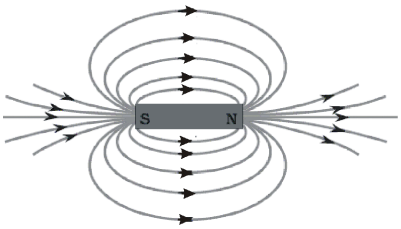
2. Which of the following pairs have same dimensions -

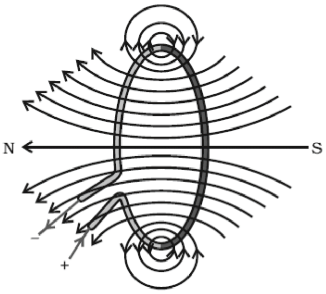
(a) Torque and work (b) Angular momentum and work

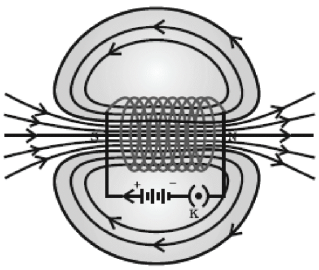
(c) Energy and moment of inertia (d) Light year and wavelengths

(A) a and b (B) a and d (C) b and c (D) a , b, and d

3. Which of the following is correct representation of magnetic field ?

(1) 

(2) 

(3) 

(A) 1 and 2 (B) 2 and 3 (C) 1 and 3 (D) 1, 2 and 3

Space for Rough Work

4. The phenomenon of electromagnetic induction is :

(A) the process of charging a body

(B) The process of generating magnetic field due to a current passing through a coil

(C) Producing induced current in a coil due to relative motion between a magnet and the coil

(D) The process of rotating a coil of an electric motor

5. The distance and displacement of a moving object are definitely equal when it

(A) Moves in a circle

(B) Slows down

(C) Speeds up

(D) Moves straight without turning back

6. Friction between two surface in contact increases when

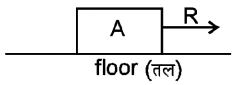
(A) A layer of grease is applied between them

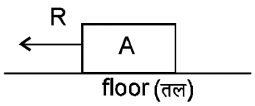
(B) They are pressed harder against each other

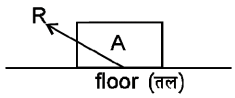
(C) They move over each other

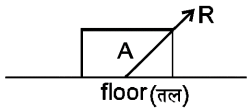
(D) They are pulled apart

7. A box 'A' is lying on the horizontal floor of the compartment of a train running along horizontal rails from left to right. At time 't', it decelerates. Then the reaction R by the floor on the box is given best by :

(A) 

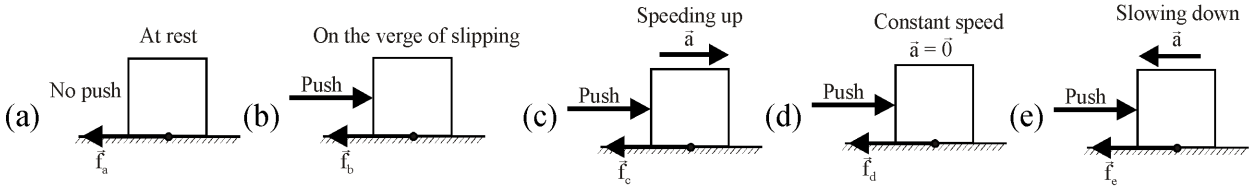
(B) 

(C) 

(D) 

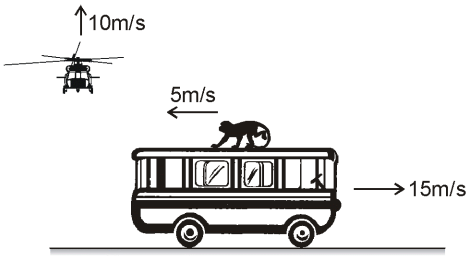
Space for Rough Work

8. Rank in order, from largest to smallest, the sizes of the friction forces $\vec{f}_a$ to $\vec{f}_e$ in these 5 different situations. The box and the floor are made of the same materials in all situations. (If $\mu_s > \mu_k$)



(A) $f_d < f_b = f_c = f_e > f_a$ (B) $f_c < f_b = f_d = f_e > f_a$ (C) $f_b = f_c = f_d = f_e > f_a$ (D) $f_b > f_c = f_d = f_e > f_a$

9. A bus is moving rightward with a velocity of 15 m/sec. and on the bus, a monkey is running oppositely with a velocity of 5 m/sec. (with respect to the bus). Nearby, A helicopter is rising with a velocity of 10 m/sec.



