

KVPY 2019-20 EXAM PAPER

ONLINE

Date : 03/11/2019

Time : 180 Minutes

Max. Marks : 100

KVPY 2019-20

SA



Piprali Road, Sikar

Phone : 01572-241911, 242911 Mob. No. : 97832-62999

Website : www.matrixhighschool.org

1. 1. Let ABC be an equilateral triangle with side length a . Let R and r denote the radii of the circumcircle and the incircle of triangle ABC respectively. Then, as a function of a , the ratio $\frac{R}{r}$.
- (A) strictly increases
 (B) strictly decreases
 (C) remains constant
 (D) strictly increases for $a < 1$ and strictly decreases for $a > 1$

Ans. C

Sol.

2. Let b be a non-zero real number. Suppose the quadratic equation $2x^2 + bx + 1 - \frac{1}{b} = 0$ has two distinct real roots. Then

(A) $b + \frac{1}{b} > \frac{5}{2}$ (B) $b + \frac{1}{b} < \frac{5}{2}$ (C) $b^2 - 3b > -2$ (D) $b^2 + \frac{1}{b^2} > 4$

Ans. C

Sol.

3. 3. Let $p(x) = x^2 + ax + b$ have two distinct real roots, where a, b are real numbers. Define $g(x) = p(x^3)$ for all real numbers x . Then which of the following statements are true?

- I. g has exactly two distinct real roots
 II. g can have more than two distinct real roots
 III. There exists a real number α such that $g(x) \geq \alpha$ for all real x

- (A) Only I (B) Only I and III
 (C) Only II (D) Only II and III

Ans. B

Sol.

4. Let $a_n, n \geq 1$, be an arithmetic progression with first term 2 and common difference 4. Let M_n be the average of the first n terms. Then the sum $\sum_{n=1}^{10} M_n$ is

- (A) 110 (B) 335 (C) 770 (D) 1100

Ans. A

Sol.

5. In a triangle ABC, $\angle BAC = 90^\circ$; AD is the altitude from A on to BC. Draw DE perpendicular to AC and DF perpendicular to AB. Suppose AB = 15 and BC = 25. Then the length of EF is

- (A) 12 (B) 10 (C) $5\sqrt{3}$ (D) $5\sqrt{5}$

Ans. A

Sol.

6. The sides a, b, c of a triangle satisfy the relations $c^2 = 2ab$ and $a^2 + c^2 = 3b^2$. Then the measure of $\angle BAC$, in degrees, is

(A) 30 (B) 45 (C) 60 (D) 90

Ans. B

Sol.

7. Let N be the least positive integer such that whenever a non-zero digit c is written after the last digit of N , the resulting number is divisible by c . The sum of the digits of N is

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

Ans. A

Sol.

8. Let x_1, x_2, \dots, x_{11} be 11 distinct positive integers. If we replace the largest of these integers by the median of the other 10 integers, then

(A) The median remains the same (B) The mean increases
(C) The median decreases (D) The mean remains the same

Ans. C

Sol.

9. The number of cubic polynomials $P(x)$ satisfying $P(1) = 2, P(2) = 4, P(3) = 6, P(4) = 8$ is

(A) 0 (B) 1
(C) more than one but finitely many (D) infinitely many

Ans. A

Sol.

10. A two-digit number \overline{ab} is called almost prime if one obtains a two-digit prime number by changing at most one of its digits a and b . (For example, 18 is an almost prime number because 13 is a prime number). Then the number of almost prime two-digit numbers is

(A) 56 (B) 75 (C) 87 (D) 90

Ans. D

Sol.

11. Let P be an interior point of a convex quadrilateral $ABCD$ and K, L, M, N be the midpoints of AB, BC, CD, DA respectively. If $\text{Area}(PKAN) = 25, \text{Area}(PLBK) = 36$, and $\text{Area}(PMDN) = 41$, then $\text{Area}(PLCM)$ is

(A) 20 (B) 29 (C) 52 (D) 54

Ans. C

Sol.

12. The number of non-negative integer solutions of the equations $6x + 4y + z = 200$ and $x + y + z = 100$ is
(A) 3 (B) 5 (C) 7 (D) Infinite

Ans. C

Sol.

