Seat No:_____ **Enrollment No:_____**

PARUL UNIVERSITY

FACULTY OF AGRICULTURE

B.Tech. (Agriculture) Summer 2018 - 19 Examination

Semester: 2 **Date: 22/04/2019**
Subject Code: 20103156 **Time: 2.00 pm to 4.00 pm**
Subject Name: Engineering Mechanics and Strength of Materials **Total Marks: 50**

Instructions
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 A) Fill in the blanks (Each of 0.5 Mark) **(05)**

i) Moving train is an example of ____ load.

ii) Stiffness factor for a beam fixed at one end and freely supported at the other is _____.

iii) In a riveted joint , when the number of rivets decreases from the innermost to the outer most row, the joint is said to be_____ .

iv) The strength of welded joints equal to _____ .

v) The slenderness ratio of long column is _____ .

vi) The value of Rankine's constant for mild steel is _____ .

vii) 100mm=_____µm.

viii) If three coplanar non-parallel forces are in equilibrium , then they must be _____.

ix) For simply supported beam B.M. is _____ at the support.

x) The CG of a solid circular cone divides the axis in the ratio _____.

B) Multiple Choice Questions (Each of 0.5 Mark) **(10)**

i) Strain is defined as the ratio of
(a) change in volume to original volume
(b) change in length to original length
(c) change in cross-sectional area to original cross-sectional area
(d) any one of the above

ii) Hooke's law holds good up to
(a) yield point
(b) limit of proportionality
(c) breaking point
(d) elastic limit

iii) Deformation per unit length in the direction of force is known as
(a) strain
(b) lateral strain
(c) linear strain
(d) linear stress

iv) If equal and opposite forces applied to a body tend to elongate it, the stress so produced is called
(a) internal resistanpe
(b) tensile stress
(c) transverse stress
(d) compressive stress

v) Which of the following has no unit
(a) kinematic viscosity
(b) surface tension
(c) bulk modulus
(d) strain

vi) Units of point load is?
(a) KN/m
(b) KN.m
(c) $KN.m^2$
(d) KN

vii) What is mean by over hanging beam?
(a) both end fixed
(b) one end fixed
(c) one or both of the end portions are extended beyond the support
(d) both end free

viii) For simply supported beam B.M. is _____ at the support.
(a) zero
(b) maximum
(c) minimum
(d) none of these

ix) The point at which the total area of a plane figure is asssumed to be concentrated is called
(a) Centroid
(b) Centre of gravity
(c) Central point
(d) Inertial point

x) Unit of strain is
(a) N/m^2
(b) unit less
(c) KN/m
(d) KN.m

xi) The centre of gravity of hemisphere lies at a distance of ____ from its base measured along the vertical radius.
a) 3r/8
b) 3/8r
c) 8r/3
d) 8/3r

xii) U.D.L stands for?
a) Uniformly diluted length
b) Uniformly developed loads
c) Uniaxial distributed load
d) Uniformly distributed loads

xiii) Units of U.D.L?
a) KN/m
b) KN-m
c) KN-m×m
d) KN

xiv) When one plate overlaps the other and both plates are riveted with two rows af rivets, the joint is known as
(a) Single riveted lap joints
(b) Double riveted lap joints
(c) Double riveted single cover butt joints
(d) Double riveted double cover butt joints

xv) A riveted joint may fail due to
(a) Shearing of rivets
(b) Crushing of rivets
(c) Tearing of the plates
(d) All of these

xvi) The effective thickness of a fillet weld is
(a) 0.5S
(b) 0.6S
(c) 0.7S
(d) 0.8S

xvii) The strength of welded joint depends upon
(a) The length of welds
(b) Size of welds
(c) Stress of weld
(d) All of these

xviii) A column of length is hinged at its both ends. Its equivalent length will be equal to
(a) 2L
(b) L
(c) 0.5L
(d) 0.707L

xix) Fixing moment over a simply supported end is
(a) Zero
(b) Negative
(c) Positive
(d) infinity

xx) Stiffness factor for beam simply supported at both end is
(a) 3EI/L
(b) 4EI/L
(c) EI/L
(d) 6EI/L

Q.2 A) Define the following (Any five out of seven questions) **(05)**

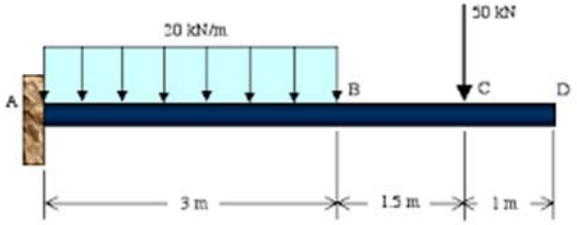
(1) Define strength of materials.
(2) Define hook's law.
(3) Define column?
(4) Define centre of gravity?
(5) Describe scaler quantities.
(6) Define moment of inertia?
(7) Define friction?

