MHT CET MEMORY-BASED QUESTION PAPER 2023
10 MAY 2023 SHIFT 2

PHYSICS

- The radius of a cylinder is increasing at the rate 2 cm/sec and its height is decreasing at the rate 3 cm/sec, then find the rate of change of volume when the radius is 3cm and the height is 5 cm.
- The area spherical balloon of radius 6 cm increases at the rate of 2 then find the rate of increase in the volume.
- Find the surface tension at critical velocity.

CHEMISTRY

- In a certain culture of bacteria the rate of increase is proportional to the no.of bacteria present at that instant it is found that there are 10000 bacteria present in 3 hours and 40000 bacteria at the 5 hours the number of bacteria present in the beginning is?
- Edge length of a unit cell of a crystal is 288 pm. If its density is 7.2 g/cm^3, then determine the type of unit cell assuming mass = 52 g.
- For the given conditions, calculate the osmotic pressure.
- A question was on PV = nRT equation.
- A question was on Gatterman-Koch's reaction.
- Identify allylic halide and vinylic halide.
- Calculate the percentage dissociation under the given conditions.
- Which of the following is an example of an ionic solid?
- What type of bonds are present in molecular crystals?
- For a BCC structure, if a = 351 pm, find r.
- Lithium forms a BCC structure having an edge length of a unit cell 351 pm, then find the atomic radius of lithium.
- What is the unit of Henry's law constant?

MATHEMATICS

- Find the differential equation of all circles passing through the origin and having their centres on the x-axis.
- $\int e^x (1 - \cot x + \cot^2 x)\, dx = ?$
- If x = 3tant and y = 3 sect, then find d^2y/dx^2.
- $\int_0^1 \cos^{-1} x\, dx = ?$
- $\int (x^2 - 1)dx/(x^3(2x^4 - 2x^2\ 1)^{1/2}) = ?$
- Find the general solution of the given differential equation.
- $\int_0^\pi (x\tan x)\, dx/(\sec x + \cos x) = ?$
- If f(x) = derivative of a $\sin^3 x$ wrt a$\cos^3 x$, then find f'(x).
- The sum of mean and variance of a given set is 15/2 and their number of trials is 10, then find the value of variance.