NEW STANDARD ACADEMY

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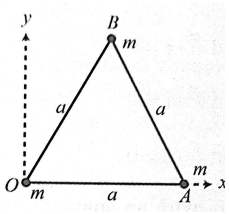
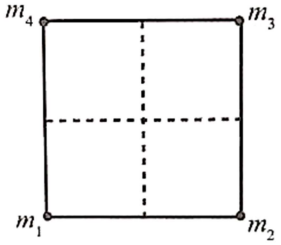
CLASS 11 DPP (Academy) 26-08-2025

PHYSICS

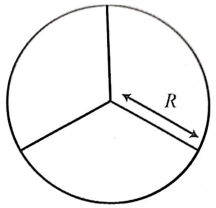
1. Three particles each of mass *m*, are placed at the corners of an equilateral triangle of side a, as shown in Figure. The position vector of the centre of mass is



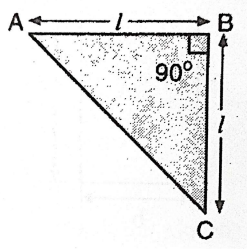
2. Four particles of mass $m_1 = 2m$, $m_2 = 4m$, $m_3 = m$ and m_4 are placed at four corners of a square. What should be the value of m_4 so that the centre of mass of all the four particles are exactly at the centre of the square?



3. The moment of inertia of uniform semicircular disc of mass M and radius *r* about a line perpendicular to the plane of the disc through the centre is ?
4. A wire of length *l* and mass *m* is bent in the form of a rectangle ABCD with $\frac{AB}{BC} = 2$ .The moment of inertia of this wire frame about the BC is?
5. A wheel comprises of a ring of radius R and mass M and three spokes of mass *m* each. The moment of inertia of the wheel about its axis is



6. A particle performing uniform circular motion has angular momentum L. If its angular frequency is doubled and its kinetic energy halved, then the new angular momentum is
7. Figure shows a thin metallic triangular sheet ABC. The mass of the sheet is M. The moment of inertia of the sheet about side AC is:



8. If F be a force acting on a particle having the position vector *r* and τ be the torque of this force about the origin, then
9. A disc is rotating with an angular velocity ω_0 .A constant retarding torque is applied on it to stop the disc. The angular velocity becomes $\frac{\omega_0}{2}$ after *n* rotations. How many more rotations will it make before coming to rest?
10. A flywheel having a radius of gyration of 2 m and mass 10 kg rotates at an angular speed of 5 rad/s about an axis perpendicular to it through its centre. The kinetic energy of rotation is

CHEMISTRY

1. 0.75 mole of an ideal gas expands isothermally and reversibly at 300 K from a volume 15 L to 25 L. Calculate q and ΔU
2. Calculate the amount of work done by 2 mole of an ideal gas at 25°C in an isothermal reversible expansion from 10 L to 20 L.
3. Two litre N_2 gas at 0°C and 5 atm are expanded isothermally and irreversibly against a constant pressure of one atm until the pressure of the gas reaches one atm. Calculate, the work of expansion.

4. 2.8 g of N_2 gas at 300 K and 20 atm was allowed to expand isothermally and irreversibly at a constant external pressure of one atm. Calculate, ΔU q and *w*.
5. Calculate the maximum work done in expanding 16 g of O_2 at 300 K and occupying volume of 5 d m^3 isothermally until the volume becomes 25 dm^3.
6. Calculate w for isothermal reversible expansion of one mole of an ideal gas from an initial pressure of one bar to 0.1 bar at constant temperature of 273 K.
7. What work is to be done on 2 mole of an ideal gas at 300 K if it is compressed reversibly and isothermally from a pressure of 1.01×10^5 Nm^{-2} to 5.05×10^6 Nm^{-20}.
8. Two moles of a perfectly ideal gas initially at 300 K and 1 bar pressure are compressed isothermally and reversibly. The final pressure is 10 bar. Calculate q, w and ΔU
9. 400 J of heat is supplied to a system at constant volume. The temperature of the system increases from 15°C to 20°C. Calculate the change in internal energy of the system.
10. What is the maximum work done by the isothermal expansion of one mole of an ideal gas at 0°C from 2.24 d m^3 to 22.4 dm^3 ?

BIOLOGY

1. Why are bryophytes called the amphibians of the plant kingdom?
2. The male and female reproductive organs of several pteridophytes and gymnosperms are comparable to floral structures of angiosperms. Make an attempt to compare the various reproductive parts of pteridophytes and gymnosperms with reproductive structures of angiosperms.
3. Heterospory i.e., formation of two types of spores microspores and megaspores is a characteristic feature in the life cycle of a few members of pteridophytes and all spermatophytes. Do you think heterospory has some evolutionary significance in plant kingdom?
4. How far does Selaginella one of the few living members of lycopodiales (pteridophytes) fall short of seed habit.
5. Each plant or group of plants has some phylogenetic significance in relation to evolution Cycas, one of the few living members of gymnosperms is called as the 'relic of past'. Can you establish a phylogenetic relationship of Cycas with any other group of plants that justifies the above statement?
6. The heterosporous pteridophytes show certain characteristics, which are precursor to the seed habit in gymnosperms. Explain.
7. Comment on the lifecycle and nature of a fern prothallus.
8. How are the male and female gametophytes of pteridophytes and gymnosperms different from each other?
9. In which plant will you look for mycorrhiza and corolloid roots? Also explain what these terms mean.
10. Gametophyte is a dominant phase in the life cycle of a bryophyte. Explain.

MATHS

1. Find the number of 4- digit odd number , when repetition of digit is not allowed.
2. How many numbers divisible by 5 and lying between 40000 and 50000 can be formed from the digits 0,3,4,5,8 and 9,if
   (i) repetition of digits is not allowed
   (ii) repetition of digits is allowed?
3. How many numbers can be formed from the digits 1. 2. 3. 9 if the repetition of digits is not allowed?
4. How many of the natural numbers from 1 to 1000 have none of their digits repeated?
5. In how many ways can 5 different balls be distributed among 3 boxes?
6. Find the total number of ways of answering 6 multiple choice questions, each question 4 choices
7. Find the number of six digit numbers, all digits of which are odd.
8. In how many ways 4 different balls be distributed in 5 boxes so that all the balls in the same box
9. Of 11cricket players, one is to be chosen as captain and another as vice captain. How many choices are there?
10. In a class there are 17 girls and 22 boys In how many ways can the teacher form a team of one girl and one boy from amongst the students of the class to represent the school in a quiz competition?