(A) As seen by the monkey, the helicopter is moving in (↖) direction

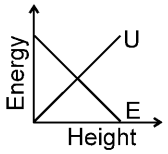
(B) As seen by the monkey, the helicopter is moving in (↗) direction.

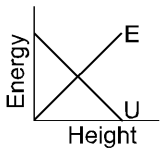
(C) As seen by helicopter's pilot, the bus is moving in (↖) direction.

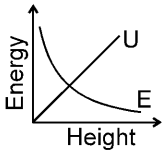
(D) As seen by the helicopter's pilot, the bus is moving in (↙) direction.

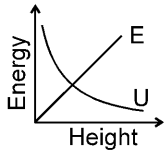
Space for Rough Work

10. Which of the following graphs is correct for kinetic energy (E) and potential energy (U) (with height (h) measured from the ground) for a particle thrown vertically upward from a horizontal ground ($h << R_E$ and $U = 0$ at $h = 0$)

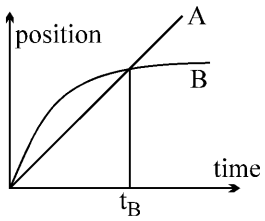
(A) 

(B) 

(C) 

(D) 

11. The graph shows position as a function of time for two trains running on parallel tracks. Which one of the following statement is true?



(A) At time t_B, both trains have the same velocity.

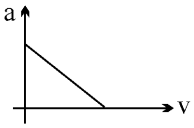
(B) Both trains have the same velocity at some time after t_B

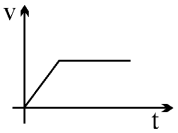
(C) Both trains have the same velocity at some time before t_B.

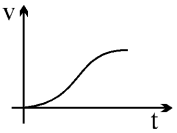
(D) Somewhere on the graph, both trains have the same acceleration.

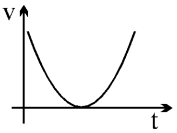
Space for Rough Work

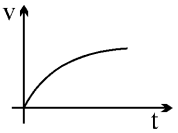
12. Acceleration versus velocity graph of a particle moving in a straight line starting from rest is as shown in figure. The corresponding velocity-time graph would be



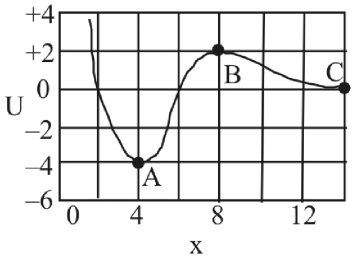
(A) 

(B) 

(C) 

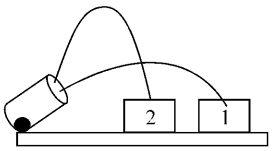
(D) 

13. For the potential energy(U) vs position(x) function shown in fig. there will be an unstable equilibrium at position



(A) A (B) B (C) C (D) None

14. Two similar cannon simultaneously fires two identical cannon balls at target 1 and 2 as shown in the figure. If the cannon balls have identical initial speeds, which of the following statements is true?



(A) Target 2 is hit before target 1 (B) Target 1 is hit before target 2

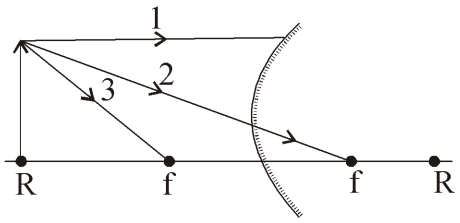
(C) Both are hit at the same time (D) information is insufficient

Space for Rough Work

15. Two metallic wires A and B are connected in series. Wire A has length l and radius r, while wire B has length 2l and radius 2r. If both the wires are of same material then find the ratio of the total resistance of series combination to the resistance of the wire A.

(A) $\frac{3}{4}$ (B) $\frac{3}{2}$ (C) $\frac{6}{2}$ (D) $\frac{6}{5}$

16. Which pairs of rays from object in the drawing are used to construct the image location produced by the convex sphericalm irror of focal length *f* and radius R ?



(A) 1 and 3 (B) 1 and 2

(C) 2 and 3 (D) Any pair of rays can be taken among shown

17. Steam at 100°C is added slowly to 1400 gm of water at 16°C until the temperature of water is raised to 80°C. The mass of steam required to do this is (L_V = 540 cal/gm) :

(A) 160 gm (B) 125 mg (C) 250 gm (D) 320 gm

Space for Rough Work

18. Two atoms of the hydrogen are located at $\vec{r}_1$ and $\vec{r}_2$. Their centre of mass is at :

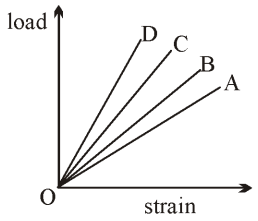
(A) $\frac{\vec{r}_1 - \vec{r}_2}{2}$ (B) $\frac{\vec{r}_1 + \vec{r}_2}{2}$ (C) $\vec{r}_1 - \vec{r}_2$ (D) $\vec{r}_1 + \vec{r}_2$

