Total Pages : 3 Roll. No. : .....

Examination Session June-2022

(Fourth Semester)

MT-607

M.A. MATHEMATICS (MSCMT/MAMT)

[Viscous Fluid Dynamics - II]

Time : 2 Hours] **[Max. Marks : 40**

Note : This paper is of Forty (40) marks divided into two (02) Section A and B. Attempt the questions contained in these sections according to the detailed instructions given therein.

SECTION—A

(Long-Answer-Type Questions)

Note : Section 'A' contains five (05) long-answer-type questions of Ten (10) marks each. Learners are required to answer any two (02) questions only. 2×10=20

1. Discuss the starting flow in plane Couette motion.

2. Discuss the temperature distribution in pipe :

   (a) When the wall of the pipe is kept at a constant temperature.

   (b) When the wall of the pipe is kept at a uniform temperature gradient.

3. Explain Stoke's flow past a sphere.

4. Explain Oseen's flow past a sphere.

5. Discuss the Prandtl's leyer theory and also define the followings :

   (a) Boundary layer thickness 'δ'

   (b) Displacement thickness 'δ_1'

   (c) Momentum thickness 'δ_2'

   (d) Skin Friction

SECTION—B

(Short-Answer-Type Questions)

Note : Section 'B' contains Eight (08) short-answer-type questions of Five (05) marks each. Learners are required to answer any four (04) questions only. 4×5 = 20

1. Discuss the temperature distribution between two concentric rotating cylinders.

2. Write a note on boundary layer theory.

3. Derive two-dimensional boundary layer equation for the viscous incompressible fluid flow past a thin plate.

4. Discuss the boundary layer flow over a flat plate.

5. Obtain an expression for the flow between two parallel Porous plates.

6. Discuss the temperature distribution of plane-Couette flow with transpiration cooling.

7. Obtain Croccos's first integral for $P_r = 1$.

8. Explain velocity Boundary layer equation in two dimensional form.

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