1. The inclination of the failure plane behind a vertical wall in the passive pressure case is inclined to the horizontal at
   a) $45^o - \varphi/2$
   b) $45^o - \varphi$
   c) $45^o + \varphi/2$
   d) $45^o + \varphi$ Ans: a
2. The yield of a retaining wall required to reach plastic equilibrium in active case is
   a) More than that in the passive case.
   b) Less than that in the passive case.
   c) Equal to that in the passive case.
   d) None of the above. Ans: b
3. The active earth pressure coefficient Ka generally refers to
   a) Effective stresses.
   b) Total stresses.
   c) Neutral stresses.
   d) All of the above. Ans:a
4. The active pressure caused by a cohesionless backfill on a smooth vertical retaining wall may be reduced by
   a) Compacting the backfill.
   b) Providing a surcharge load on the backfill.
   c) Saturating the backfill with water.
   d) None of the above. Ans: a
5. The total active pressure after the development of tension cracks is equal to
   a) $0.5\Upsilon H^2K_a-2c'H\sqrt{K_a}$
   b) $0.5\Upsilon H^2K_a+2c'H\sqrt{K_a}$
   c) $0.5\Upsilon H^2K_a-2c'H\sqrt{K_a}-2(c')^2/\Upsilon$
   d) $0.5\Upsilon H^2K_a-2c'H\sqrt{K_a}+2(c')^2/\Upsilon$ Ans: d
6. The radius of the friction circle is equal to
   a) $R\sin\varphi$
   b) $R\cos\varphi$
   c) $R\tan\varphi$
   d) $R\varphi$ Ans: a
7. If a uniform surcharge of $120kN/m^2$ is placed on the backfill with $\varphi'=30^o$, the increase in pressure is

a) $12kN/m^2$
b) $30kN/m^2$
c) $40kN/m^2$
d) $120kN/m^2$ Ans: c