Assignment 7

AI24BTECH11008- Sarvajith

35. The right triangular truss is made of members having equal cross sectional area of $1550mm^2$ and Young's modulus of $2x10^5$ MPa. The horizontal deflection of the joint Q is

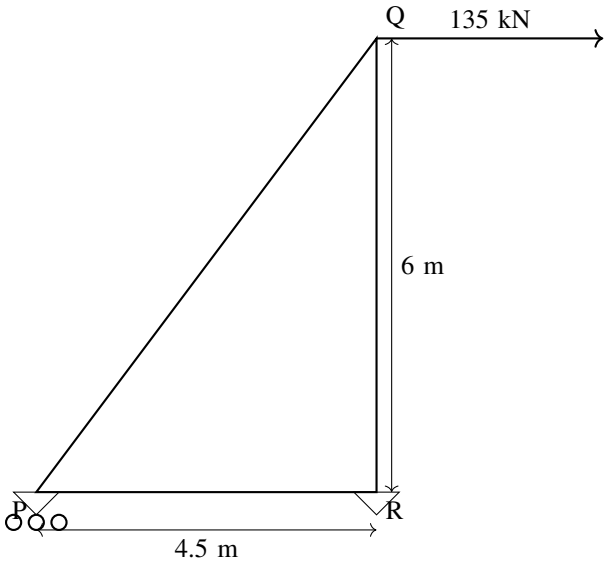
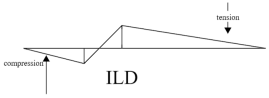


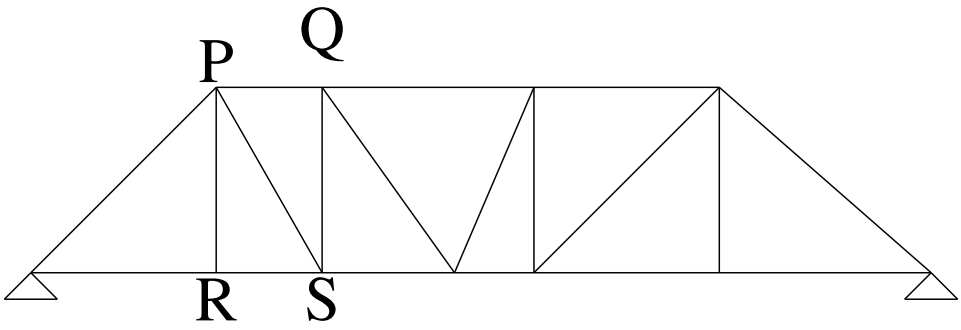
Fig. 0.1: 1

A. 2.47mm
B. 10.25mm
C. 14.10mm
D. 15.68mm

36. The influence line diagram (ILD) shown is for the member



A. PS
B. RS
C. PQ



D. QS

37. Consider the following statements:
    a) The compressive strength of concrete decreases with increase in watercement ratio of the concrete mix.
    b) Water is added to the concrete mix for hydration of cement and workability.
    c) Creep and shrinkage of concrete are independent of the water-cement ratio in the concrete mix

    The true statements are

    A. a and b
    B. a,b and c
    C. b and c
    D. only b

38. The percentage loss of prestress due to anchorage slip of 3mm in a concrete beam of length $30m$ which is post-tensioned by a tendon with an initial stress of 1200 $\frac{N}{mm^2}$ and modulus of elasticity equal to $2.1x10^5 \frac{N}{mm^2}$ is

    A. 0.0175
    B. 0.175
    C. 1.75
    D. 17.5

39. A concrete beam of rectangular cross-section of size 120mm (*width*) and 200mm (*depth*) is prestressed by a straight tendon to an effective force of 150kN at an eccentricity of 20mm (below the centroidal axis in the depth direction). The stresses at the top and bottom fibres of the section are.

    A. $2.5N/mm^2$ $(compression)$, $10\frac{N}{mm^2}$ $(compression)$
    A. $10N/mm^2$ $(tension)$, $3.75\frac{N}{mm^2}$
    A. $3.75N/mm^2$ $(tension)$, $3.75\frac{N}{mm^2}$ $(compression)$
    A. $2.75N/mm^2$ $(compression)$, $3.75\frac{N}{mm^2}$ $(compression)$

40. Consider the following statements:

    I Modulus of elasticity concrete increases with increase in compressive strength of concrete

II Brittleness of concrete increases with decrease in compressive strength of concrete
III Shear strength of concrete increases with increase in compressive strength of concrete.

