**Reg. No.** ☐☐☐☐☐☐☐☐☐☐☐☐

| Question Paper Code | 11812 |
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## B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2023
Sixth Semester
### Civil Engineering
### CE8602 - STRUCTURAL ANALYSIS – II
(Regulations 2017)

Duration: 3 Hours                                     Max. Marks: 100

### PART - A (10 × 2 = 20 Marks)
Answer ALL Questions

| | | Marks, K-Level, CO |
|---|---|---|
| 1. | Differentiate Determinate and Indeterminate Structures. | 2,K2,CO1 |
| 2. | What is meant by influence lines? | 2,K1,CO1 |
| 3. | Name the type of rolling loads for which the absolute maximum bending moment occurs at the mid span of a beam? | 2,K1,CO3 |
| 4. | State Muller Breslau's principle. | 2,K1,CO3 |
| 5. | How many degree of static indeterminacy in fixed arch and three hinged arches? | 2,K1,CO4 |
| 6. | Distinguish between two hinged and three hinged arches. | 2,K2,CO4 |
| 7. | Demonstrate the nature of force in the cables. | 2,K2,CO5 |
| 8. | Write the temperature effect on cable. | 2,K1,CO5 |
| 9. | List out the assumptions made for plastic analysis. | 2,K1,CO6 |
| 10. | What are unsymmetrical frames and how are they analyzed? | 2,K1,CO6 |

### PART - B (5 × 13 = 65 Marks)
Answer ALL Questions

| 11. | a) | Two point loads of 100kN and 200kN spaced 3m apart cross a girder of span 12 meters from left to right with the 100kN leading. Draw the ILD for shear force & absolute maximum bending moment to the given loading system. | 13,K3,CO1 |
|---|---|---|---|

**OR**

| | b) | A simply supported beam has as pan of 15m and subjected to an UDL of 30kN/m, 5m long travelling from left to right. Draw the ILD for shear force and bending moment at a section 6m from the left end. Use the diagrams for calculating the maximum BM and SF at this section. | 13,K3,CO1 |
|---|---|---|---|

| 12. | a) | Draw the influence line for reaction $R_A$ for the continuous beam ABC of span AB=BC=4m Simply supported at A, B & C. Compute the ordinates at every 1m interval, Take EI=constant. | 13,K3,CO3 |
|---|---|---|---|

*K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create*     **11812**

**OR**

b) Determine the influence line diagram for the prop reaction at end B of a propped can til ever beam AB of span 6m. Compute the ordinates at every 1minterval.   *13,K3,CO3*

13. a) A parabolic two hinged arch has a span of 40m and arise of 5m. A concentrated load 10kN act sat 15m from the left support. The second moment to fare a varies as these cant of the inclination of the arch axis. Calculate the horizontal thrust and reaction sat the hinge. Also calculate maximum bending moment at the section.   *13,K3,CO4*

**OR**

b) A circular (three hinged) arch of span 25m with a central rise of 5m is hinged at the crown and the end supports. It carries appoint load of 100k Nat 6m from the left support. Calculate   *13,K2,CO4*
    (i) There action at the supports and
    (ii) Moment at 6m from the left support.

14. a) At here hinged stiffening girder of as us pension bridge of 100m span subjected to two point loads 10kN each placed at 20m and 40m respectively from the left hand hinge. Determine the bending moment and shear force in the girder at section 30m from each end. Also determine the maximum tension in the cable which has a central dip of 10m.   *13,K3,CO5*

**OR**

b) A suspension bridge has a span 50m with a 15m wide runway. It is subjected to a load of 30kN/m including self weight. The bridge is supported by a pair of cables having a central dip of 4m. Find the cross sectional area of the cable necessary if the maximum permissible stress in the cable materials is not to exceed 600MPa.   *13,K3,CO5*

15. a) A uniform beam of span 4m and fully plastic moment ($M_P$) is simply supported at one end and rigidly clamped at other end. A concentrated load of 15kN may be applied anywhere within the span. Find the smallest value of $M_P$ such that collapse would first occur when the load is in its most unfavorable position.   *13,K3,CO6*
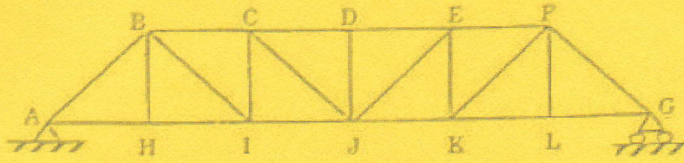
**OR**

b) A continuous beam ABC is loaded as shown in figure. Determine the required $M_P$, if the load factor is **3.2**   *13,K3,CO6*
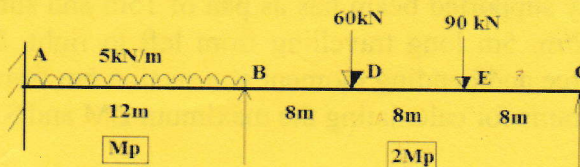
## PART - C ( 1 × 15 = 15 Marks)

16. a) Draw the IL for force in member BC and CI for the truss shown in Fig. *15,K3,CO2*
The height of the truss is 8m and each segment is 8m long.



### OR

b) Draw the ILD for the forces in members $U_3L_3$ and $U_3L_4$ of the truss *15,K3,CO2* shown in fig. below. The height of the truss is 3m and each segment is 3m long.