Time:02:30 PM to 05:00 PM Instructions: 1. Attempt all questions. 2. Make suitable assumptions wherever necessary. 3. Figures to the right indicate full marks. **0.1** Derive an expression for stresses in conical dome subjected to concentrated (a) load at crown. Calculate the shape factor of section shown in Figure 1. **(b) Q.2** Define (i) Meridian stress (ii) Hoop stress and (iii) domes and write application (a) of Domes. A conical dome of 12 m diameter with a central rise of 3.5 m supports total **(b)** uniformly distributed load of  $4 \text{ kN/m}^2$  over the surface inclusive of self-weight. Calculate Meridional and hoop force at ring beam level. OR

- A spherical dome has base diameter of 10 m and rise of 2.5 m carries a live load 07 **(b)** of 2.5 kN/m<sup>2</sup>. Calculate the meridional and hoop stress at  $\phi = 30^{\circ}$  and at ring beam level. Assume thickness of dome is 12 cm and density of dome material is  $25 \text{ kN/m}^3$ .
- Define the following terms 04 Q.3 (a) (i) Plastic hinge (ii) Shape factor (iii) Plastic modulus of section (iv) Plastic moment capacity
  - Determine the plastic moment capacity Mp requires for the continuous beam 10 **(b)** shown in Figure 2.

## OR

- 0.3 Find the collapse load for a fixed beam of span L and subjected to an UDL of (a) 04 w/unit length using static method and kinematics method.
  - Determine the value of collapse load of the portal frame shown in Figure 3. All **(b)** 10 the member have the same plastic moment capacity Mp.
- Analyze the beam shown in Figure 4 flexibility matrix method and draw the **Q.4** (a) 14 shear force and bending moment diagram.

## OR

- Analyze the beam shown in Figure 4 stiffness matrix method and draw the shear 14 **Q.4 (a)** force and bending moment diagram.
- Analyze the plane frame shown in Figure 5 flexibility matrix method and draw 14 **Q.5** (a) the shear force and bending moment diagram.

## OR

0.5 Analyze the plane truss shown in Figure 6 flexibility matrix method. 14 (a) \*\*\*\*\*

**GUJARAT TECHNOLOGICAL UNIVERSITY** 

**BE - SEMESTER-V (NEW) - EXAMINATION - SUMMER 2016** 

Subject Code:2150610

**Subject Name: Advance Structural Analysis** 

**Total Marks: 70** 

07

07

07

07

Date:11/05/2016

Enrolment No.





Figure 5

3 m