19. A particle is moving in a circular path with velocity varying with time as $v = 1.5t^2 + 2t$. If 2 cm the radius of circular path, the angular acceleration at t = 2 sec will be -

(A) 4 rad/sec^2 (B) 40 rad/sec^2

(C) 400 rad/sec^2 (D) 0.4 rad/sec^2

20. The load versus strain graph for four wires of the same material is shown in the figure. The thickest wire is represented by the line



(A) OB (B) OA (C) OD (D) OC

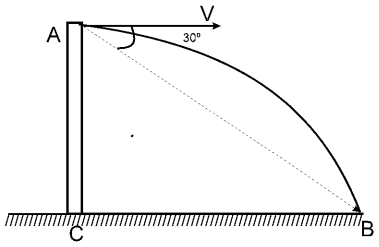
Space for Rough Work

Question No. 21 – 30 are of Integer Answer Type Question.

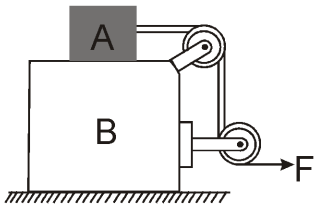
Answer of these question will come from **00** to **99**.

21. A bus starts from rest with an acceleration of 1 m/sec^2. A man who is 48 m behind the bus starts with a uniform velocity of 10 m/sec, then the minimum time after which the man will catch the bus is -

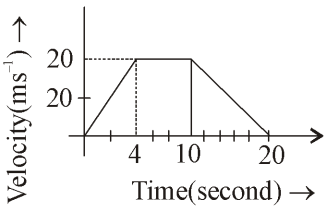
22. An object is thrown horizontally from a point 'A' from a tower and hits the ground 3s later at B. The line from 'A' to 'B' makes an angle of 30° with the horizontal. The initial velocity of the object is : (take g = 10 m/s^2)



23. In the arrangement shown in figure, $m_A = m_B = 2$kg. String is massless and pulley is frictionless. Block B is resting on a smooth horizontal surface and friction coefficient between blocks A and B is $\mu = 0.5$. What maximum horizontal force F can applied so that block A does not slip over that block B ? (g = 10 m/s^2)

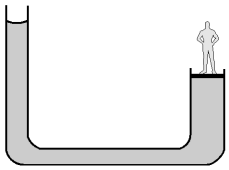


24. The figure represents the velocity-time graph of body moving in a straight line. How much distance does it travel during the last 10 seconds ?

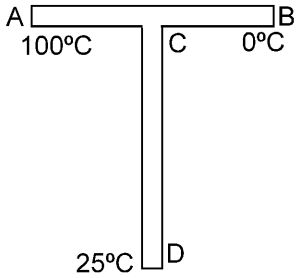


Space for Rough Work

25. The area of cross-section of the wider tube shown in figure is 900 cm^2. If the boy standing on the piston weighs 45 kg, find the difference in the levels of water in the two tubes.



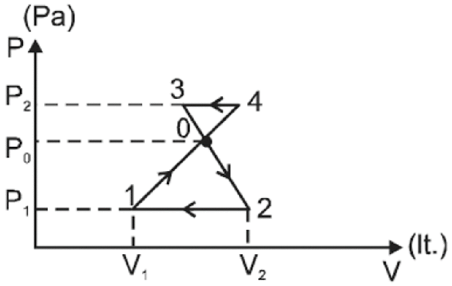
26. A rod CD of thermal resistance 5.0 K/W is joined at the middle of an identical rod AB as shown in figure. The ends A, B and D are maintained at 100°C, 0°C and 25°C respectively. Find the heat current in CD.



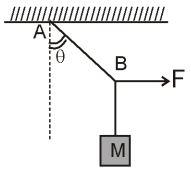
27. A cricketer can throw a ball to a maximum horizontal distance of 100 m. How much high should above the ground can the cricketer throw the same ball.

Space for Rough Work

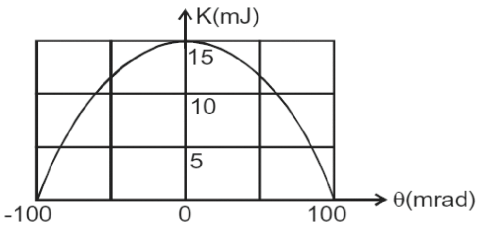
28. Find the work done by an ideal gas during a closed cycle $1 \to 4 \to 3 \to 2 \to 1$ shown in figure if $P_1 = 10^5$ Pa, $P_0 = 3 \times 10^5$ Pa, $P_2 = 4 \times 10^5$ Pa, $V_2 - V_1 = 10$ litre, and segments 4-3 and 2-1of the cycle are parallel to the V-axis ?



