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| **Program: B.Tech Mechanical** | | |
| **Course: F.M.-II ; Semester: 5th** | | |
| **Course Code: BMEE1-562** | | **NBA Code: C-354** |
| CO No. | **COs (Course Outcomes):** On the successful completion of course, students will be able to: | |
| 1 | Understand the concept of potential flow | |
| 2 | Understand Navier- stokes and its application | |
| 3 | Understand the aspects of turbulence and turbulent flow | |
| 4 | Explain the development of boundary layer. | |
| 5. | Explain the nature of flow past simple geometries | |
| 6. | Set up an expression for the velocity of propagation of pressure wave. | |

**QUESTION BANK**

1. Define uniform flow? Explain it briefly.
2. Explain Doublet flow showing streamlines and the potential lines.
3. The average velocity in fully developed laminar pipe flow is ……………….of the maximum velocity.
4. The region downstream from the point of separation is called …………..and Boundary layer separation is caused by which ………gradient
5. For a source flow, the flow is in ……….direction and …….velocity is zero.
6. Explain the terms Mach number, mach cone, Mach line and Mach angle.
7. The flow field within the oval contour of Rankine body is due …………….and…………………….
8. Find the sonic velocity for the crude oil of specific gravity 0.8 and bulk modulus 15.3 x 108 N/m2.
9. Why air flowing at low velocities can be considered incompressible ?
10. Define Turbulence intensity.
11. A free stream flow at 8m/s is superimposed on a source placed at the origin. If the stagnation point occurs at (-0.34,0), make calculations for the strength of source, maximum width of Rankine half body, and the flow velocity at point P (1.5, п/2) in the flow field.
12. Derive the expression for Vr and Vϴ of Flow past a cylinder.
13. For a doublet of strength 20m2/s, Calculate the velocity at point P(1,2) and the value of stream function passing through it.
14. Derive the expression for maximum height h of the Rankine Oval Body.
15. Define Scale of of Turbulence
16. Derive the Relationship between shear stress and pressure gradient.
17. Calculate the friction drag on a plate 15 cm wide and 45cm long placed longitudinally in a stream of oil (specific gravity 0.0925 and kinematic viscosity 0.9 stokes) flowing with a free stream velocity of 6 meters per second. Also find the thickness of the boundary layer and shear at the trailing edge
18. For laminar flow between two fixed parallel plates, the Shear stress is……………………..at the wall boundary.
19. What do you understand by boundary layer?
20. Cite some examples of boundary layer formation.
21. Derive the Von-Karman momentum integral equation fo flow past a flat plate
22. Explain the development of boundary layer along a thin flat and smooth late held parallel to uniform flow point out the salient features.
23. Derive the equation of pressure difference existing between the top and bottom of cylinder with circulation.
24. Derive Navier -Stokes equations of motion.
25. Derive Reynolds equations of turbulence.
26. Explain the concepts of real flow and real fluid effects.
27. How does the velocity and pressure vary with area for subsonic and supersonic flow.
28. Explain why air flowing at low velocities can be considered incompressible?
29. Derive the Von-Karman momentum integral equation for flow past a flat plate. Based upon the equation find expressions for the boundary layer thickness, wall shear stress, local skin friction coefficient and the overall drag coefficient for laminar flow over a flat plate.
30. Discuss the basic components of total drag.
31. Establish the continuity , momentum and energy equations for compressible flow.
32. Derive the Max. Velocity and average velocity in 2-D laminar flow between two fixed parallel plates.
33. What are the coefficients of drag and lift?
34. How are the drag and lift forces caused on a body immersed in a moving fluid
35. Two fixed parallel plates kept 8 cm apart have laminar flow of oil between them with a maximum velocity 2 m/s. Taking dynamic viscosity of oil to be µ =2.0 Ns/m2, compute:
36. The discharge per metre width.
37. The shear stress at the plates.
38. The pressure difference between the two points 25 m apart
39. Velocity at 2 cm from the plate.
40. The velocity gradients at the plates end.