Use separate answer-sheet for each paper **(Answer of each paper should be limited to one A4 size page)**
Notation and symbols have their usual meaning.

Time: 2 Hours   Full Marks: 20

Paper: MAG 401
(Continuum Mechanics-III)

Answer **any one** question. Only the **first** answer will be evaluated.   1×5=5

1. Define Reynolds number. Discuss its significance for motion of viscous fluid.   (1+4)
2. (a) Obtain Euler's equation of motion for inviscid fluid in vector invariant form.
    (b) Write down the equation of continuity satisfied by incompressible fluid.   (4+1)

Paper : MAG 402
Unit-I (Elements of Quantum Mechanics)

Answer **any one** question .Only the **first** answer will be evaluated.   1x3=3

1. Write down Schroding equation for one-dimensional harmonic oscillator.
2. State Bohr's postulates on atomic model .

Unit-II (Chaos and Fractals)

Answer **any one** question .Only the **first** answer will be evaluated.   1x2=2

1. What is similar dimension of fractals?
2. Define topological conjugacy between two maps.

Paper : MAS 403
(Viscous Flows, Boundary Layer Theory & Magneto-Hydrodynamics-II)
Special Paper-I

Answer **any one** question. Only the **first** answer will be evaluated.   1×5=5

1. (a) What is pinch effect?
    (b) Obtain the expression for Lorentz force under MHD approximations.   (2+3)
2. (a) Define Hartmann number and give its physical significance .
    (b) State Cowling theorem.   (1+2+2)

Paper : MAS 404
(Advanced Operations Research-II)
Special Paper-II

Answer **any one** question. Only the **first** answer will be evaluated.   1×5=5

1. (a) State Poisson axioms of arrivals of a queuing system .
    (b) Write down the dual of the primal problem with equality constraints by geometric programming
        technique.   (3+2)
2. (a) Write down the algorithm of dynamic programming technique for solving an optimization problem .
    (b) What is the Traffic intensity?   (4+1)