29. A mass M is suspended by a rope from a rigid support at A as shown in figure. Another rope is tied at the end B, and it is pulled horizontally with a force F.If the tension in the string AB is nF when the rope AB makes an angle 30° with the vertical in equilibrium. Find n ?



30. Figure shows the kinetic energy K of a simple pendulum versus its angle θ from the vertical. The pendulum bob has mass 0.2 kg. If the length of the pendulum is equal to n/g meter, then find n. (g = 10 m/s^2).



Space for Rough Work

Part – 2 contains 20 Single correct type questions and **10 Integer type questions.**

Question No. 31 – 50 are of Single Correct Answer Type Question.

Four options are given in each question out of which only **one** option is correct.

31. A metal M of equivalent mass E forms an oxide of molecular formula M_xO_y. The atomic mass of the metal is given by the correct equation :

(A) $\frac{2Ey}{x}$ (B) xyE (C) $\frac{E}{y}$ (D) y/E

32. An excited state of H atom emits a photon of wavelength λ and returns in the ground state, the principal quantum number of excited state is given by :

(A) $\sqrt{\lambda R(\lambda R-1)}$ (B) $\sqrt{\frac{\lambda R}{(\lambda R-1)}}$ (C) $\sqrt{\lambda R(\lambda-1)}$ (D) $\sqrt{\frac{\lambda R-1}{\lambda R}}$

33. If U_{RMS} of a gas is $30R^{1/2}$ ms^{-1} at 27°C then the molar mass of gas is :

(A) 0.02 kg/mol (B) 0.001 kg/mol (C) 0.003 kg/mol (D) 1 kg/mol

34. The ratio among most probable velocity, mean velocity and root mean square velocity is given by

(A) 1 : 2 : 3 (B) $1:\sqrt{2}:\sqrt{3}$ (C) $\sqrt{2}:\sqrt{3}:\sqrt{\frac{8}{\pi}}$ (D) $\sqrt{2}:\sqrt{\frac{8}{\pi}}:\sqrt{3}$

35. The following two reactions are known

$Fe_2O_3(s) + 3CO(g) \longrightarrow 2Fe(s) + 3CO_2(g)$, $\Delta H = -26.8$ KJ

$FeO(s) + CO(g) \longrightarrow Fe(s) + CO2(g)$, $\Delta H = -16.5$ KJ

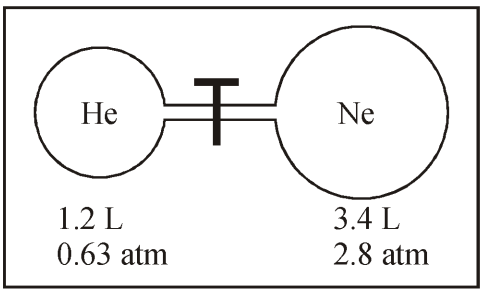
The value of ΔH for the following reaction is :

$Fe_2O_3(s) + CO(g) \longrightarrow 2FeO(s) + CO_2(g)$

(A) +10.3 KJ (B) –43.3 KJ (C) –10.3 KJ (D) +6.2 KJ

Space for Rough Work

36. Consider the following apparatus. Calculate the partial pressure of helium after the opening valve. The temperature remains constant at 16°C.



(A) 0.164 atm (B) 1.64 atm (C) 0.328 atm (D) 1 atm

37. What will be the heat of formation of methane, if the heat of combustion of carbon is '–x' KJ, heat of formation fo water is '–y' KJ and heat of combustion of methane is '–z' KJ ?

(A) (–x – y + z) KJ (B) (–z – x + 2y) KJ

(C) (–x – 2y – z) KJ (D) (–x – 2y + z) KJ

38. The raction quotient(Q) for the reaction

$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$ is given by $Q = \frac{[NH_3]^2}{[N_2][H_2]^3}$ .The reaction will proceed from right to left if:

(A) Q = 0 (B) $Q = K_C$ (C) $Q < K_C$ (D) $Q > K_C$

Space for Rough Work

39. For the equilibrium $SO_2Cl_2(g) \rightleftharpoons SO_2(g) + Cl_2(g)$, what is the temperature at which $\frac{K_p(atm)}{K_c(M)} = 3$?

(A) 0.027 K (B) 0.36 K (C) 36.54 K (D) 273 K

40. What is the ionization constant of an acid if the hydronium ion concentration of a 0.40 M solution is 1.40×10^{-4} M ?