13. Let $N_1 = 2^{55} + 1$ and $N_2 = 165$. Then
(A) N_1 and N_2 are coprime
(B) The HCF (Highest Common Factor) of N_1 and N_2 is 55
(C) The HCF of N_1 and N_2 is 11
(D) The HCF of N_1 and N_2 is 33

Ans. D

Sol.

14. Let $l > 0$ be a real number, C denote a circle with circumference l , and T denote a triangle with perimeter l . Then

(A) given any positive real number a , we can choose C and T as above such that the ratio $\frac{\text{Area}(C)}{\text{Area}(T)}$ is greater than a .

(B) given any positive real number α , we can choose C and T as above such that the ratio $\frac{\text{Area}(C)}{\text{Area}(T)}$ is less than α .

(C) given any C and T as above, the ratio $\frac{\text{Area}(C)}{\text{Area}(T)}$ is independent of C and T

(D) there exist real numbers a and b such that for any circle C and triangle T as above, we must have

$$a < \frac{\text{Area}(C)}{\text{Area}(T)} < b.$$

Ans. A

Sol.

15. The number of three digit numbers \overline{abc} such that the arithmetic mean of b and c and the square of their geometric mean are equal is-

(A) 9 (B) 18 (C) 36 (D) 54

Ans. b

Sol.

16. Various optical processes are involved in the formation of a rainbow. Which of the following provides the correct order in time in which these processes occur ?
(A) Refraction, total internal reflection, refraction
(B) Total internal reflection, refraction, total internal reflection

(C) Total internal reflection, refraction, refraction

(D) Refraction, total internal reflection, total internal reflection.

Ans. A

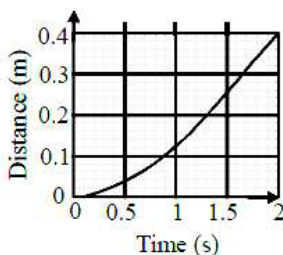
Sol.

17. A specially designed Vernier calliper has the main scale least count of 1 mm. On the Vernier scale there are 10 equal divisions and they match with 11 main scale divisions. Then, the least count of the Vernier calliper is

(A) 0.1 mm (B) 0.909 mm (C) 1.1 mm (D) 0.09 mm

Ans. A

18. A steel ball is dropped in a viscous liquid. The distance of the steel ball from the top of the liquid is shown below. The terminal velocity of the ball is closest to :



(A) 0.26 m/s (B) 0.33 m/s (C) 0.45 m/s (D) 0.21 m/s

Ans. B

Sol.

19. A student in a town in India, where the price per unit (1 unit = 1 kW-hr) of electricity is Rs.5.00, purchases a 1 kVA UPS (uninterrupted power supply) battery. A day before the exam, 10 friends arrive to the student's home with their laptops and all connect their laptops to the UPS. Assume that each laptop has a constant power requirement of 90 W. Consider the following statements

I. All the 10 laptops can be powered by the UPS if connected directly.

II. All the 10 laptops can be powered if connected using an extension box with a 3A fuse.

III. If all the 10 friends use the laptop for 5 hours, then the cost of the consumed electricity is about Rs.

22.50.

Select the correct option with the true statements.

(A) I only

(B) I and II only

(C) I and III only

(D) II and III only

Ans. C

Sol.

20. Frosted glass is widely used for translucent windows. The region where a transparent adhesive tape is stuck over the frosted glass becomes transparent. The most reasonable explanation for this is

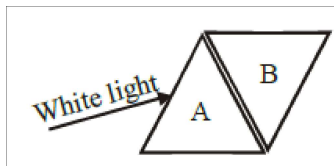
(A) diffusion of adhesive glue into glass

- (B) chemical reaction at adhesive tape-glass interface
- (C) refractive index of adhesive glue is close to that of glass
- (D) adhesive tape is more transparent than glass

Ans. C

Sol.

21. Consider two equivalent, triangular hollow prisms A and B made of thin glass plates and arranged with negligible spacing as shown in the figure. A beam of white light is incident on prism A from the left. Given that the refractive index of water is inversely related to temperature, the beam to the right of prism B would NOT appear white if A B White light.



- (A) both prisms are filled with hot water (70°C)
- (B) both prisms are filled with cold water (7°C)
- (C) both prisms are empty
- (D) prism A is filled with hot water (70°C) and prism B with cold water (7°C)

Ans. D

Sol.

