BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE PILANI

MID-TERM EXAMINATION (OPEN BOOK EXAMINATION)
[October 09, 2023, Room No. 1222, 1231]

COURSE NO. CE G 617 (Advance Structural Analysis)

Time: 4.0-5.30 PM **Max. Marks**: 100

Note: Attempt all questions.

Q.1 A two-span continuous beam (ABC) loaded at mid-spans of AB and BC is shown in Fig. 1. The beam is also supported by mild steel bar of diameter 40 mm at A and C through hinge support at D. The flexural rigidity of the bars could be neglected. Take E= 200 GPa, I_{beam}= 3 x 10^8 mm^4. Using basic flexibility method, compute the reaction at B, forces in bars, displacement at A and C, and member end actions just to the left of joint B. **[50]**

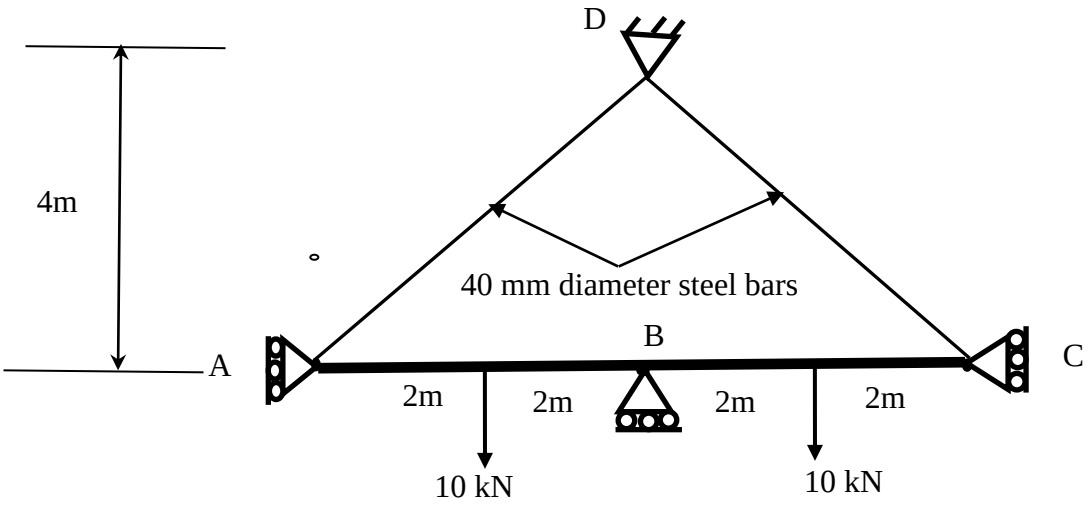

Figure 1

Q.2 For the grid structure with an spherical hinge at B as shown in Fig.2, determine the internal force resultants at joint B using flexibility method. Member AB and BC are oriented along X and Y directions, respectively. Assume each member is having rectangular section of width 100 mm and depth of 200 mm. Take E=200 GPa and G=80 GPa. **[30]**

[P.T.O.]

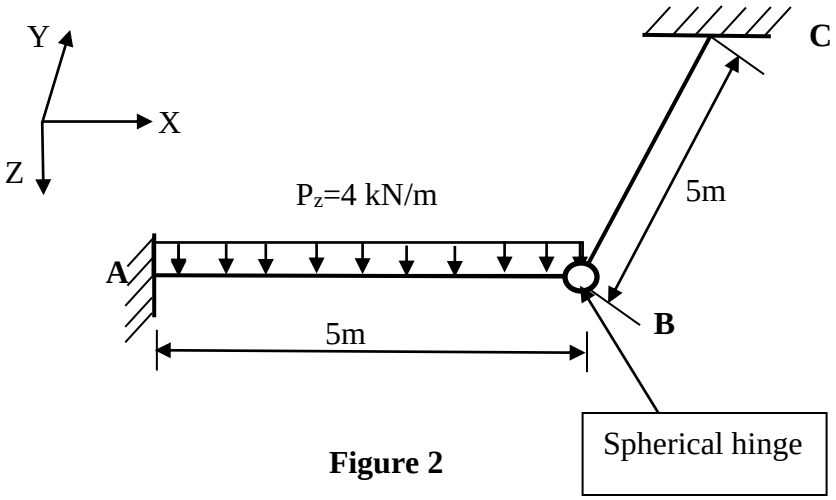

Figure 2

Q.3 For the continuous beam loaded as shown in Fig.3, determine the reaction at joint B if support support at B settles vertically down by 1 mm and joint C rotates by 0.3° in anti-clock wise direction. Take E=200 GPa, I=3x10^8 mm^4. **[20]**

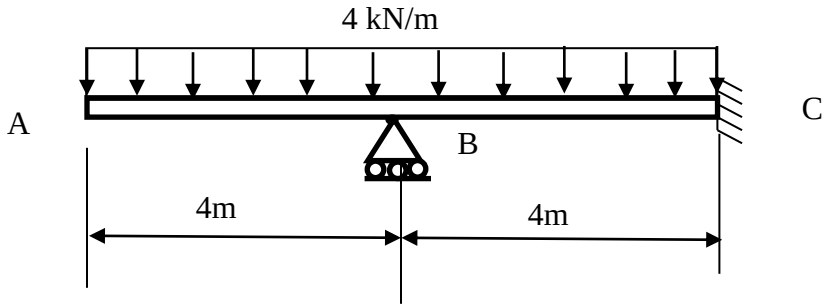

Figure 3