NEW STANDARD ACADEMY

SEMRI KOTHI SUPER MARKET, RAEBARELI

CLASS 12 (BIOLOGY) DPP (Academy) 08/07/2024

1. A haemophilic son was born to normal parents. Give the genotypes of the parents.
2. Write the genotype of
   (i) an individual who is carrier of sickle-cell anaemia gene, but apparently unaffected and
   (ii) an individual affected with the disease.
3. Give an example of a sex- linked recessive disorder in humans
4. Name the type of cross that would help to find the genotype of a pea plant bearing violet flowers.
5. Explain why it is scientifically incorrect to blame the mother for bearing a female child?
6. A colourblind child is born to a normal couple Work out a cross to show how it is possible. Mention the sex of this child.
7. Why is pedigree analysis done in the study of human genetics? State the conclusions that can be drawn from it.
8. Differentiate between male and female heterogamety.
9. Name a disorder, give the karyotype and write the symptoms a human suffer from as a result of monosomy of the sex chromosome.
10. (i) Sickle-cell anaemia in humans is a result of point mutation. Explain.
    (ii) Write the genotypes of both the parents, who have produced a sickle-celled anaemic offsprings.
11. Explain polygenic inheritance with the help of a suitable example.
12. Which chromosomes carry the mutant genes causing thalassemia in humans? What are the problems caused by these mutant genes?
13. When a garden pea plant with green pods was cross-pollinated with another plant with yellow pods. 50% of the progeny borne green pods
    (i) Work out the cross to illustrate this.
    (ii) How do you refer to this type of cross? Why is such a a cross done?
14. (i) Why is haemophilia generally observed in human males? Explain the conditions under which a human female can be haemophilic.
    (ii) A pregnant human female was advised to undergo MTP It was diagnosed by her doctor that the foetus she is carrying has developed from a zygote formed by an XX-egg fertilised by Y carrying sperm. Why was she advised to undergo MTP?
15. (a) Write the scientific name of the organism Thomas Hunt Morgan and his colleagues worked with for their experiments. Explain the correlation between linkage and recombination with respect to genes as studied by them.
    (b) How did Sturtevant explain gene mapping while working with Morgan?
16. How are alleles of particular gene differ from each other? Explain its significance.
17. For the expression of traits "Genes provide only the potentiality and the environment provides the opportunity". Comment on the veracity of the statement
18. How does a mutagen induce mutation? Explain with example.
19. Why is not law of independent assortment always valid for two or more phenotypical traits of an individual?
20. The mate fruit fly and female fowl are heterogametic while the femate fruit fly and the male fowl are homogametic. Why are they called so?

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CLASS 12 (Chemistry) DPP (Academy) 08/07/2024