(A) 1.96×10^{-8} (B) 1.22×10^{-9} (C) 4.90×10^{-8} (D) 1.40×10^{-6}

41. Which of the following possesses highest second ionisation energy :

(A) $1s^2, 2s^2\ 2p^6, 3s^2$ (B) $1s^2, 2s^2\ 2p^6, 3s^1$ (C) $1s^2, 2s^2\ 2p^3$ (D) $1s^2, 2s^2\ 2p^4$

42. The correct order of increasing C – O baond length of CO, CO_3^{2-} CO_2 is :

(A) $CO_3^{2-} < CO_2 < CO$ (B) $CO_2 < CO_3^{2-} < CO$

(C) $CO < CO_3^{2-} < CO_2$ (D) $CO < CO_2 < CO_3^{2-}$

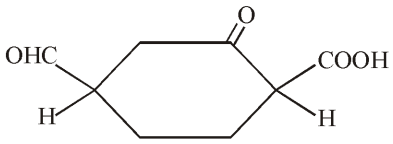
43. Amongst H_2O, H_2S, H_2Se and H_2Te, the one with the highest boiling point is :

(A) H_2O because of H– bonding (B) H_2Te because of higher molar mass

(C) H_2S because of H – bonding (D) H_2Se because of lower molar mass

Space for Rough Work

44. The IUPAC name of following polyfunctional compound is



(A) 2, 4–dioxo cyclohexanoic acid

(B) 2, 4–dioxo cycloheptanoic acid

(C) 4–formyl–2–oxo cyclohexane–1–carboxylic acid

(D) 2, 4 – dioxo cyclohexane – 1 – carboxylic acid

45. A,  ,A is named as

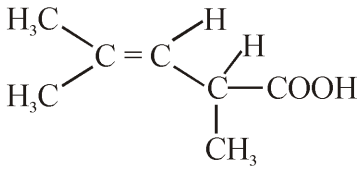
(A) bicyclo (2, 2, 1) heptane

(B) bicyclo (2, 2, 2) hexane

(C) bicyclo (2, 2, 1) hexane

(D) bicyclo (2, 1, 0) hexane

46. The following compound can exhibit :



(A) Geometrical isomerism

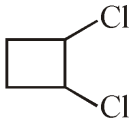
(B) Geometrical and optical isomerism

(C) Optical isomerism

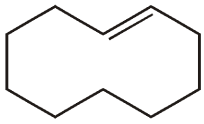
(D) Tautomerism

Space for Rough Work

47. Which will form geometrical isomers ?

(A) 

(B) $CH_3CH = NOH$

(C) 

(D) All of these

48. The correct order of increasing electron affinity of the following is

(A) O < S < F < Cl

(B) O < S < Cl < F

(C) S < O < F < Cl

(D) S < O < Cl < F

49. Which bond angle θ would result in maximum dipole moment for the triatomic molecule yxy ?

(A) $\theta = 90^\circ$

(B) $\theta = 120^\circ$

(C) $\theta = 150^\circ$

(D) $\theta = 180^\circ$

50. An electron, a proton and an alpha particle have KE of 16E, 4E, and E respectively. What is the qualitative order of their de–broglie wavelengths :

(A) $\lambda_e > \lambda_p > \lambda_\alpha$

(B) $\lambda_p = \lambda_\alpha > \lambda_e$

(C) $\lambda_p < \lambda_e < \lambda_\alpha$

(D) $\lambda_\alpha < \lambda_e \approx \lambda_p$

Space for Rough Work

Question No. 51 – 60 are of Integer Answer Type Question.

Answer of these question will come from **00** to **99**.

51. Coffiene has a molecular weight of 194. If it contains 28.9% by mass of nitrogen, number of atoms of nitrogen in one molecule of coffeine is :

52. A sample of ammonium phosphate $(NH_4)_3PO_4$, contains 6 moles of hydrogen atoms. The number of moles of oxygen atoms in the sample is :

53. A compoun of vanadium has a magnetic moment (μ) of 1.73BM. if the vanadium ion in the compound is present as V^{x+}, then the value of x is ?

54. In iron atom, how many electrons have n = 3 and l = 2 ?

55. the time taken for a certain volume of a certain gas to diffuse through a small hole was 2min. Under similar conditions an equal volume of oxygen took 5.65 min to pass. What is the molecular mass of gas (in amu) ?

56. A planar molecule has AB_x structure with six pair of electrons around A and one lone pair. the value of x is : 15.

57. Number of σ bonds in $C(CN)_4$ are _____.

58. Given below are two reversible reactions :

$A + B \rightleftharpoons Z,\ K_{C_1} = 24$

$2B + C \rightleftharpoons 2Y,\ K_{C_2} = 24$

The equilibrium constant K_C for the reaction

$A + Y \rightleftharpoons Z + \frac{C}{2}$ is _____.