22. A ball is moving uniformly in a circular path of radius 1m with a time period of 1.5s. If the ball is suddenly stopped at $t = 8.3$ s, the magnitude of the displacement of the ball with respect to its position at $t = 0$ s is closest to-
- (A) 1 m (B) 33 m (C) 3 m (D) 2 m

Ans. D

Sol.

23. A particle slides from the top of a smooth hemispherical surface of radius R which is fixed on a horizontal surface. If it separates from the hemisphere at a height h from the horizontal surface then the speed of the particle is

- (A) $\sqrt{2g(R-h)}$ (B) $\sqrt{2g(R+h)}$ (C) $\sqrt{2gR}$ (D) $\sqrt{2gh}$

Ans. A

Sol.

24. The nuclear radius is given by $R = r_0 A^{1/3}$, where r_0 is constant and A is the atomic mass number. Then.
- (A) The nuclear mass density of U^{238} is twice that of Sn^{119}
 - (B) The nuclear mass density of U^{238} is thrice that of Sn^{119}
 - (C) The nuclear mass density of U^{238} is the same as that of Sn^{119}

Ans. C

Sol.

25. The electrostatic energy of a nucleus of charge Ze is equal to kZ^2e^2/R , where k is a constant and R is the nuclear radius. The nucleus divides into two daughter nuclei of charges $Ze/2$ and equal radii. The change in electrostatic energy in the process when they are far apart is

(A) $0.375kZ^2e^2/R$ (B) $0.125kZ^2e^2/R$ (C) kZ^2e^2/R (D) $0.5kZ^2e^2/R$

Ans. A

Sol.

26. Two masses M_1 and M_2 carry positive charges Q_1 and Q_2 , respectively. They are dropped to the floor in a laboratory setup from the same height where there is a constant electric field vertically upwards. M_1 hits the floor before M_2 . Then.

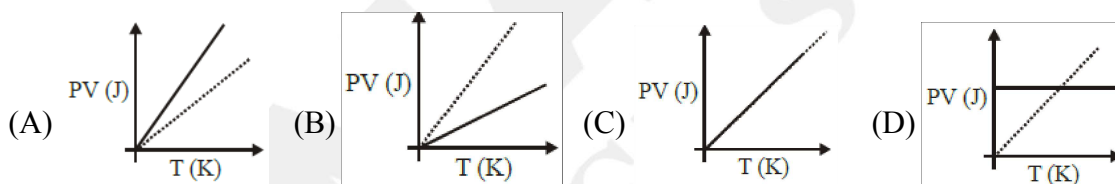
(A) $Q_1 > Q_2$ (B) $Q_1 < Q_2$ (C) $M_1Q_1 > M_2Q_2$ (D) $M_1Q_2 > M_2Q_1$

Ans. D

Sol.

27. Which one of the following schematic graphs best represents the variation of PV (in Joules) versus T (in Kelvin) of one mole of an ideal gas? (The dotted line represents $PV = T$).

Graph



Ans. A

Sol.

28. Mumbai needs 1.4×10^{12} litres of water annually. Its effective surface area is 600 km^2 and it receives an average rainfall of 2.4 m annually. If 10% of this rain water is conserved it will meet approximately

(A) 1% of Mumbai's water needs
(B) 10% of Mumbai's water needs
(C) 50% of Mumbai's water needs
(D) 100% of Mumbai's water needs

Ans. B

Sol.

29. A mass M moving with a certain speed V collides elastically with another stationary mass m . After the collision the masses M and m move with speeds V' and n respectively. All motion is in one dimension. Then

(A) $V = V' + n$ (B) $V' = V + n$ (C) $V' = (V + n)/2$ (D) $n = V + V'$

Ans. D

Sol.

30. Four rays, 1, 2, 3 and 4 are incident normally on the face PQ of an isosceles prism PQR with apex angle $\angle Q = 120^\circ$. The refractive indices of the material of the prism for the above rays 1, 2, 3 and 4 are 1.85, 1.95, 2.05 and 2.15, respectively and the surrounding medium is air. Then the rays emerging from the face QR are

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

Ans. C

Sol.

31. The hybridizations of N, C and O shown in the following compound $\begin{matrix} R \\ \diagdown \\ N = C = O \end{matrix}$ respectively, are
- (A) sp^2 , sp , sp^2 (B) sp^2 , sp^2 , sp^2 (C) sp^2 , sp , sp (D) sp , sp , sp^2

Ans. A

Sol.