1. An aqueous solution contains 0.4% urea and 3.42% sugar by mass, calculate the osmotic pressure of the solution at 27°C.
2. Calculate the OP of the mixture at 300 K obtained by mixing solution A and solution B together. Solution A contains 6 gram urea dissolved in 250 ml. aqueous solution. Solution B contains 34.2 gram sugar present in 750 mL aqueous solution.
3. The OP of two solutions A and B at 27°C is 24.6 and 8.2 atm respectively. Now 1 litre of solution A and 3 litres of solution B are mixed together. Calculate the OP of the mixture at 27°C.
4. Two solutions of glucose of 0.01 M and 0.001 M are separated by SPM. Calculate the pressure to be applied so that no osmosis occurs at 27°C.
5. At 300 K, 36 g of glucose present per litre in its solution has an osmotic pressure of 4.98 bar. If the osmotic pressure of the solution is 1.52 bar at the same temperature, what would be its concentration?
6. A solution containing 12.5 g of a non-electrolyte substance in 175 g of water gave a boiling point elevation of 0.7 K. Calculate the molar mass of the substance. (K_b for water = 0.52 K kg mol^{-1})
7. The boiling point of benzene is 353.23 K. When 1.80g of non-volatile solute was dissolved in 90 g of benzene, the boiling point is raised to 354.11 K. Calculate the molar mass of the solute. K_b for benzene is 2.53 K kg/mol.
8. An aqueous solution containing 12 g glucose in 100 g water was found to boil at 100.34°C. Calculate malat elevation constant for water. Molar mass of glucose = 180.
9. 0.456 g of an organic compound (molar mas 152) are dissolved in 31.4 g of acetone. Calculate the b.p. of the solution. Given that molecular elevation constant for acetone is 17.2°C. Boiling point of acetone = 56.2°C
10. 0.1 molal aqueous solution boils at 100.0518° C. What is molal elevation constant for water?
11. 0.73 g of an organic compound (molar mais 152) are dissolved in 36.8 g of acetone. Boiling point solution is 56.55°C. Now 0.564 g of a non-volatile solute are dissolved in same mass of acetone. Elevation in bp. 0.16°C. If b.p. of pure acetone is 56.3°C, calculate the molar mass of non-volatile solute.
12. B.P of carbon disulphide is 46.3°C .A solution containing 3.795 g sulphur in 100 g carbon disulphide gave an elevation in boiling point of 0.36 kelvin. Molal elevarion constant for carbon disulphide is 2.42 K kg/mol. Calculare the molecular formula of sulphur.
13. Vapour pressure of an aqueous solution of urea is 732 mm at 100°C. What is the b.p. of this solution? K_b for water 0.52 K/m.
14. 18 grum glucose $C_3H_{12}O_6$ a dissolved in 1 kg of water At whose temperature wall the water boil (1.013 bur pressure)? K_b = 0.52Kkg/moL).
15. A solution of an organic compound a prepared by dissolving 68.4gm 1000 g of water Calculate the molecular mass of the compound and osmotic pressure of the solution at 293 K. elevation in b.pt. is 0.104 and K_b for water is 0.52 K kg/mol.
16. Calculate the molal elevation constant of water At 100°C, latent heat of vaporisation of water in 0.54 kcal/gram
17. The boiling point of 5% solution (w/w) of a non-volatile solute in water is 100.45°C. If boiling point of pure water is 100°C, then calculate the molar mass of solute. K = 0.52 K kg/mol.
18. How much glucose (molar mass 180) should be dissolved in 1 kg water to have boiling point of aqueous solution equal to 100.26°C? K for water = 0.52 km^{-1}.
19. A solution containing 0.5126 g of naphthalene (molar mass 128) in 50 g of carbon tetrachloride gave an elevation in b.p. of 0.402 K while a solution of 0.625 g of an unknown solute gives boiling point elevation of 0.65°C. What is the molar mass of solute?
20. An aqueous solution of a non-volatile solute containing 2/3 mole of solute in 1kg water boiled at 100.34°C. Calculate the molal elevation constant.
21. K_b for water is 0.52 K m^{-1}. What is the boiling point of 0.1 molal aqueous solution of sugar?
22. Calculate the boiling point of a solution containing 0.36 g of glucose in 100 g of water. (K_b =0.52 K/m).
23. Boiling point of pure benzene is 80°C. Latent heat of vaporisation of benzene is 90 cals/gram. Calculate molal elevation constant of benzene?
24. B.P of benzene is 80°C. Its latent heat of vapourisation is 376.2 joule/gram. What is molal elevation constant of benzene?

25. On dissolving 3.24 g of sulphur in 40 g of benzene, boiling point of solution was higher than that of benzene by 0.81 K K_b value for benzene is 2.53 K kg mol^{-1}. What is the molecular formula of sulphur?
26. 0.90 g of a non-electrolyte was dissolved in 87.90 g of benzene. This raised the boiling point of benzene by 0.25°C. If the molecular mass of non-electrolyte is 103 g mol^{-1} calculate the molal elevation constant for benzene
27. A solution containing 10 g of non-volatile solute in 100 g of water boils at 373.15 K. Find the molecular mass of the solute (K_b for H_2O is 0.52 K/m)
28. A solution of glycerol (molar mass = 92 g/mol) in water was prepared by dissolving some glycerol in 500 g of water. This solution has boiling point of 100.42°C. What mass of glycerol was dissolved to = 0.512 make the solution? (K_b for water = 0.512 K kg mol^{-1})
29. A solution prepared by dissolving 1.25 g of oil of winter green (methyl salicylate) in 99.0 gram of benzene has boiling point of 80.31°C. Determine the molar mass of the compound. B.P of pure benzene is 80.1°C and K_b for benzene is 2.53°C kg mol^{-1}
30. The freezing point of cyclohexane is 279 65 K. A solution of 14.75 g of a solute in 500 g of cyclohexane freezes at 277.33K. What is the molar mass of the solute? K_f = 20.2Kkg / mol

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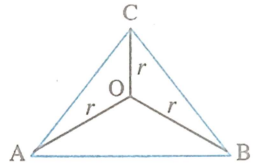
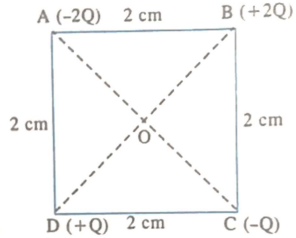
CLASS 12 (PHYSICS) DPP (Academy) 08/07/2024

