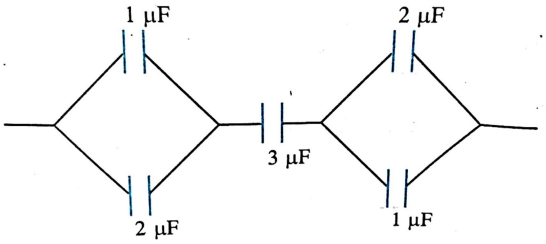
NEW STANDARD ACADEMY

Marks: 60

Date : 15-07-24 **CLASS : 12TH NEET** **Time: 3 HRS**

PHYSICS

1. Three identical charges are placed at the vertices of an equilateral triangle the force experienced by each charge, (if $K = \frac{1}{4\pi\epsilon_0}$) is?
2. Calculate the capacitance of combination in following Figure.



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3. What is the value of the total electric flux emitted from a unit positive charge?
4. A charge 'q' is placed at the centre of the line joining two equal charges 'Q'. The system of the three charges will be in equilibrium if q is equal to
5. Two spheres having same radius and mass are suspended by two strings of equal length from the same point, in such a way that their surface touch each other. On depositing charge 4×10^{-6} C on them they repel each other in such a way that in equilibrium the angle between their strings become 60°. If the distance from the point of suspension to the centre of the sphere is 10 cm. Find the mass of each sphere
6. Two charges -q and+q are located at points A(0, 0, - a) and B(0, 0, a) respectively. How much work is done in moving a test charge from point P (7, 0, 0) to Q(- 3, 0, 0) ?
7. Eight charged water droplets, each with a radius of 1 mm and charge 10^{-9} C coalesce to form a single drop. Calculate potential of bigger drop.
8. n small drops of same size are charged to V volt each. They coalesce to form a bigger drop. Calculate potential of bigger drop.
9. To what potential we must charge an insulated sphere of radius 14 cm so that the surface charge density is equal to $1\mu Cm^{-2}$?
10. 6. A short dipole is of electric dipole moment of 4×10^{-9} Cm. Determine the electric potential due to the dipole at a point distance 0.3 m from the centre of dipole situated (a) on the axial line (b) on the equatorial line (c) on a line making an angle of 60° with the dipole axis.

CHEMISTRY

1. Calculate the degree of dissociation of 1.25% NaCl aqueous solution which is isotonic with 7.5% aqueous solution of glucose. Percentage given is by mass/volume
2. Phenol associates in benzene to form dimer. A solution containing 20×10^{-3} kg of phenol in 1kg of benzene has its freezing point depressed by 0.69K. If K_f for benzene is 5.12 K kg/mol, what is the degree of association of phenol?
3. Calculate the mass of a non-volatile solute (molar mass 40g mol^{-1}) which should be dissolved in 114g octane to reduce its vapour pressure to 80%.
4. A conductivity cell contains two electrodes. The area of each electrode is $10cm^2$ and are 1.5 cm apart. Conductivity cell is filled with N/20 solution of an electrolyte. If the electrodes are exactly half-dipped in the solution, find the equivalent conductivity of the electrolyte. The resistance of the solution determined is 50 ohms.
5. A copper-silver cell is set up. The copper ion concentration in it is 0.10 M. The concentration of silver ion is not known. The cell potential

measured 0.422 V. Determine the concentration of silver ion in the cell. (Given $E^0_{Ag^+/Ag}$ = +0.80V, $E^0_{Cu^{2+}/Cu}$ = +0.34V)

6. Rate constant for first order reaction is 5.78×10^{-5} sec^{-1} .What % of initial reactant will react in 10 hours?
7. The reaction $SO_2Cl_2 \xrightarrow{k_1} SO_2 + Cl_2$ is a first order reaction with $k_1 = 2.2\times10^{-5}$ sec^{-1} at 575 K. What percentage of SO_2Cl_2 will get decomposed in 90 minutes when the reaction is carried out at 575 K?
8. The rate constant at 427°C is 2 $second^{-1}$. The activation energy is 129.1 kJ/mol. Calculate the rate constant at 527°C
9. E° for Mn^{3+}/Mn^{2+} couple is much more + ve than for Fe^{3+}/Fe^{2+} Why?
10. (a) Complete the following chemical reactions:
    (i) $Na_2Cr_2O_7 + KCl \rightarrow$
    (ii) $2MnO_4^- + 5SO_3^{2-} + 6H^+ \rightarrow$
    (b) How does the colour of $Cr_2O_7^{2-}$ change when treated with an alkali?

BIOLOGY

1. Is haemophilia in humans a sex-linked or autosomal disorder? Work out a cross in support of your answer.
2. Write the types of sex-determination mechanisms the following crosses show. Give an example of each type.
   (i) Female XX with male XO.
   (ii) Female ZW with male ZZ
3. Explain the role of ^{35}S and ^{32}P in the experiments conducted by Hershey and Chase.
4. Describe how the lac operon operates, both in the presence and the absence of an inducer in E. coli
5. Branching descent and natural selection are the two key concepts of Darwinian theory of evolution. Explain each concept with the help of a suitable example.
6. $p^2+2pq+q^2 = 1$. Explain this algebraic equation on the basis of Hardy-Weinberg's principle.
7. Trace the life cycle of malarial parasite in human body, when bitten by infected female Anopheles
8. How are primary and secondary immune responses carried out in the human body? Explain.
9. State the medicinal value and the bioactive molecules produced by Streptococcus, Monascus Trichoderma
10. Secondary treatment of the sewage is also called biological treatment. Justify this statement and explain the process.