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

PARUL UNIVERSITY

FACULTY OF AGRICULTURE

B.Tech. FOA Winter 2019 - 20 Examination

Semester: 1 **Date: 05/12/2019**
Subject Code: 20103110 **Time: 10:30 am to 12:30pm**
Subject Name: Engineering Mechanics **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) For fixed beam B.M. is _____ at the support.

ii) The forces acting in space but meeting at one point are known_____

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

iv) The scalar quantity is_____

v) Write two type of beam are_____

vi) The center of gravity is_____

vii) 100mm=_____m.

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

ix) The unit of stress is_____

x) The unit of coefficient of friction is_____

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

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

ii) What is mean by overhanging 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

iii) 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

iv) It equal and opposite forces applied to a body tend to elongate it, the stress so produced is called
(a) internal resistance
(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) A unit of point load is?
(a) KN/m
(b) KN.m
(c) $KN.m^2$
(d) KN

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

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

xiv) The unit of moment of inertia is
(a) mm^4
(b) mm^3
(c) mm^2
(d) mm

xv) The relation of coefficient of rolling friction & static friction
(a) Both are equal
(b) coefficient of rolling friction is greater than static friction
(c) coefficient of rolling friction is lessor than static friction
(d) All of these

xvi) The maximum coefficient of friction is
(a) 0.8
(b) 0.6
(c) 0.5
(d) 1.0

xvii) The axis passing through the center of gravity of circle is lie on
(a) Outside the circle
(b) Center of circle
(c) Inside of circle
(d) All of these

xviii) The unit of force is
(a) N
(b) Nm
(c) N/m
(d) None

xix) The condition of equilibrium is
(a) $\Sigma F = 0$
(b) $\Sigma M = 0$
(c) Both a & b
(d) None

xx) The moment of inertia of circle is
(a) $\pi/64*d^2$
(b) $\pi/64*d^4$
(c) $\pi/64*d^5$
(d) $\pi/64*d$

Q.2

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

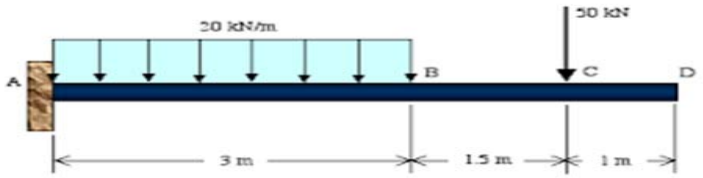
(1) Define coefficient of friction?
(2) Define hook's law.
(3) Define Bulk Modulus.
(4) Define center of gravity?
(5) Describe vector quantities.
(6) Define moment of inertia?
(7) Define engineering mechanics.

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

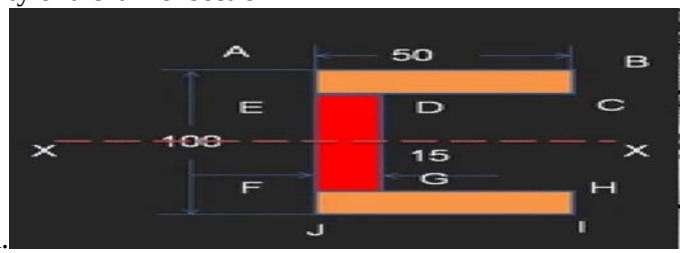
(1) Define non coplanar concurrent force system.
(2) Describe newton's first law of motion.
(3) Define friction.
(4) What is pressure?
(5) Define continuous beam.
(6) Define bending moment.
(7) Define shear force.

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.



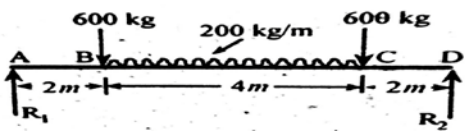
(3) Explain pappus guldinus first & second theorem.
(4) Explain various types of beams.
(5) Draw Stress Strain diagram for mild steel.

(6) Define Rolling Friction & Static Friction.

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

(1) What is parallelogram law? Derive the expression for parallelogram law.
(2) Define force and explain various force systems with illustrations.

(3) Analyse the simply supported beam shown in Figure. Draw the shear force and bending moment diagram.



(4) A block of weight 200N is placed on a rough inclined surface making an angle 40° with horizontal. The block is held by a string parallel to the plane. Find the tension developed in string when coefficient of friction is 0.4.