B) Answer the following (Any five out of seven questions) **(05)**

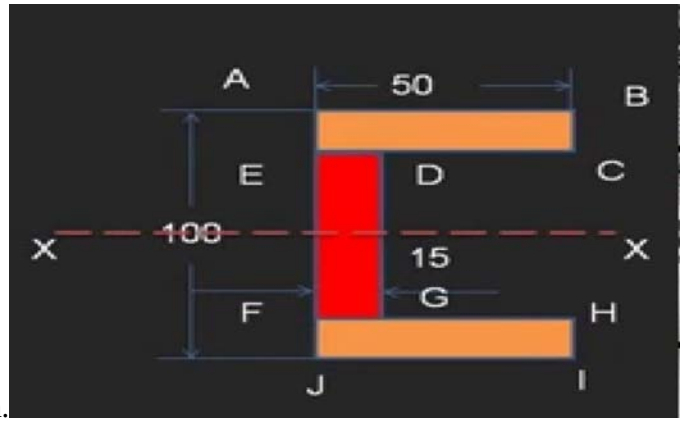
(1) Define strut?
(2) Describe vector quantities.
(3) Define stiffness.
(4) Define carry over moment
(5) Define distribution factor.
(6) Define fixed end moments.
(7) What is Euler's formula?

Q.3 Write Short notes (Any five out of six questions) **(10)**

(1) Find the reaction.



(2) Find the center of gravity of a channel section



100mm*50mm*15mm.

(3) Give the advantage and disadvantage of welded joints.

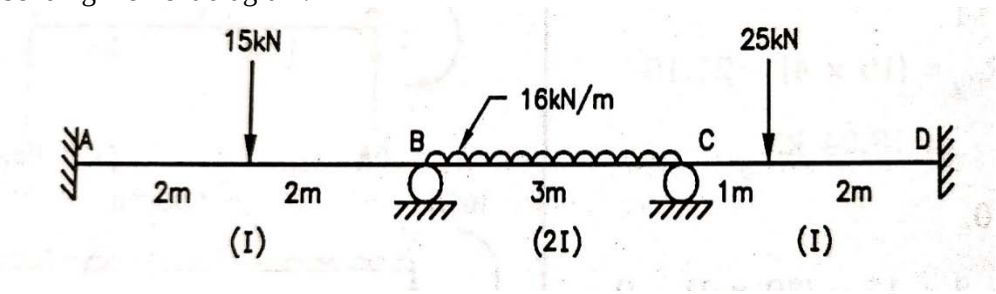
(4) Describe the common types of riveted joints.

(5) Differentiate between long columns and short columns.

(6) Write Short note of slenderness ratio.

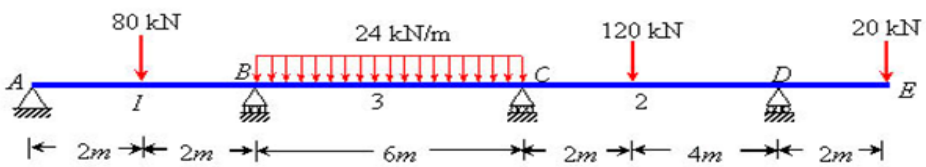
Q.4 Long Questions (Any three out of four questions) **(15)**

(1) Analyse the beam as shown in figure by moment distribution method and draw bending moment diagram.



(2) A simply supported beam of span 9m carries two point loads 210 KN & 125 KN at 2m & 6m from left supports. The self weight of the beam is 26 KN/m . Determine maximum slope and deflection at the centre. EI is constant. (using double integration techniques)

(3) Analyze the continuous beam shown in Figure by the three moment equation. Draw the shear force and bending moment diagram.



(4) Explain the design criteria of wall with opening.