2014-CE-14-26

EE24BTECH11001 - ADITYA TRIPATHY

14. For a saturated cohesive soil, a triaxial test yields the angle of internal friction (ϕ) as zero. The conducted soil test is (2014 – CE)

    a) Consolidated Drained (CD) test
    b) Consolidated Undrained (CU) test
    c) Unconfined Compression (UC) test
    d) Unconsolidated Undrained (UU) test

15. The action of negative skin friction on the pile is to (2014 – CE)
    a) increase the ultimate load on the pile
    b) reduce the allowable load on the pile
    c) maintain the working load on the pile
    d) reduce the settlement of the pile

16. A long slope is formed in a soil with shear strength parameters: $c' = 0$ and $\phi' = 34^{\circ}$. A firm stratum lies below the slope and it is assumed that the water table may occasionaly rise to the surface, with seepage taking place parallelto the slope. Use $\gamma_{sat} = 18kN/m^3$ and $\gamma_w = 10kN/m^3$. The maximum slope angle (in degrees) to ensure a factor of safety of 1.5, assuming a potential failure surface parallel to the slope, would be (2014 – CE)

    a) 45.3 b) 44.7 c) 12.3 d) 11.3

17. An incompressible homogenous fluid is flowing steadily in a variable diameter pipe having the large and small diameters as 15cm and 5cm, respectively. If the velocity at a section at the 15cm diameter portion of the ipe is 2.5m/s, the velocity of the fluid (in m/s) at a section falling in 5cm portion of the pipe is (2014 – CE)

18. A conventional flow duration is a plot between (2014 – CE)
    a) Flow and percentage time flow is exceeded
    b) Duration of flooding and ground level elevation
    c) Duration of water supply in a city and proportion of area receiving supply exceeding this duration
    d) Flow rate and duration of time taken to empty a reservoir at that flow rate

19. In reservoirs with an uncontrolled spillway, the peak of the plotted outflow hydrograph (2014 – CE)
    a) lies outside the plotted inflow hydrograph
    b) lies on the recession limb of the plotted inflow hydrograph
    c) lies on the peak of the inflow hydrograph
    d) is higher thhan the peak iof the plotted inflow hydrograph

20. The dimension for kinematic viscosity is (2014 – CE)

    a) $\frac{L}{MT}$ b) $\frac{L}{T^2}$ c) $\frac{L^2}{T}$ d) $\frac{ML}{T}$

21. Some of the nontoxic metals normally found in natural water are (2014 – CE)

    a) arsenic, lead and mercury
    b) calcium, sodium and silver

c) cadmium, chromium and copper d) iron, manganese and magnesium

22. The amount of CO_2 generated (in kg) while completely oxidizing one kg of CH_4 to the end products is (2014 – *CE*)
23. The minimum value of 15 minute peak hour factor on a section of a road is (2014 – *CE*)

a) 0.10 b) 0.20 c) 0.25 d) 0.33

24. The following statements are related to temperature stresses developed in concrete pavement slabs with free edges without any restraint
    P. The temperature stresses will be zero during both day and night times if pavement slab is considered weightless
    Q. The temperature stresses will be compressive at the bottom of the slab during night time if the self-weight of the pavement slab is considered
    R. The temperature stresses will be compressive at the bottom of the slab during day time if the self-weight of the pavement is considered

    The TRUE statement(s) is (are) (2014 – *CE*)

a) P only b) Q only c) P and Q only d) P and R only

25. The Reduced Levels (RLs) of the points P and Q are +49.600m and +51.870m respectively. Distance PQ is 20m. The distance (in m from P) at which the +51.000m contour cuts the line PQ is (2014 – *CE*)

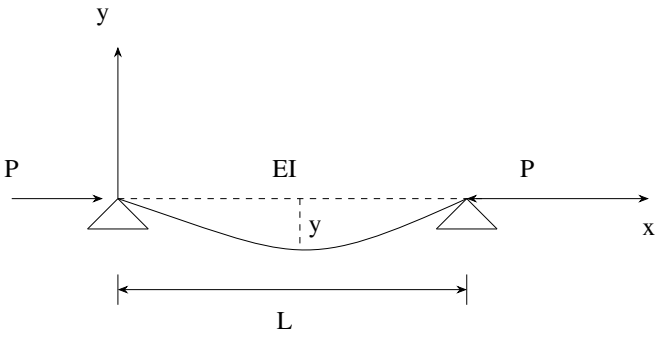
a) 15.00 b) 12.33 c) 3.52 d) 2.27

Q.26 - Q.55 carry two marks each.

26. If the following equation establishes equilibrium in slightly bent position, the mid- span deflection of a member shown in the figure is

$$\frac{d^2y}{dx^2} + \frac{P}{EI}y = 0 \tag{1}$$

If a is amplitude constany for y, then



(2014 – *CE*)

a) $y = \frac{1}{P}\left(1 - a\cos\frac{2\pi x}{L}\right)$ b) $y = \frac{1}{P}\left(1 - a\sin\frac{2\pi x}{L}\right)$

c) $y = a\sin\frac{n\pi x}{L}$ d) $y = a\cos\frac{n\pi x}{L}$