REGISTRATION NUMBER | | | | | | | | | | |

SRINIX COLLEGE OF ENGINEERING

2nd INTERNAL EXAMINATION-2021-22

Subject-**SA-II** Semester-**5TH** Branch-**CIVIL**

Full Mark-**100** Time-**2.30Hrs**

ANSWER ALL QUESTIONS (PART-A) **[2X10=20]**

1. Define Plastic Hinge.
2. Define Upper band theorem and Lower band theorem.
3. Find the shape factor of a rectangle?
4. What do you mean by mechanism and define load factor.
5. What is the shape factor for a circular section having 30 cm. diameters?
6. What do you mean by plastic section modulus?
7. A fixed beam is subjected to a point load at the centre, find the collapse load.
8. Write the expression for horizontal thrust for a two hinged arch.
9. Mention the relationship between flexibility and stiffness.
10. Write down the equation for a parabolic arch of span 'L' and central rise 'h' with left support on origin.

ANSWER ANY Eight QUESTIONS (PART-B) **[6X8=48]**

1. A fixed beam ABC has two spans. AB=5m,BC=4m.End A is fixed .C has a overhanging portion of 0.6m,where a point load of 50KN is acting .On AB two point loads of 200KN each act a at 1.5m from A and B respectively .On BC a 75KN/m is acting throughout the span. Analyze the beam by slope deflection method. Assume uniform flexural rigidity.
2. A two hinged parabolic arch of span 20m and rise 3.6m carries two concentrated load of 25kN at crown and 20kN at the left quarter span section. Find the horizontal thrust at each support and the bending moment at the loaded section.
3. Derive the expression for a shape factor for circular section having diameter D.
4. State upper bound and lower bound theorems and write their applications.
5. A continuous beam ABC consists of spans AB ad BC of lengths 5m and 6m respectively. Both ends A and C of the beam are having fixed support condition. The moment of inertia of span AB is four times of BC. The span AB carries a uniformly distributed load of 20kN/m, while span BC carries a uniformly distributed load of 30kN/m. Find the support moments using kani's method.
6. A two hinged parabolic arch of span 40m and rise 8m carries a point load of 80kN at a distance of 10 m from the left support.Find the horizontal thrust at each support. Find also the maximum bending moment.

7. A fixed beam ABC has two spans, AB=6m and BC=4m.A udl of 30Kn/m acts on span AB, on BC appoint load of 20kN acts at 1m from 'B'. Analyze the beam using slope deflection method and also draw bending moment diagram.

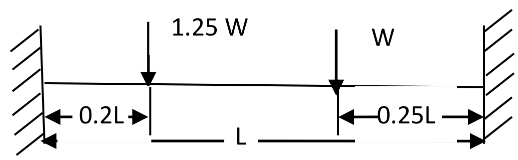
8. A continuous beam ABCD has three spans, AB=3m, BC=4m, CD=4m.And A is simply supported and D is fixed. A point load of 10KN acts at 1m from A on span AB .On BC a udl of 5KN/m acts. On span CD a point load of 20KN acts at the centre $I_{ab}:I_{bc}:I_{cd}=1.5:2:1$.Determine the support moments at A,B,C,D using kani's method.

9. A continuous beam ABCD is fixed at A and D. AB=5m, BC=4m, CD=5m, A point load of 12KN act at 1m from end A on AB. On BC an udl of 5KN/m is acting throughout the span. At the center of CD a point load of 5KN is acting Calculate the support moments at A, B, C, D using moment distribution method .All members are having uniform EI value.

10. Apropped cantilever of span 5m subjected to a uniformly distributed load of 8 kN/m.If the plastic moment capacity of the beam is Mp.Find the collapse load based on basic principle,Draw the bending moment diagram.

ANSWER ANY TWO QUESTIONS (PART-C) **[16X2=32]**

1. Determine the collapse load in a fixed beam shown in figure.



2. A suspension cable of 120m span and 12m central dip carries a load of 2kN/m. Calculate minimum and maximum tension in the cable. Find the horizontal and vertical forces in each pier under the following condition:-
a) If the cable passes over a frictionless roller on the top of the pier.
b) If the cable is firmly clamped to saddles carried on frictionless roller on top of the piers.

3. Determine the plastic moment capacity of the section required for the frame shown in figure. The loads shown are the working loads. Take load factor $\lambda = 1.75$. Assume same plastic moment capacity for all the members.