

COMBINED COMPETITIVE EXAMINATION (MAIN)

CHEMISTRY

Paper—I

Time : 3 hours

Full Marks : 200

Note : (1) The figures in the right-hand margin indicate full marks for the questions.

(2) Attempt **five** questions in all.

(3) Question No. 1 is compulsory.

1. Answer any ten of the following : 4×10=40

- (a) Write down the possible formula and nature of chemical bond between two atoms A and B with atomic numbers 16 and 20 respectively.
- (b) Give the electronic configuration of Fe^{3+} and Cu^{2+} .
- (c) "To detect chlorine in chlorobenzene, AgNO_3 is not suitable." Explain.
- (d) What is chemical potential? Give the physical significance of it.
- (e) Calculate the packing fraction for an FCC unit cell.
- (f) How can the order of an unknown reaction be determined by differential method? Discuss briefly.
- (g) State Kohlrausch's law of independent ion migration.
- (h) Explain the condition for a molecule to absorb light.
- (i) Determine the magnetic moment value from the spin only formula for high-spin Co^{3+} and low-spin Mn^{2+} ions.
- (j) Draw the structure of $\text{Fe}_3(\text{CO})_{12}$.
- (k) Show that an irreversible process leads to entropy production.
- (l) Comment on the magnetic properties of (i) potassium ferricyanide and (ii) hexachloronickel(II) ion.

