BRAINWARE UNIVERSITY

Term End Examination 2024-2025
Programme – B.Tech.(ME)-2021
Course Name – Computational Fluid Dynamics
Course Code - PEC-ME702A
(Semester VII)

Full Marks : 60 **Time : 2:30 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A
(Multiple Choice Type Question) 1 x 15=15

1. *Choose the correct alternative from the following :*

(i) Recognize the accurate form of momentum equation which represent the one-diamensional, steady state, compressible flow of a Newtonian fluid.

a) $\rho u\frac{\partial u}{\partial x}=\frac{-\partial p}{\partial x}+\frac{\partial^2 u}{\partial x^2}+f$

b) $u\frac{\partial u}{\partial x}=\frac{-\partial p}{\partial x}+\mu\frac{\partial^2 u}{\partial x^2}+f$

c) $\rho u\frac{\partial u}{\partial x}=\frac{-\partial p}{\partial x}+\mu\frac{\partial^2 u}{\partial x^2}+f$

d) $\rho u\frac{\partial u}{\partial x}=\mu\frac{\partial^2 u}{\partial x^2}+f$

(ii) Identify the accurate statement which describes the no-slip boundary conditions.

a) The velocity of the fluid at the solid boundary is equal to the velocity of the boundary itself.

b) The velocity of the fluid at the solid boundary is not equal to the velocity of the boundary itself.

c) The velocity of the fluid at the solid boundary is opposite to the velocity of the boundary itself.

d) The velocity of the fluid at the solid boundary is equal to the nominal fluid velocity at the boundary.

(iii) Considering the incompressible flow, recognize the incorrect statement.

a) Mass continuity equation is satisfied.

b) Volumetric strain rate acting on a fluid particle is zero.

c) Density of the fluid must be constant.

d) $\frac{D\rho}{Dt}=0$

(iv) Choose the incorrect statement.

a) For Non-Newtonian fluids, the relationship between stress tensor and deformation rate is linear.

b) The deviatoric stress tensor, is invariant to coordinate transformation comprising