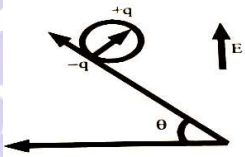
NEW STANDARD ACADEMY

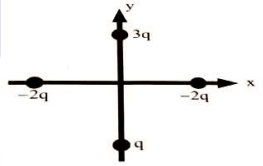
Exam **NEET - JEE** **Marks: 60**
Date : 03-07-23 **CLASS : 12TH** **Time: 90:MIN**

PHYSICS

1. A small sphere is charged to a potential of 50 V and a big hollow sphere is charged to a potential of 100 V. How can you make charged flow from the smaller sphere to the bigger sphere?
2. An electric field is expressed as $\underset{E}{\rightarrow} = 2\hat{\imath} + 3\hat{\jmath}$. Find the potential defference (V_A-V_B) between two points A and B whose position vectors are given by $\underset{rA}{\rightarrow} = \hat{\imath} + 2\hat{\jmath} \; and \; \underset{rB}{\rightarrow} = 2\hat{\imath} + \hat{\jmath} + 3\hat{k}$.
3. Three concentric metallic spherical shell A,B and C of radii a,b and c(a<B<C) have surface change densities $-\sigma, +\sigma$ and $-\sigma$ respectively. The potential of shell A is :
4. An infinite non conducting sheet of charges has a surface charges density of 10^{-7} c/m^2. Find separation between two equipotential surfaces near the sheet whose potential differ by $5V$?
5. A wheel having mass m has charges +q and –q on diametrically opposite points. It remains in equilibrium on a rough inclined plane in the presence of uniform vertical electric field E. Find E



6. 4 charges are placed each a distance 'a' from origin. Find dipole moment of configuration is –



7. The radius of curvature of a convex spherical mioor is 1.2 m. How far away from the mirror is an object of height 1.2 cm if the distance between its virtual image and the mirror is 0.35 m? What is the height of the image.

8. A light ray falling at an angle of 60^0 with the surface of a clean slab of ice of thickness 1.00 m is refracted into it at an angle of 15^0. Calculate the time taken by the light rays to cross the slab. Speed of light in vacuum = 3 x 10^8 m/s.

9. A point source is placed at a depth h below the surface of water (refractive index = μ). The medium above the surface of water is air($\mu = 1$). Find the area on the surface of water through which light comes in air from water.
10. Derived refraction formula for spherical surfaces.

CHEMISTRY

11. A 300 ml solution of NaCl was electrolysed for 60.0 min. If the pH of the final solution was 12.24, average current used is -
12. The ionization constant of a weak electrolyte is 25 x 10^{-6} whiole the equivalent conductance of its 0.01 M solution is 19.6 S cm^2 eq^{-1}. Find the equivalent conductance of the electrolyte at infinite dilution (in S cm^2 eq^{-1}).
13. The emf of the cell corresponding to the reaction $Zn(s) + 2H^+(aq) \rightleftharpoons Zn^{2+}$ (0.10 M) + $H_2(g)$ I atm is 0.28 volt at 250^0 C. Calculate the pH of the solution at hydrogen electrode.
    $E^0_{Zn^{+2}/Zn}$ = -0.76 volt; $E^0_{H^+/H2}$ = 0 volt
14. 0.5 M H_2SO_4 is diluted from 1 litre to 10 litre. What will be the normality of the resulting solution.
15. 1 kg of an aqueous solution of Sucrose is cooled and maintained at -4^0C. How much ice will be separated out if the molality of the solution is 0.75? k_f (H_2O) = 1.86 Kg mol^{-1} K.
16. For the decomposition reaction: $N_2O_{4(g)} \rightarrow 2NO_{2(g)}$ the initial pressure of N_2O_4 falls from 0.46 atm to 0.28 atm in 30 minute. What is the rate of appearance of NO_2 ?
17. A reaction is first order in A and second order in B:
    1. Write rate equation
    2. How is the rate affected whin the concentration of B is tripled?

3. How is the rate affected when the concentration of both A and B is doubled?

18. Predict the magnetic moment of (a) Co^{3+} (b) Cu^{2+}
19. Why are the ionization energies of 5d elements greater than 3d element?
20. Why Mohr`s salt is used as primary standard and not simple $FeSO_4$?

BIOLOGY

21. Each pollen grain produced two male gamete how many pollen grains will be required to fertilize 8 ovules present in a particular carpal ?Give reason in support of your answer.
22. What is apomixis comments on its significance how can it be commercially used?
23. Draw a labelled diagram of mature embryo sac.
24. A man having blood group A is a married with an woman having blood group B work out the genotype of man and woman if there one of the children is born with blood group O what is the possible genotype of other offspring.
25. How are Mendilian inheritance, polygenic inheritance and pleotropy different from each other?
26. Which disorder is caused in Man by the presence of one extra sex chromosomes and give the symptom of this disorder.
27. If the sequence of the coding stand in a transcription unit is written as follows
    5'-ATTGGCTAGGTCCAG-3'
    Write down the sequence of mRNA .
28. What is DNA fingerprinting ? Mention it application?
29. Give the difference between divergent and convergent evolution with example?
30. Define with example-
    a-genetic drift
    b-founder effect
    c--directional selection
    d-Hardy-Weinberg equilibrium law

MATHS

21. Let g(x) = 1 +x – [x] and $f(x) = \begin{cases} -1, & x < 0 \\ 0, & x = 0 \\ 1, & x > 0 \end{cases}$.*Then* for all x, f(g(x)) is equal to (where[.] represents the greatest integer function)
22. The domain of $f(x)$ = $(log\,(x^2 + 5x + 6))/([x] - 1)$ is, where [.] denotes the greatest integer function.
23. If $\sin^{-1}\frac{x}{5} + \text{cosec}^{-1}\frac{5}{4} = \frac{\pi}{2}$, then a value of x is –
24. Let $\tan^{-1}y = \tan^{-1}x + \tan^{-1}\left(\frac{2x}{1-x^2}\right)$, where $|x| < \frac{1}{\sqrt{3}}$. Then a value of y is _____
25. If $A = \begin{bmatrix} 2 & -3 \\ -4 & 1 \end{bmatrix}$, then adj $(3A^2 + 12\,A)$ is equal to _____
26. If $A = \begin{bmatrix} a & 0 \\ 1 & 1 \end{bmatrix}$ amd $B = \begin{bmatrix} 1 & 0 \\ 5 & 1 \end{bmatrix}$, then value of a for which $A^2 = B$ is.
27. Let $P = \begin{bmatrix} 1 & 0 & 0 \\ 4 & 1 & 0 \\ 16 & 4 & 1 \end{bmatrix}$ and I be the identity matrix of order 3. If $Q = [q_{ij}]$ is a matrix such that $P^{50} - Q = I$, then $(q_{31} + q_{32})/q_{21}$ equals
28. If the function g(x) = $\begin{cases} k\sqrt{x+1}, & 0 \le x \le 3 \\ mx + 2. & 3 < x \le 5 \end{cases}$ is differentiable, then the value of $k + m$ is.
29. The function given by y = ||x|-1| is differentiable for all real numbers except the points
30. The value of p for which the function $f(x) = \begin{cases} \frac{(4^x-1)^3}{\sin\frac{x}{p}\log\left[1+\frac{x^2}{3}\right]}, & x \neq 0 \\ \text{continuous at } 12(\log 4)^3, & x = 0 \end{cases}$, is