

1. Which of the following will be true for the mean velocity of flow for a non-Newtonian fluid?

- a) $v_{av} = \frac{n}{3n+1} \left(\frac{\Delta P}{2KL} \right)^{1/n} R^n$
- b) $v_{av} = \frac{n}{3n+1} \left(\frac{\Delta P}{2KL} \right)^{1/n} R^{\frac{n+1}{n}}$
- c) $v_{av} = \frac{n}{3n+1} \left(\frac{\Delta P}{2KL} \right) R^{\frac{n+1}{n}}$
- d) None of the above

ANSWER: b

2. In a pipe flow of radius r , if the pressure applied is given as ΔP , fluid viscosity is μ and length of the tube is L , the maximum velocity of flow is given by

- a) $v_{max} = \frac{(\Delta P)r^2}{2\mu L}$
- b) $v_{max} = \frac{(\Delta P)r^2}{4\mu L}$
- c) $v_{max} = \frac{(\Delta P)r^2}{8\mu L}$
- d) None of the above

ANSWER: b

3. Under what limiting condition, the equation of non-Newtonian fluid becomes identical to equation of Newtonian fluid?

- a) $n = 1$ and $K = \mu$
- b) $n = 2$ and $K = \mu$
- c) $n > 1$ and $K = \mu$
- d) $n < 1$ and $K = \mu$

ANSWER: a

4. In case of Non-Newtonians fluid, slope of the line drawn between shear stress and shear rate is called as

- a) Absolute viscosity
- b) dynamic viscosity
- c) Kinematic viscosity
- d) Apparent viscosity

ANSWER: d

5. In a pipe flow, the relationship between the maximum velocity of flow and the mean velocity across a cross section at any time is given by

- a) $v_{\max} = 2 * v_{\text{mean}}$
- b) $v_{\max} = 4 * v_{\text{mean}}$
- c) $v_{\max} = 8 * v_{\text{mean}}$
- d) None of the above

ANSWER: a

6. For dilatant fluids

- a) Apparent viscosity remains constant with shear rate
- b) Apparent viscosity decreases with shear rate
- c) Apparent viscosity increases with shear rate
- d) None of the above

ANSWER: c

7. Generalised coefficient of viscosity γ is given as

- a) $\gamma = K' \dot{\gamma}^{n-1}$
- b) $\gamma = K' \dot{\gamma}^{n'-1}$
- c) $\gamma = K' \dot{\gamma}^{n+1}$
- d) $\gamma = K' \dot{\gamma}^{n'+1}$

ANSWER: b

8. Generalised Reynolds number $N_{Re,gen}$ is given as

a)
$$N_{Re,gen} = \frac{v_{av}^{2-n'} D^{n'} \rho}{\gamma}$$

$$b) \quad N_{Re,gen} = \frac{v_{av}^{2-n} D^n \rho}{\gamma}$$

$$c) \quad N_{Re,gen} = \frac{v_{av} D \rho}{\mu'}$$

d) Both a and c

ANSWER: d

9. The maximum velocity of Non-Newtonian fluid flow through slit is given as

$$a) \quad v_{max} = \frac{n}{n+1} \left(\frac{\Delta P}{KL} \right)^{1/n} \delta^{\frac{n+1}{n}}$$

$$b) \quad v_{max} = \frac{n}{2n+1} \left(\frac{\Delta P}{KL} \right)^{1/n} \delta^{\frac{n+1}{n}}$$

$$c) \quad v_{max} = \frac{n}{3n+1} \left(\frac{\Delta P}{KL} \right)^{1/n} \delta^{\frac{n+1}{n}}$$

d) None of the above

ANSWER: a

10. For the Non-Newtonian fluid flow through slit, which of the following is correct?

$$a) \quad v_{av} = \frac{2n+1}{n+1} v_{max}$$

$$b) \quad v_{av} = \frac{n+1}{2n+1} v_{max}$$

$$c) \quad v_{av} = \frac{n+1}{3n+1} v_{max}$$

$$d) \quad v_{av} = \frac{2n+1}{3n+1} v_{max}$$

ANSWER: b