The true statements are

A. II and III
B. I, II and III
C. I and II
D. I and III

41 A steel flat of rectangular section of size 70 x 6 mm is connected to a gusset plate by three bolts each having a shear capacity of 15kN in holes having diameter 11.5mm. If the allowable tensile stress in the flat is 150MPa, the maximum tension that can be applied to the flat is

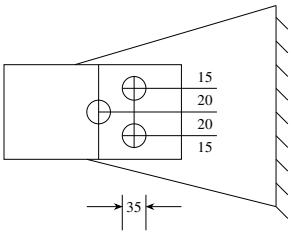


Fig. 0.2: 3

A. 43.2kN
B. 52.65kN
C. 59.5kN
D. 63.0kN

42. A bracket connection is made with four bolts of 10mm diameter and supports a load of 10kN a an eccentricity of 100mm. the maximum force to be resisted by any bolt will be

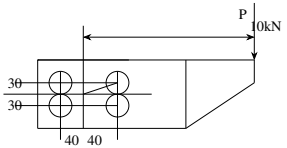


Fig. 0.3

A. 5kN
B. 6.5kN
C. 6.8kN
D. 7.16kN

43. The plastic collapse load W_p for the propped cantilever supporting two point loads as shown in the figure in terms of plastic moment capacity, M_p is given by

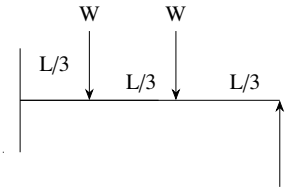


Fig. 0.4

A. $3\frac{M_p}{L}$
B. $4\frac{M_p}{L}$
C. $5\frac{M_p}{L}$
D. $6\frac{M_p}{L}$

44. Sieve analysis on a dry soil sample of mass 1000g showed that 980g and 270g of soil pass through 4.75mm and 0.075mm sieve, respectively. The liquid limit and plastic limits of the soil fraction passing through 425μ sieves are 40% and 18% respectively. The soil may be classified as

A. SC
B. MI
C. CI
D. SM

45. The water content of a saturated soil and the specific gravity of soil solids were found to be 30% and 2.70, respectively. Assuming the unit weight of water to be $10\frac{kN}{m^3}$, the saturated unit weight $\left(\frac{kN}{m^3}\right)$, and the void ratio of the soil are

A. 19.4, 0.81
B. 18.5, 0.30
C. 19.4, 0.45
D. 18.5, 0.45

46. The factor of safety of an infinite soil slope shown in the figure having the properties $c = 0, c = 0, \phi = 35\,\text{deg}, \gamma_{dry} = 16\frac{kN}{m^3}\text{and}\gamma_{sat} = 20\frac{kN}{m^3}$ is approximately equal to

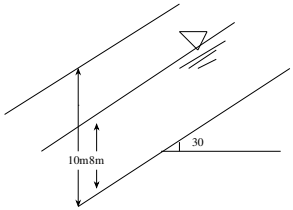


Fig. 0.5

A. 0.70
B. 0.80
C. 1.00

D. 1.20

47. **Match the following groups:**

Group - I	Group - II
P. Constant head permeability test	1. Pile foundations
Q. Consolidation test	2. Specific gravity
R. Pycnometer test	3. Clay soil
S. Negative skin friction	4. Sand

Options:

A P-4, Q-3, R-2, S-1
B P-4, Q-2, R-3, S-1
C P-3, Q-4, R-2, S-1
D P-4, Q-1, R-2, S-3

48. The bearing capacity of a rectangular footing of plan dimensions 1.5m x 3m resting on the surface of a sand deposit was estimated as 600 $\frac{kN}{m^2}$ when the water table is far below the base of the footing. The bearing capacities in $\frac{kN}{m^2}$ when the water level rises to depths of 3m, 1.5m and 0.5m below the base of the footing are:

A 600, 600, 400
B 600, 450, 350
C 600, 500, 250
D 600, 400, 250

49. What is the ultimate capacity in kN of the pile group shown in the figure assuming the group to fail as a single block?

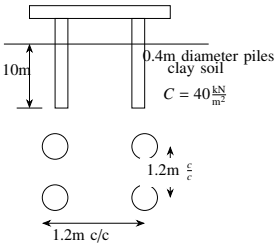


Fig. 0.6: 7

A. 921.6
B. 1177.6
C. 2438.6
D. 3481.6

50. A horizontal water jet with a velocity of $10\frac{m}{s}$ and cross sectional area of $10mm^2$ strikes a flat plate held normal to the flow direction. The density of water is 1000 $\frac{kg}{m^3}$. The total force on the plate due to the jet is

A. 100N
B. 10N
C. 1N

D. 0.1N

51. A 1:50 scale model of a spillway is to be tested in the laboratory. The discharge in the prototype is $1000\frac{M^3}{s}$. The discharge to be maintained in the model test is

A. $0.057\frac{m^3}{s}$

B. $0.08\frac{m^3}{s}$

C. $0.57\frac{m^3}{s}$

D. $5.7\frac{m^3}{s}$

References

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