1. An electron moves a distance of 6 cm when accelerated from rest by an electric field of strength 2×10^{4} NC^{-1} Calculate the time of travel. The mass of electron is $m_e = 9.1 \times 10^{-31}$ kg and charge on electron = 1.6×10^{-19} C
2. A stream of electrons moving with a velocity of $3 \times 10^{7} ms^{-1}$ is deflected by 2 mm in traversing a distance of 0.1 m in a uniform electric field of strength 18V c m^{-1} Determine e/m of electron.
3. How many electrons should be removed mass 1.6 g, so that it may just float in an electric field of intensity 10^{9} NC^{-1} directed upwards?
4. A charged oil drop remains stationary when situated between two parallel plates 20 mm apart and a potential drop of 500 V is applied to the plates. Find the charge on oil drop if it has a mass of 2×10^{-4} kg. Take g = $10ms^{-2}$
5. Calculate the magnitude of the electric field which can just a deuteron of mass 3.2×10^{-27} kg. Take g = 10m s^{-2}
6. A charged particle of charge $2\mu C$ and mass 10 milligram moving with a velocity of 1000 m/s enters a uniform electric field of strength 10^{3} NC^{-1} directed perpendicular to its direction of motion. Find the velocity and displacement of the particle after 10s.
7. Radius of uranium nucleus (Z = 92) is 6.8×10^{-15} m. If the positive charge on the nucleus is distributed uniformly, find the electric field intensity at the surface of uranium nucleus.
8. Two point charges of 2.0×10^{-7} C and 1.0×10^{-7}C are 1.0 cm apart. What is the magnitude of the electric field produced by either charge at the site of the other? Use standard value of $\frac{1}{4\pi\epsilon_0}$.
9. Two charges +10 μC and +40 μC respectively are placed 12 cm apart. Find the position of the point where electric field is zero.
10. An infinite number of identical charges each of charge q are placed along the axis (x-axis) at a distance a, 2a, 3a, 4a…….. from the origin. Calculate the magnitude of the electric field at the origin due to the distribution of charges.
11. Two point charges +6q and -8q are placed at the vertices 'B' and 'C' of an equilateral triangle ABC of side a. Obtain an expression for the magnitude and direction of the resultant electric field at the vertex A due to these two charges.
12. In the given Fig. three identical charges each of magnitude are situated at the corners of an equilateral triangle. Find electric field intensity at O.



13. Four point charges 2Q, 2Q , -Q and Q are placed at corners of a square ABCD of side 2 cm. Find the magnitude and direction of the electric field at the centre O of square if Q = $0.02\mu C$



Use $\frac{1}{4\pi\epsilon_0} = 9 \times 10^{9} Nm^{2} C^{-2}$

14. A thin insulating rod of length / carries a uniformly distributed charge Q. Calculate the electric field intensity due to this rod at a distance from one end of rod.
15. Twenty seven drops of radius 0.02 m and each carrying a charge of $5\mu C$ are combined to form a bigger drop. Find how the surface density of electrification will change if no charge is lost.
16. A thin semicircular ring of radius ais charged uniformly and the charge per unit length is λ. Find the electric field at its centre.
17. Obtain the formula for the electric field due to a long thin wire of uniform linear charge density without using Gauss law.
18. A metal cube of length 0.1 m is charged by$12\mu C$. Calculate its surface charge density.

19. How much charge is required to electrify a sphere of radius 0.15 m so as to get surface charge density of 7/11 μ Cm^{-2}?
20. Two equal spheres of water having equal and similar charges coalesce to form a large sphere. If no charge is lost, how will the surface charge densities of the electrification change?
21. An electric dipole with dipole moment 4×10^{-9} Cm is aligned at an angle of 30° with the direction of a uniform electric field of magnitude 5×10^{5} N C^{-1}. How much torque is acting on the dipole?
22. An electric dipole consists of two opposite charges of magnitude $\frac{2}{3}\times10^{-7}$ C separated by 2 cm. The dipole is placed in an external field of 3×10^{7} N C^{-1} .What maximum torque does the electric field exert on dipole?
23. An electric dipole consists of two charges +20 μC and -20 μC separated by a distance of 1 cm. Calculate the electric field intensity at any point on the axial line at a distance of 10 cm from the mid point of dipole.
24. Two charges each of 1μC but opposite sign are 1 cm apart. Calculate the electric field at a point distance 10 cm from the mid-point on the axial line of dipole.
25. Calculate the electric field intensity due to an electric dipole of length 0.1 m having charges of 1 μC at an equatorial point 12 cm from the centre of dipole.
26. What is the magnitude of electric intensity due to a dipole of moment 2×10^{-8} Cm at a point distant 1 m from the centre of dipole, when the line joining the point to the centre of dipole makes an angle of 60° with dipole axis?
27. Calculate the electric field intensity due to an electric dipole of length 10 cm and consisting of two charges $\pm2\mu$C at a distance of 50 cm from each charge.
28. An electric dipole consists of two equal and opposite charges separated by 2.0 cm apart. When dipole is placed in uniform electric field of 10^{5} NC^{-1}, it experiences a maximum torque of 0.2×10^{-3} Nm. Find the magnitude of each charge.
29. A system has two charges $q_A=2.5\times10^{-7}$ C and $q_B = -2.5\times10^{-7}$ C located at points A(0, 0, - 15) cm and B(0, 0, 15) cm respectively. Find the total charge and electric dipole moment of the system.
30. The electric field due to a short dipole at a distance r, on the axial line, from its mid-point is the same as electric field at a distance r' on its equatorial line from its mid-point. Determine ratio r /r'