32. The following compounds are.

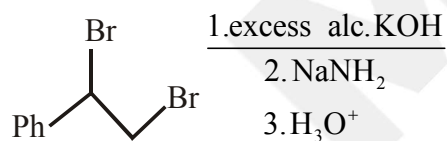


(A) geometrical isomers (B) positional isomers
(C) optical isomers (D) functional group isomers

Ans. D

Sol.

33. The major product of the following reaction.

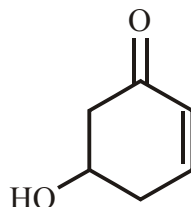


(A) $\text{Ph} \equiv \text{H}$ (B) (C) (D)

Ans. A

Sol.

34. IUPAC name of the following compound



(A) 1-hydroxycyclohex-4-en-3-one
(B) 1-hydroxycyclohex-3-en-5-one

(C) 3-hydroxycyclohex-5-en-1-one

(D) 5-hydroxycyclohex-2-en-1-one

Ans. D

Sol.

35. In water gas shift reaction, hydrogen gas is produced from the reaction of steam with.

(A) methane (B) coke (C) carbon monoxide (D) carbon dioxide

Ans. C

Sol.

36. Treatment with lime can remove hardness of water caused by.

(A) CaCl_2 (B) CaSO_4 (C) $\text{Ca}(\text{HCO}_3)_2$ (D) CaCO_3

Ans. C

Sol.

37. The most polarizable ion among the following is.

(A) F^- (B) I^- (C) Na^+ (D) Cl^-

Ans. B

Sol.

38. For a multi-electron atom, the highest energy level among the following is

(A) $n = 5, l = 0, m = 0, s = +\frac{1}{2}$ (B) $n = 4, l = 2, m = 0, s = +\frac{1}{2}$

(C) $n = 4, l = 1, m = 0, s = +\frac{1}{2}$ (D) $n = 5, l = 1, m = 0, s = +\frac{1}{2}$

Ans. D

Sol.

39. The oxide which is neither acidic nor basic is.

(A) As_2O_3 (B) Sb_4O_{10} (C) N_2O (D) Na_2O

Ans. C

Sol.

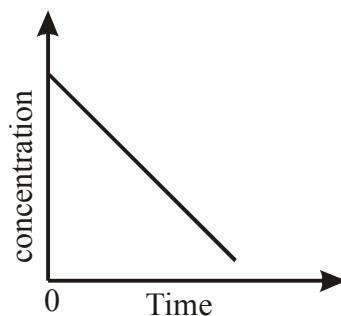
40. The element whose salts cannot be detected by flame test is.

(A) Mg (B) Na (C) Cu (D) Sr

Ans. A

Sol.

41. The plot of concentration of a reactant vs. time for a chemical reaction is shown below



The order of this reaction with respect to the reactant is

- (A) 0 (B) 1
(C) 2 (D) not possible to determine from this plot

Ans. A

Sol.

42. During the free expansion of an ideal gas in an isolated chamber.

- (A) internal energy remains constant (B) internal energy decreases
(C) work done on the system is negative (D) temperature increases

Ans. A

Sol.

43. The number of moles of water present in a spherical water droplet of radius 1.0 cm is [Given : density of water in the droplet = 1.0 g cm^{-3}]

- (A) $\frac{\pi}{18}$ (B) $\frac{2\pi}{27}$ (C) 24π (D) $\frac{2\pi}{9}$

Ans. B

Sol.

44. Among the following, the correct statement about cathode ray discharge tube is.

- (A) the electrical discharge can only be observed at high pressure and at low voltages
(B) in the absence of external electrical or magnetic field, cathode rays travel in straight lines
(C) the characteristics of cathode rays depend upon the material of electrodes
(D) the characteristics of cathode rays depend upon the gas present in the cathode ray tube

Ans. B

Sol.

45. For a spontaneous process.

- (A) enthalpy change of the system must be negative
(B) entropy change of the system must be positive
(C) entropy change of the surrounding must be positive

(D) entropy change of the system plus surrounding must be positive

Ans. D

Sol.

