MHT CET Memory-Based Question Paper 2023
9 May 2023 Shift 1

Physics

- A question related to semiconductor doping was asked.
- Find the change in the charge carriers of a p-n junction diode if its temperature is increased.
- Find the current in the circuit for the given diagram.
- Find the fringe width for the given double-slit experiment.
- Find the height of a conical pendulum if the time period is given.
- Find the internal electric field of a charged sphere.
- Find the kinetic energy of a given molecule in terms of PV.
- Find the ratio of the angular momentum of the minute hand and the second hand of a clock.
- Find the relation between the kinetic energy of rotational motion and the angular momentum of a particle.
- Identify the correct graph depicting pressure vs volume relationship at constant temperature.
- If at the surface of the earth, the weight of a body is 300 N, then find the same at a depth R/2 below the surface of the earth. (R = radius of earth).
- If the height of a capillary tube is increased from h to H while keeping its volume the same, then what will be the new radius?
- If two inductors are kept next to each other as shown in the diagram given, which of the following will be true?
    - i. They are loose bound
    - ii. They are tight bound
    - iii. They have self-inductance
    - iv. None of these
- Of the given options, find the quantity with which the total energy of a simple harmonic motion is directly proportional.
- There was a theory question on Plane Wavefront.
- What is the correct condition for an LCR circuit to be at resonance?

Chemistry

- Find the packing efficiency of silver metal.
  Answer: 74%
- In the Contact Process, which metal catalyst is used to prepare sulphuric acid?
  Answer: vanadium pentoxide (V_2O_5)
- Identify the homopolymers from the given options.
  Answer: neoprene
- Identify the element with the following electronic configuration: $1s^2 1p^4$
- Identify the graph of a first-order reaction (concentration vs rate).
- What is the value of the specific rotation of the glucose molecule?
  Answer: +52.2
- Which material is the most suitable for manufacturing an electromagnetic substance?
  Answer: iron

- What is the correct expression for enthalpy?
  Answer: H = E+ PV
- What is bond energy?
  Answer: Bond enthalpy is defined as the amount of energy required to break one mole of band of one type, present between two atoms in a gaseous state.
- Which device is used to measure atmospheric pressure?
  Answer: barometer
- Which monomer is used for the synthesis of Teflon?
  Answer: tetrafluoroethylene monomer
- What is the magnetic moment of Cr+2?
  Answer: 4.90 BM
- What is the oxidation number of Scandium?
  Answer: +3
- A question on Packing efficiency.
- A question on Dry Cell - Reduction.
  Answer: MnO2
- What catalyst is used in the conversion of Alkyl Halide to Alkyl Nitrate?
  Answer: R-X +KO-N=0R-O-N=0 + KX
- Which thermodynamic process exchanges heat with the system and surrounding?
  Answer: adiabatic process
- Which of the following compounds is not a gel?
  Answer: milk
- Pka was given find pH.
  Answer: pH = pKa + log(A) / (HA)
- Find the number of atoms in one mole of simple cubic structure.
  Answer: one
- A and B are atoms, A occupies corners of cube and B occupies wach face of cube, what is the molecular formula of structure?
  Answer: AB3
- Elevation in boiling point is given, find molality.
  Answer: $\Delta Tb = kb \times m$
- ΔU and W is given, find H.
  Answer: $\Delta H = \Delta U + W$
- Magnetic dipole in Sc+2.
  Answer: 1.73

MATHEMATICS

- Find the differentiation of $\cot^{-1}((3 + 4\tan x)/(4 - 3\tan x))$.
- Statements p and q were given and it was stated that $p \rightarrow p \wedge \sim q$ is false, then identify the true statement.
- Find $[(f(x+h) - f(x-h))/h]$.