22. The temperatures at which the molecules of first two members of the homologous series of alkanes will have the same root mean square speed as carbon dioxide gas has at 770 K are respectively

   A. 525 K and 280 K

   B. 265 K and 513 K

   C. 290 K and 527 K

   D. 280 K and 525 K

23. Methane reacts with excess of chlorine to produce two compounds, X and Y. The properties of X and Y are :

   (i) Compound X turns blue litmus red.

   (ii) Compound Y contains 92.2% chlorine and has no effect on blue litmus paper.

   X and Y are respectively

   A. CCl_4 and HCl

   B. HCl and $CHCl_3$

   C. HCl and CCl_4

   D. H_2O and CH_2Cl_2

24. The first (Δ_iH_1) and second (Δ_iH_2) ionisation enthalpies (in kJ mol^{-1}) and the electron gain enthalpy ($\Delta_{eg}H$) (in kJ mol^{-1}) of the elements I, II, III, IV and V are given :

Element	Δ_iH_1	Δ_iH_2	$\Delta_{eg}H$
I	520	7300	–60
II	419	3051	–48
III	1681	3374	–328
IV	1008	1846	–295
V	2372	5251	+48

Among these elements, the most reactive metal and the least reactive element are respectively

   A. I and V

   B. V and II

   C. II and V

   D. IV and V.

25. The correct order of relative rate of electrophilic addition reaction of the given compounds is

   I.   II.
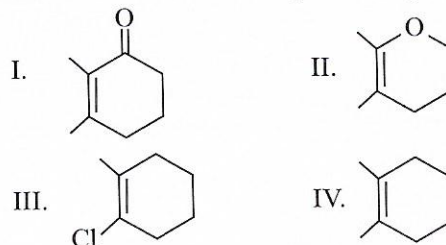
   III.   IV.

   A. I > II > IV > III

   B. II > IV > III > I

   C. II > III > IV > I

   D. IV > I > III > II

SECTION-2
ACHIEVERS SECTION

26. PQ is an inclined plane of inclination 30° with horizontal. Point O is 20 m above point P. A particle is projected horizontally from O leftwards and it collides with the plane PQ perpendicularly. Speed of the particle at the time of projection should be ($g = 10$ m/s^2)
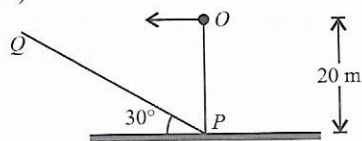
   A. 13 m/s   B. $8\sqrt{3}$ m/s

   C. $4\sqrt{5}$ m/s   D. $2\sqrt{3}$ m/s

27. If the speed (v) of the bob in a simple pendulum is plotted against the tangential acceleration (a), the correct graph will be represented by

   A. I

   C. III

   B. II

   D. IV
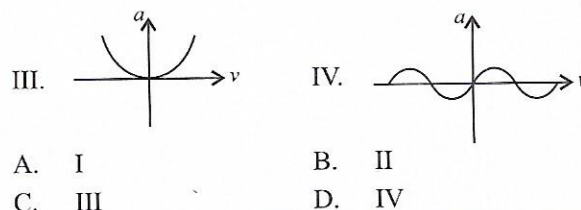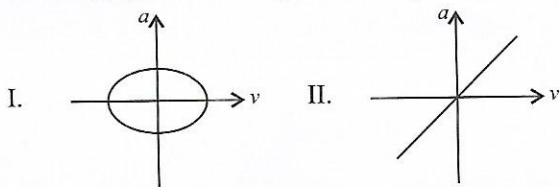
Direction (Q. No. 28 and 29) : Read the given passage and answer the following questions.

An inorganic compound (P) imparts green colour to flame. (P) also produces a colourless gas (Q) and colourless solution (R) with dil. CH_3COOH. Solution (R) produces white ppt. with Na_2SO_4 but does not produce ppt. with $NaCl$. Gas (Q) produces black ppt. with $AgNO_3$ solution.

28. $P \xrightarrow{\text{BaSO}_4, \Delta}$ Residue + gas 'S'

   Select the incorrect statement about gas 'S'.

   A. It is triatomic.

   B. It produces yellow ppt. with gas Q in aqueous solution.

   C. It produces water soluble salt with KOH solution.

   D. It produces black ppt. with $AgNO_3$ solution.