46. Which one of the following is a CORRECT statement about primate evolution ?

(A) Chimpanzees and gorillas evolved from macaques

(B) Humans and chimpanzees evolved from gorillas

(C) Humans, chimpanzees and gorillas evolved from a common ancestor

(D) Humans and gorillas evolved from chimpanzees

Ans. C

Sol.

47. The crypts of Lieberkuhn are found in which one of the following parts of the human digestive tract ?

(A) Oesophagus

(B) Small intestine

(C) Stomach

(D) Rectum

Ans. B

Sol.

48. Removal of the pancreas impairs the breakdown of

(A) lipids and carbohydrates only

(B) lipids and proteins only

(C) lipids, proteins and carbohydrates

(D) proteins and carbohydrates only

(A)

(B)

(C)

(D)

Ans. C

Sol.

49. Microscopic examination of a blood smear reveals an abnormal increase in the number of granular cells with multiple nuclear lobes. Which one of the following cell types has increased in number ?

(A) Lymphocytes

(B) Monocytes

(C) Neutrophils

(D) Thrombocytes

Ans. C

Sol.

50. Which one of the following genetic phenomena is represented by the blood group AB ?

(A) Codominance

(B) Dominance

(C) Overdominance

(D) Semidominance

Ans. A

Sol.

51. The mode of speciation mediated by geographical isolation is referred to as

(A) adaptive radiation

(B) allopatric speciation

(C) parapatric speciation

(D) sympatric speciation

Ans. B

Sol.

52. Which one of the following metabolic conversions requires oxygen ?
- (A) Glucose to pyruvate (B) Glucose to CO_2 and ethanol
(C) Glucose to lactate (D) Glucose to CO_2 and H_2O

Ans. D

Sol.

53. Where are the proximal and distal convoluted tubules located within the human body ?
- (A) Adrenal cortex (B) Adrenal medulla
(C) Renal cortex (D) Renal medulla

Ans. C

Sol.

54. In a diploid organism, when the locus X is inactivated, transcription of the locus Y is triggered. Based on this observation, which one the following statements is CORRECT ?
- (A) X is dominant over Y (B) X is epistatic to Y
(C) Y is dominant over X (D) Y is epistatic to X

Ans. D

Sol.

55. Which one of the following sequences represent the CORRECT taxonomical hierarchy ?
- (A) Species, genus, family, order (B) Order, genus, family, species
(C) Species, order, genus, family (D) Species, genus, order, family

Ans. A

Sol.

56. Which one of the following organs is NOT a site for the production of white blood cells ?
- (A) Bone marrow (B) Kidney (C) Liver (D) Spleen

Ans. B

Sol.

57. Which one of the following anatomical structures is involved in guttation ?
- (A) Cuticle (B) Hydathodes (C) Lenticels (D) Stomata

Ans. B

Sol.

58. Which one of the following parts of the eye is affected in cataract ?
- (A) Cornea (B) Conjunctiva (C) Retina (D) Lens

Ans. D

Sol.

59. Which one of the following organisms is a bryophyte ?

(A) Liverwort (B) Volvox (C) Chlamydomonas (D) Fern

Ans. A

Sol.

60. During oogenesis in mammals, the second meiotic division occurs.

- (A) before fertilisation (B) after implantation
(C) before ovulation (D) after fertilisation

Ans. D

Sol.

61. Let a, b, c, d be distinct real number such that a, b are roots of $x^2 - 5cx - 6d = 0$, and c, d are roots of $x^2 - 5ax - 6b = 0$. then $b + d$ is

- (A) 180 (B) 162 (C) 144 (D) 126

Ans. C

Sol.

62. Let $S = \{1, 2, 3, \dots, 100\}$. Suppose b and c are chosen at random from the set S . The probability that $4x^2 + bx + c$ has equal roots is

- (A) 0.001 (B) 0.004 (C) 0.007 (D) 0.01

Ans. A

Sol.

63. Let \mathbb{N} be the set of positive integers. For all $n \in \mathbb{N}$, let $f_n = (n+1)^{1/3} - n^{1/3}$.

$$\text{Then } A = \left\{ n \in \mathbb{N} : f_{n+1} < \frac{1}{3(n+1)^{2/3}} < f_n \right\}$$

- (A) $A = \mathbb{N}$
(B) A is a finite set
(C) The complement of A in \mathbb{N} is nonempty, but finite
(D) A and its complement in \mathbb{N} are both infinite

Ans. A

Sol.