59. Minimum number of C–atoms that ketone may contain is :

60. The frequency of one of the lines in paschen series of hydrogen atom is 2.340×10^{11} Hz. The quantum number n_2 which produces this transition is :

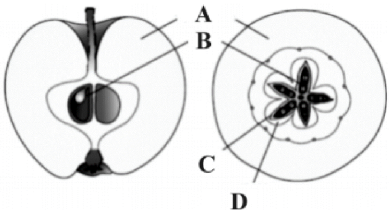
Space for Rough Work

Part – 3 contains 30 Single correct type questions

Question No. 61 – 90 are of Single Correct Answer Type Question.

Four options are given in each question out of which only **one** option is correct.

61. Identified A, B, C and D in the given figure of false fruit of apple.



(A) A – Mesocarp; B – Endocarp; C – Seed; D – Thalamus

(B) A – Seed; B – Thalamus; C – Mesocarp; D – Endocarp

(C) A – Thalamus; B – Seed; C – Endocarp; D – Mesocarp

(D) A – Mesocarp; B – Endocarp; C – Seed; D – Thalamus

62. Pollination occurs in

(A) bryophytes and angiosperms. (B) pteridophytes and angiosperms.

(C) angiosperms and gymnosperms. (D) angiosperms and fungi.

63. Placenta acts as an

(A) Embryo (B) Corpus luteum (C) Exocrine gland (D) Endocrine tissue

64. Water pollution can be stopped best by

(A) treating effluents to remove injurious chemicals.

(B) rearing more fishes.

(C) cultivating useful water plants.

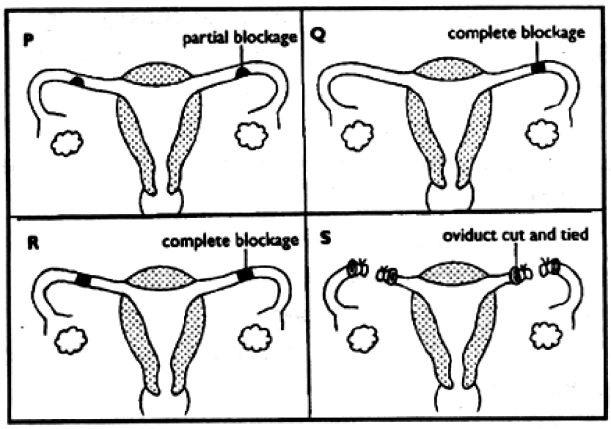
(D) spraying with DDT.

Space for Rough Work

65. Which of the following contraceptive also provides protection from contacting STDs and AIDS ?

(A) Diaphragms (B) Spermicidal foams (C) Condoms (D) Lactational amenorrhoea

66. The given diagram shows the uterine tubes of four women (P, Q, R and S).



In which two women is fertilization impossible at present ?

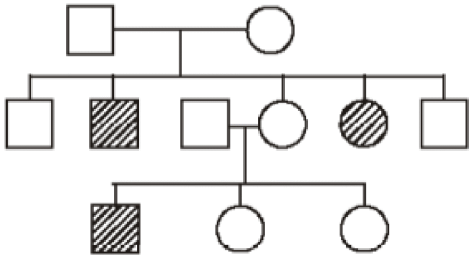
(A) P and Q (B) Q and R (C) R and S (D) S and P

67. Which of the following crosses will give tall and dwarf pea plants in same proportions?

(A) TT × tt (B) Tt × tt (C) TT × Tt (D) tt × tt

Space for Rough Work

68. Study the pedigree chart given below and choose its correct representation.



(A) Inheritance of a condition like phenylketonuria as an autosomal recessive trait.

(B) The pedigree chart is wrong as this is not possible.

(C) Inheritance of a recessive sex-linked disease like haemophilia.

(D) Inheritance of a sex-linked inborn error of metabolism like phenylketonuria.

69. Chargaff's rules are applicable to

(A) single stranded RNA.

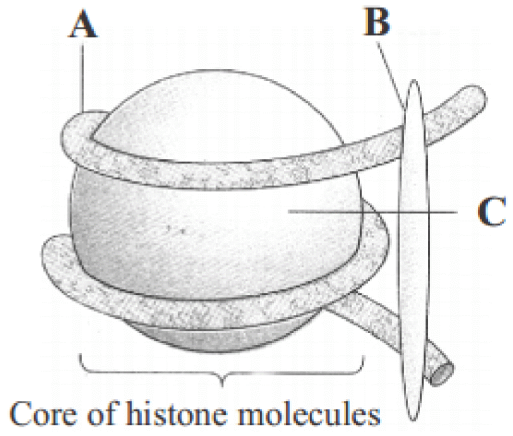
(B) single stranded DNA and RNA.

