Assignment

EE24BTECH11038 - Malakala Bala Subrahmanya Aravind

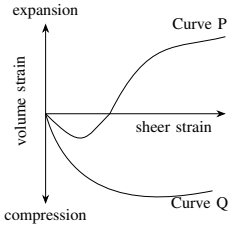
1) Contractor X is developing his bidding strategy against Contractor Y.The ratio of Y‘s bid price to X‘s cost for the 30 previous bids in which contractor X has competed against Contractor Y in the given table

Ratio of Y‘s bid price to x‘s cost	**Number of bids**
1.02	6
1.04	12
1.06	3
1.10	6
1.12	3

Based on bidding behaviour of the contractor Y,the probability of winning against Contractor Y at a mark up of 8% for the next project is

a) 0%
b) more than 0% and less than 50%
c) more than 0% and less than 100%
d) 100%

2) Based on drained triaxial shear test on sands and clays the reprsentative variations of volumetric strain $\frac{\Delta v}{v}$ with the shear strain (γ) is shown in the figure.



choose the CORRECT option regarding the representative behaviour exhibited by curve P and curve Q.

a) Curve P represents dense sand and overconsolidated clay,while curve Q represents loose sand and normally consolidated clay
b) Curve P represents dense sand and normally consolidated clay,while curve Q represents loose sand and overconsolidated clay
c) Curve P represents loose sand and overconsolidated clay,while curve Q represents dense sand and normally consolidated cay

d) Curve P represents loose sand and overconsolidated clay,while curve Q represents dense sand and consolidated clay

3) A fluid flowing steadily in a cirucar pipe of radius R has a velocity that is everywhere parllel to the axis of the pipe The velocity distribution along the radial direction is $V_r = U\left(1 - \frac{r^3}{R^2}\right)$ where r is the radial distance as measured fromthe pipe axis and U is the maximum velocity at r=0.the average velocity in the pipe is

a) $\frac{U}{2}$
b) $\frac{U}{3}$
c) $\frac{U}{4}$
d) $\frac{5U}{6}$

4) A water sample is analyzed for coliform organisms by the multiple-tube fermentation method. The results of confirmed test are as follow:

sample size	Number of positive results out of 5 test tubes	number of negative result
0.01	5	0
0.001	3	2
0.0001	1	4

the most proable number(MPN)of coliform organisms for the above results is to obtained using the following MPN index.

MPN index for various combinations of positive results when five tubes are used per di	
Combination of positive tubes	**MPN index per 100ml**
0-2-4	11
1-3-5	19
4-2-0	22
5-3-1	110

a) 1100000
b) 110000
c) 1100
d) 110

5) Ammonia nitrogen is present in a given wastewater sample as the ammonium ion $\left(NH_4^+\right)$ and ammonia (NH_3). If pH is the only deciding factor for the proportion of these two constituents, which of the following is a correct statement?

a) At pH above 9.25, only $\left(NH_4^+\right)$ will be present
b) At pH below 9.25, (NH_3) will be predominant
c) At pH 7.0, $\left(NH_4^+\right)$ and (NH_3) will be found in equal measures.
d) At pH 7.0, $\left(NH_4^+\right)$ will be predominant.

6) On a road, the speed-density relationship of a traffic stream is given by u = 70 - 0.7k At the capacity condition, the average time headway will be

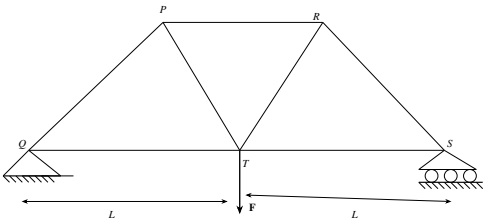
a) 0.5 s
b) 1.0 s
c) 1.6 s
d) 2.1 s

7) the values of abscissa(x) and ordinate (y) of a curve are as follow

X	Y
2	5
2.5	7.25
3	10
3.5	13.25
4	17

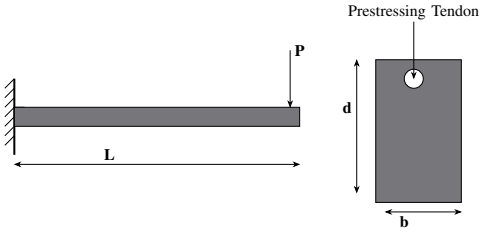
By simpson's $\frac{1}{3}$rd rule the area under the curve is

8) Refer the truss as shown in the figure If load ,**F** = $10\sqrt{3}KN$ moment of inertia



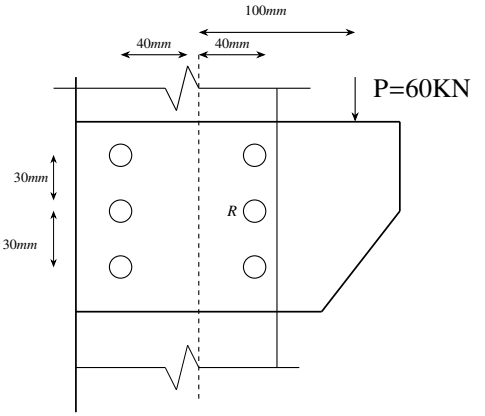
I = $8.33 \times 10^6 mm^4$area of crossection ,A=$10^4 mm^2$ and length L=2m for all the members of the truss the compressive stress carried by member Q-R is

9) A prismatic cantilever prestressed concrete beam of span length, L = 1.5m has one straight tendon placed in the cross-section as shown in the following figure (not to scale). The total prestressing force of 50 kN in the tendon is applied at d_p = 50mm from the top in the cross-section of width, b = 200mm and depth, d = 300mm If

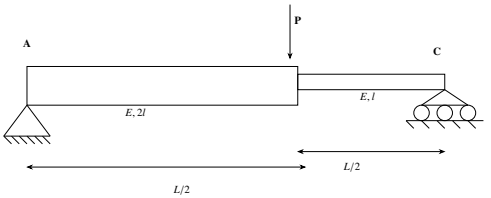


the concentrated load,P = 5KN the resultant stress (in MPa, in integer) experienced at point 'Q' will be

10) A column is subjected to a total load P of 60 kN supported through a bracket connection, as shown in the figure (not to scale). The resultant force in the bolt R

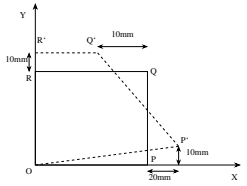


11) Employ stiffness matrix approach for the simply supported as shown in the figure to calculate unknown displacements/rotations. Take length ,L=8m modulus of elasticity ,E=$3\times10^4 N/mm^2$ moment of inertia I=$225\times10^6 mm^4$ The mid-span deflection of the



beam in mm under P=100KN in downward direction will be

12) A square plate O-P-Q-R of a linear elastic material with sides 1.0m is loaded in a state of plane stress under a given stress condition the plate deforms ti a new configuration O-P'-Q'-R' as shown in the figure Under the given deformation the edges of aplate remain straight.



13) A small project has 12 activities -N,P,Q,R,S,T,U,V,W,X,Y and Z the relationship among these activities and the duration of these activities are given in the table. The total float of activity ”V” in integer

Activity	**Duration**	**Depends upon**
N	2	-
P	5	N
Q	3	5
R	4	p
S	5	Q
T	8	R
U	7	R,S
V	2	U
W	3	U
X	5	T,V
Y	1	W
Z	3	X,Y