64. A prime number p is called special if there exist primes p_1, p_2, p_3, p_4 such that $p = p_1 + p_2 = p_3 - p_4$. The number of special primes is

- (A) 0 (B) 1 (C) more than one finite (D) infinite

Ans. B

Sol.

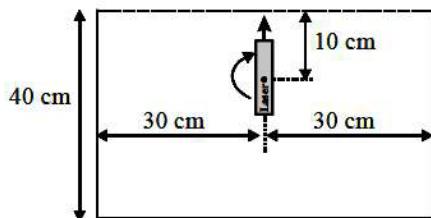
65. Let ABC be a triangle in which $AB = BC$. Let X be a point on AB such that $AX : XB = AB : AC$. If $AC = AX$, then the measure of $\angle ABC$ equals

- (A) 18° (B) 36° (C) 54° (D) 72°

Ans. B

Sol.

66. A water-proof laser pointer of length 10 cm placed in a water tank rotates about a horizontal axis passing through its center of mass in a vertical plane as shown in the figure. The time period of rotation is 60 s. Assuming the water to be still and no reflections from the surface of the tank, the duration for which the light beam escapes the tank in one time period is close to (Refractive index of water = 1.33)



- (A) 8.13 s (B) 14.05 s (C) 16.27 s (D) 23.86 s

Ans. C

Sol.

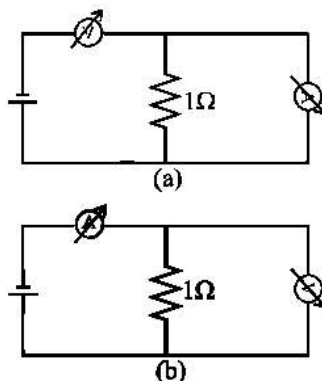
67. In an hour-glass approximately 100 grains of sand fall per second (starting from rest), and it takes 2 sec for each sand particle to reach the bottom of the hour-glass. If the average mass of each sand particle is 0.2 g then the average force exerted by the falling sand on the bottom of the hour-glass is close to

- (A) 0.4 N (B) 0.8 N (C) 1.2 N (D) 1.6 N

Ans. A

Sol.

68. A student uses the resistance of a known resistor ($1\ \Omega$) to calibrate a voltmeter and an ammeter using the circuits shown below. The student measures the ratio of the voltage to current to be $1 \times 10^3\ \Omega$ in circuit (a) and $0.999\ \Omega$ in circuit (b). From these measurements, the resistances (in Ω) of the voltmeter and ammeter are found to be close to:



- (A) 10^2 and 10^{-2} (B) 10^3 and 10^{-3} (C) 10^{-2} and 10^2 (D) 10^{-3} and 10^3

Ans. B

Sol.

69. A hot air balloon with a payload rises in the air. Assume that the balloon is spherical in shape with diameter of

11.7 m and the mass of the balloon and the payload (without the hot air inside) is 210 kg. Temperature and pressure of outside air are 27 °C and 1 atm = 10^5 N/m² respectively. Molar mass of dry air is 30 g. The temperature of the hot air inside is close to, [The gas constant R = 8.31 J/K/mol]

- (A) 27 °C (B) 52 °C (C) 105 °C (D) 171 °C

Ans. C

Sol.

70. A healthy adult of height 1.7 m has an average blood pressure (BP) of 100 mm of Hg. The heart is typically at a height of 1.3 m from the foot. Take the density of blood to be 10³ kg/m³ and note that 100 mm of Hg is equivalent to 13.3 kPa (kilo Pascals). The ratio of BP in the foot region to that in the head region is close to

- (A) one (B) two (C) three (D) four

Ans. C

Sol.

71. PbO₂ is obtained from.

- (A) the reaction of PbO with HCl (B) thermal decomposition of Pb(NO₃)₂ at 200 °C
(C) The reaction of Pb₃O₄ with HNO₃ (D) The reaction of Pb with air at room temperature

Ans. C

Sol.

72. For one mole of van der Waals gas, the compressibility factor $z \left(= \frac{PV}{RT} \right)$ volume will certainly decrease if

[Given: "a", "b" are standard parameters for van der Waals gas]

- (A) "b" increases and "a" decreases at constant temperature
(B) "b" decreases and "a" increases at constant temperature
(C) temperature increases at constant "a" and "b" values
(D) "b" increases at constant "a" and temperature

Ans. B

Sol.