(C) single stranded DNA.

(D) double stranded DNA.

Space for Rough Work

70. The given figure shows the structure of nucleosome with their parts labelled as A, B & C. Identify A, B and C.



(A) A – DNA; B – H1 histone; C – Histone octamer

(B) A – H1 histone; B – DNA; C – Histone octamer

(C) A – Histone octamer; B – RNA; C – H1 histone

(D) A – RNA; B – H1 histone; C – Histone octamer

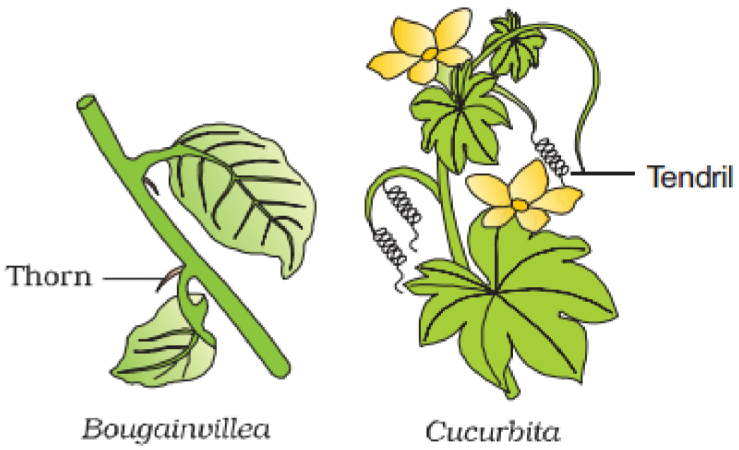
71. What is common amongst whale, seal and shark?

(A) Homoiothermy (B) Seasonal migration

(C) Thick subcutaneous fat (D) Convergent evolution

Space for Rough Work

72. The given figure shows an example of



(A) homologous organs (B) convergent evolution

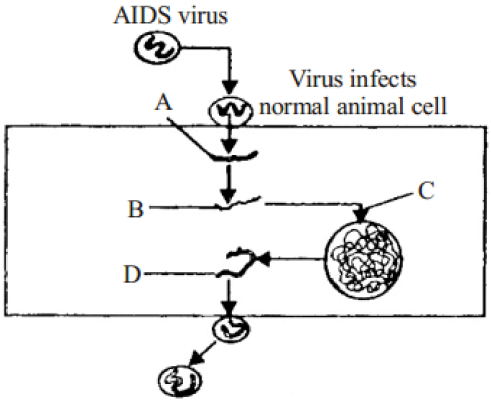
(C) divergent evolution (D) both (A) and (C)

73. The toxic substance, 'haemozoin', related to the high fever and chill, is released during which of the following disease?

(A) Dengue (B) Malaria (C) Diphtheria (D) Phenumonia

Space for Rough Work

74. Refer the given figure showing the mode of action of AIDS virus and identify the sequences labelled as A, B, C and D.



(A) A - Viral DNA introduced into cell; B - Viral DNA; C - Viral DNA incorporates into host RNA; D - New viral RNA produced

(B) A - Viral RNA introduced into cell; B - Viral RNA; C - Viral DNA incorporates into host DNA; D - New viral DNA produced

(C) A - Viral RNA introduced into cell; B - Viral DNA; C - Viral DNA incorporates into host DNA; D - New viral RNA produced

(D) A - Viral DNA introduced into cell; B - Viral RNA; C - Viral RNA incorporates into host DNA; D - New viral DNA produced

Space for Rough Work

75. Which of the following stage is transferred to surrogate mothers in livestock breeding experiments?

(A) Unfertilized eggs (B) Fertilized eggs

(C) 8 to 32 celled embryo (D) Frozen semen

76. Refer the given figures and answer the questions. Which of the following statements is correct regarding the above figures?

(i) These are all Indian hybrid crops of low yielding varieties.

(ii) These are all Indian hybrid crops of high yielding varieties.

(iii) The production of the above crops led to dramatic increase in food production.

(iv) These crops are produced as a result of various plants breeding technique.

