CODE NO:- Z-229

FACULTY OF ENGINEERING & TECHNOLOGY
S.E (Civil) Year Examination - June – 2015
Strength of Materials
(Revised)

[Time: Three *Hours*]   [Max. Marks:80]

"Please check whether you have got the right question paper."

i) Q. No.1 and Q.No.6 are compulsory. Attempt <u>any two</u> questions from the remaining questions from each section.
ii) Draw neat sketches wherever necessary.
iii) Figures to the right indicate full marks.
iv) Assume suitable data wherever necessary.

SECTION-A

Q.1   Answer the following (<u>any five</u>)   10
     a) Enlist types of stresses & strain
     b) Define Elasticity.
     c) Explain compound and composite Bar.
     d) Define Modulus of elasticity.
     e) Define neutral axis
     f) Define modular radio.
     g) Enlist type of loading
   h) Define sheer force.

Q.2   a) A member ABCD is subjected to point load as shown in fig. Determine force p_2 and total elongation of the   08
member assuming $E = 2.01 \times 10^5 \text{N}/mm^2$
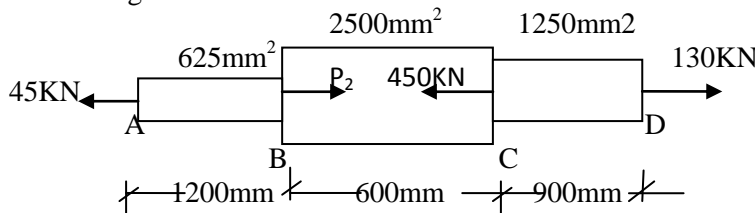
    b) A steel rod ABCD 9m long & 50mm in diameter is subjected to the forces as shown in fig. If value of young's   07
Modulus. For steel is 200Gpa , determine its deformation
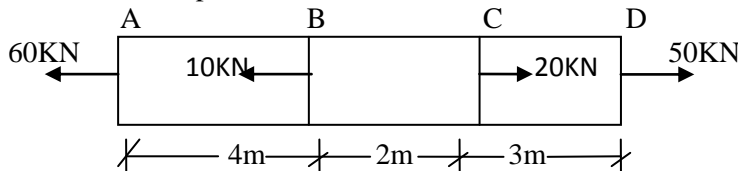
Q.3   Draw shear force and bending Moment Diagram for the cantilever beam shown in fig.   15
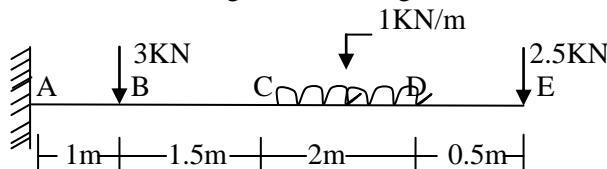
Q.4   A simply supported beam having T- section with flange size 150mm×50mm& web is 50mm × 150mm. If a   15
moment of 64KNm is applied around th horizontal neutral axis , including tension below the neutral axis. Find
bending stresses at both the extreme fibers of the cross-section.

Q.5 a) A bar of steel 25mm in diameter is subjected to an axial tension load of 200KN if E $=2\times 10^5 N/MM^{2,}$ $\mu = 0.3$. 08
         Determine change inlength , diameter & volume of the bar : Length of bar is 1.5m.
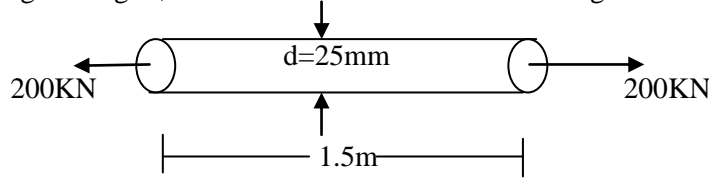
     b) Derive expression for shearing stess at a section in a loaed beam.   07

                                            SECTION-B

Q.6   Answer the following (<u>any five</u>)   10
             a) Define strain energy.
             b) Define Limit of eccentricity.
             c) Define direct and bending stress
             d) Define principal stress & planes .
             e) Define modulus of resilence .
             f) Explain core or Kernal of section .
             g) What are limitations in Euler's theory.
             h) What are the assumptions in theory of torsion.

Q.7 a) A hollw cirurlar shaft 200mm external diametr & 160mm internal diameter transmitting power at 180RPM the 08
         angle of twist on a length of 2m is found to be 0.55 Calculate power transmitted & Maximum shear stress take
         c=0.8$\times 10^5$Mpa.
     b) A steel bar 3m long and $2500 mm^2$ in area hangs vertically which is seccurely fixed on a collor at its lower end . 07
         If a weight of 15KN falls on the collor from a hight of 10mm, determine the stress developed in the bar ? What
         will be strain energy stroed in bar? Take E= 200Gpa.

Q.8 a) A short I- secction column carries a compressive load of 120 KN at the mid point of one flange . Determine the 08
         extreme stresses for the section .
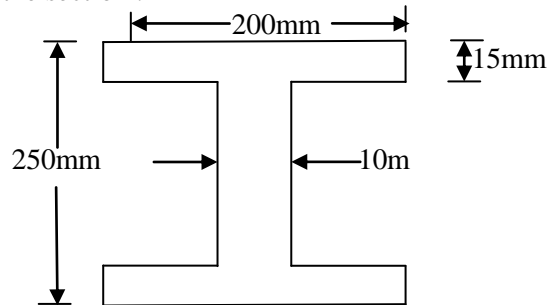
     b) A cylindrical shall 3m long has 1.2m internal diameter & 16mm thickness Calculate the circumferential and 07
         longitudinal stresses induced and changes in the dimension of shell.If it is subjected to an internal pressure of
         1.5N/MM^2 ,Take E= 2.1$\times 10^5 N/MM^2$ μ=0.3

Q.9   At a point in strained material 120N/mm^2 & 60 N/mm² both tensile find normal stress , tangential stress and 15
         resultant stress, on a plane .inclined at 60℃ to the major principal plane.

Q.10   A hollow cast iron column 100mm internal diameter 25mm thick, 8m long is fixed at both the ends . Calculate 15
         the safe load by using Euler's formula & Rankinels formula
          Take E= 100Gpa ,σ$_c$=550N/mm^2.