73. The correct statements among the following

- i. $E_{2s}(\text{H}) > E_{2s}(\text{Li}) > E_{2s}(\text{Na}) > E_{2s}(\text{K})$
- ii. the maximum number of electrons in the shell with principal quantum number n is equal to $2n^2$
- iii. Extra stability of half-filled subshell is due to smaller exchange energy
- iv. Only two electrons, irrespective of their spin, may exist in the same orbital are

- (A) i and ii (B) ii and iii (C) iii and iv (D) i and iv

Ans. A

Sol.

74. An organic compound contains 46.78% of a halogen X. When 2.00 g of this compound is heated with

fuming HNO_3 in the presence of AgNO_3 , 2.21 g AgX was formed. The halogen X is [Given: atomic weight of $\text{Ag} = 108$, $\text{F} = 19$, $\text{Cl} = 35.5$, $\text{Br} = 80$, $\text{I} = 127$]

- (A) F (B) Cl (C) Br (D) I

Ans. C

Sol.

75. An organic compound X with molecular formula C_6H_{10} , when treated with HBr , forms a gem dibromide. The compound X upon warming with HgSO_4 and dil. H_2SO_4 , produces a ketone which gives a positive iodoform test. The compound X is.



Ans. D

Sol.

76. A cell weighing 1 mg grows to double its initial mass before dividing into two daughter cells of equal mass. Assuming no death, at the end of 100 divisions what will be the ratio of the mass of the entire population of these cells to that of the mass of the Earth? Assume that mass of the Earth is 10^{24} kg and 2^{10} is approximately equal to 1000.

- (A) 10^{-28} (B) 10^{-3} (C) 1 (D) 10^3

Ans. C

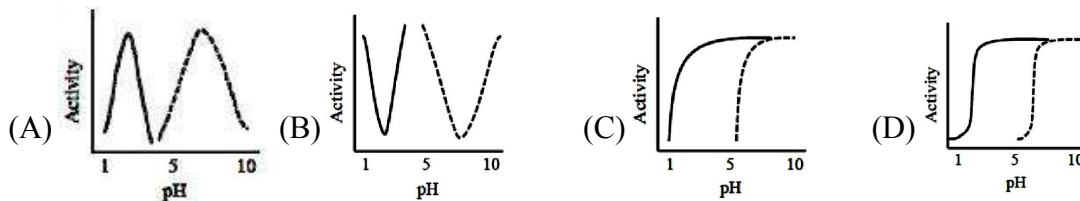
Sol.

77. Papaya is a dioecious species with XY sexual genotype for male and XX for female. What will be the genotype of the embryos and endosperm nuclei after double fertilization?
- (A) 50% ovules would have XXX endosperm and XY embryo, while the other 50% would have XXY endosperm and XX embryo
- (B) 100% ovules would have XXX endosperm and XY embryo
- (C) 100% ovules would have XXY endosperm and XX embryo
- (D) 50% ovules would have XXX endosperm and XX embryo, while the other 50% would have XXY endosperm and XY embryo

Ans. D

Sol.

78. Solid and dotted lines represent the activities of pepsin and salivary amylase enzymes of the digestive tract, respectively. Which one of the following graphs best represents their activity vs pH?



Ans. A

Sol.

79. If the gene pool of the locus X in the human genome is 4, then what would be the highest possible number of genotypes in a large population?

- (A) 6 (B) 8 (C) 10 (D) 16

Ans. C

Sol.

80. Match the plant hormones in Column I with their primary function in Column II.

Column I

P. Absciscic acid

Q. Ethylene

R. Cytokinin

S. Gibberellin

Column II

(i) Promotes disease resistance

(ii) Maintains seed dormancy

(iii) Promotes seed germination

(iv) Promotes fruit ripening

(v) Inhibits leaf senescence

Choose the CORRECT combination

(A) P - iii, Q - iv, R - i, S - ii

(B) P - ii, Q - iv, R - v, S - iii

(C) P - v, Q - iii, R - ii, S - i

(D) P - iv, Q - ii, R - iii, S - v

Ans. B

Sol.