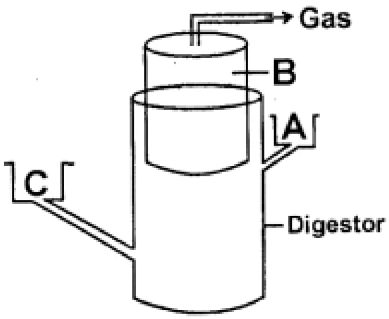
(A) (i), (ii), and (iii) (B) (ii), (iii) and (iv) (C) (iii) and (iv) only (D) (i) and (iii) only

77. Lactic acid bacteria convert milk into curd and improves its nutritional quality by enhancing

(A) vitamin A (B) vitamin B (C) vitamin C (D) vitamin D

Space for Rough Work

78. The diagram below shows a typical biogas plant. With few structure labelled as A, B and C. Identify A, B and C.



(A) A – Sludge, B – Methane, Oxygen, C – Dung, water

(B) A – Sludge, B – Methane, Carbon dioxide, C– Dung, water

(C) A – Sludge, B – Ethylin, Carbon dioxide, C – Dung, water

(D) A – Sludge, B – Methane, Carbon dioxide, C – Sewage

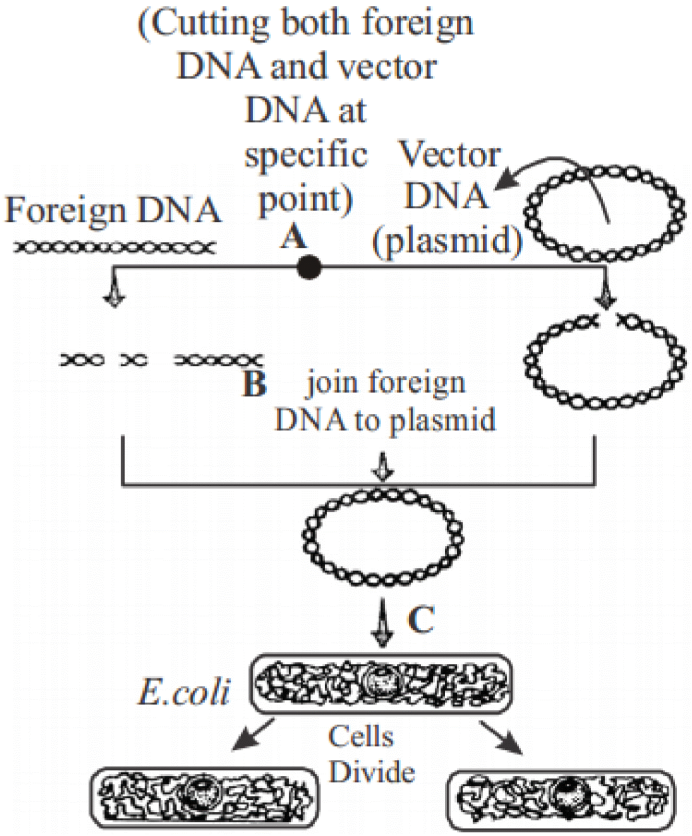
79. Which of the following is known as specific molecular scissors?

(A) Ligase (B) Helicase

(C) Restriction endonuclease (D) DNA polymerase

Space for Rough Work

80. Which one of the following option is correct for A, B and C marked in the given diagram of recombinant DNA technology.



(A) A-Exonuclease; B-Ligases; C-Transformation

(B) A-Endonuclease; B-gyrase; C-Transformation

(C) A-Exonuclease; B-Hydrolase; C-Transduction

(D) A-Restriction endonuclease; B-Ligases; C-Transformation

Space for Rough Work

81. Soil fertility can be destroyed by

(A) cutting down forests (B) acid rain

(C) overgrazing and over-irrigation (D) all of the above

82. Which of these is not an advantage of CNG over diesel?

(A) Burns more efficiently. (B) It is cheap.

(C) Cannot be siphoned off by thieves. (D) Easy to lay down pipelines for delivery.

83. Sacred groves are especially useful in

(A) preventing soil erosion. (B) year-round flow of water in rivers.

(C) conserving rare and threatened species. (D) generating environmental awareness.

84. Which animal has become extinct from India?

(A) Snow Leopard (B) Hippopotamus (C) Wolf (D) Cheetah

85. If CO_2 is removed totally from the biosphere, which organisms will be affected first ?

(A) Consumers (B) Secondary consumers

(C) Producers (D) Primary producers

86. Which one of the following is not an abiotic component?

(A) Temperature (B) Decomposers (C) Water (D) Soil

Space for Rough Work

87. If in a pond, there were 20 lotus last year and through reproduction 8 new plants are added, taking current population to 28, the birth rate per year is

(A) 0.2 (B) 0.4 (C) 0.6 (D) 0.8

88. The RNAi stands for

(A) RNA inactivation (B) RNA initiation (C) RNA interference (D) RNA interferon

89. Which of these is used as vector in gene therapy for SCID?

(A) Arbovirus (B) Rotavirus (C) Retrovirus (D) Parvovirus

90. Genetic engineering is possible, because

(A) we can cut DNA at specific sites by endonucleases like DNase I.

(B) restriction endonucleases purified from bacteria can be used in vitro.

(C) the phenomenon of transduction in bacteria is well understood.

(D) we can see DNA by electron microscope.

Space for Rough Work