NEW STANDARD ACADEMY

SEMRI KOTHI SUPER MARKET, RAEBARELI

CLASS 12 (MATH'S) DPP (Academy) 08/07/2024

1. The function f is defined in[-5,5] as $f(x) = x$, if x is rational and $f(x)$ = -x, if is irrational then
2. If $f(x) = \begin{cases} xe^{-\left(\frac{1}{|x|}+\frac{1}{x}\right)}, x \neq 0 \\ 0 \quad\quad\quad\quad , x = 0 \end{cases}$ then $f(x)$*is*
3. Let $f(x) = \frac{1-tanx}{4x-\pi}, x \neq \frac{\pi}{4}, x \in \left[0, \frac{\pi}{2}\right]$. If $f(x)$ is differentiable at x =1 and $\lim_{h\to 0} \frac{1}{h} f(1+h) = 5$ then $f'(1)$ equals.
4. If f is a real –valued differentiable function satisfying $|f(x)-f(y)| \leq (x-y)^2$,x,y$\in R$ and $f(0) = 0$ then $f(1)$ *equals.*
5. The set of points where $f(x) = \frac{x}{1+|x|}$ is differentiable is
6. Let $f: R \to R$ be a function defined by $f(x) = min\ \{x+1, |x|+1\}$. Then which of the following is true?
7. The function $f: R - \{0\} \to$ R given by $f(x) = \frac{1}{x} - \frac{2}{e^{2x}-1}$ can be made continuous at x = 0 by defining $f(0)$ *as*
8. *Let* f(x) = $\begin{cases} (x-1)\sin\left(\frac{1}{x-1}\right), if\ x \neq 1 \\ 0, \quad\quad\quad\quad if\ x = 1 \end{cases}$ then which one of the following is true?
9. Let $f(x) = x|x|$ and g (x) = sin x
   Statement 1 : go$f$ *is* twice differentiable at x =0 and its derivative is continuous at that point.
   Statement 2: g0f is twice differentiable at x = 0.
10. The value of p and q for which the function
    $f(x) = \begin{cases} \frac{\sin(p+1)x+\sin x}{x} & x < 0 \\ q, & x = 0 \\ \frac{\sqrt{x+x^2}-\sqrt{x}}{x^{3/2}} & x > 0 \end{cases}$ is continuous for all x in R , are
11. Number of points of discontinuity for $f(x)$ = sgn (sin x), x $\in [0, 4\pi]$ is_____
12. Number of points where $f(x)$ = sgn (x^2-3x+2) + [x-3], x $\in$ [0,4](Where [.] denotes the greatest integer function) is discontinuous is_____.
13. Let f be a continuous function on R such that $f\left(\frac{1}{4x}\right) = (\sin e^x)e^{-x^2}\frac{x^2}{x^2+1}$, then the value of $f(0)$ is _____
14. Let $f(x) = \begin{cases} \frac{x}{2} - 1, 0 \leq x < 1 \\ \frac{1}{2}, 1 \leq x \leq 2 \end{cases}$ and g(x) = (2x+1)(x-k) +3, 0$\leq x \infty$. Then g($f(x)$) is continuous at x = 1 if 12 k is equal to_____
15. Number of points where $f(x) = \sqrt{x^2} + [x]^2$, x $\in [-2,2]$is discontinuous is__
16. Number of points where $g(x) = |x(2x+1)(2x-1)|\ cos(\pi x)$ is non-differentiable is
17. Number of points of discontinuity for the function f(x) = (log|x|) sgn(x^2 - 1), x$\neq$ 0 is
18. Let f(x) be a continuous function having range is [2, 6.5] If h(x) = $\left[\frac{\cos x + f(x)}{\lambda}\right]$, $\lambda \in$ N is continuous, where [.] denotes the greatest integer function, then the least value of λ is _____
19. If f(x) = $a\,x^3 + bx^2 + cx + d$ zeroes α, β, γ where a< 0, $\beta > \gamma > 0$ and c $\neq$0 then the number of points at which $g(x) = |f(|x|)|$ is not differentiable is
20. If g(x) =
$$\lim_{m\to\infty} \frac{x^m f(x) + h(x) + 3}{2x^m + 4x + 1}$$
when x $\neq$ 1 and g(1) = e^3 such that $f(x)$ $g(Z)$ and h(x) are continuous function at $x = 1$, then the value of 5$f(1)$ - 2$h(1)$ *is* _____