Second Semester B.Arch. Degree Examination, Dec.2015/Jan.2016
Building Structures - II

Time: 3 hrs.

Max. Marks:100

Note: *Answer any FIVE full questions,*
Choosing one from each module.

MODULE - I

1 a. Define centre of gravity and centroid. **(04 Marks)**
   b. Determine the location of the centroid, shown in Fig Q1(b) **(16 Marks)**
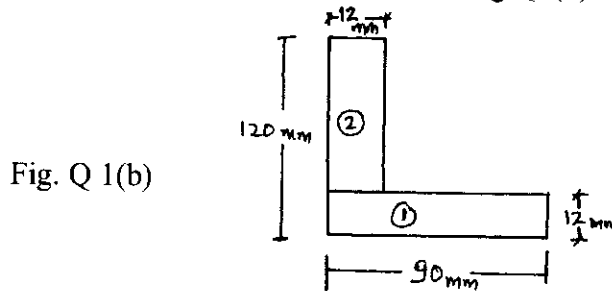

Fig. Q 1(b)

2 a. State parallel axis theorem and explain in brief. **(04 Marks)**
   b. Find the moment of inertia and radius of gyration about centroidal axes for a rectangular beam of size 150mm wide and 300mm depth. Also find radius of gyration. **(16 Marks)**

MODULE - II

3 a. Draw SFD and BMD for the cantilever beam shown in Fig.Q3(a). **(10 Marks)**
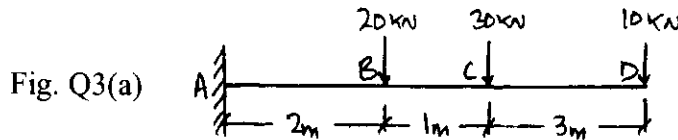

Fig. Q3(a)

   b. Draw SFD and BMD for the S.S beam shown in Fig. Q3(b) **(10 Marks)**
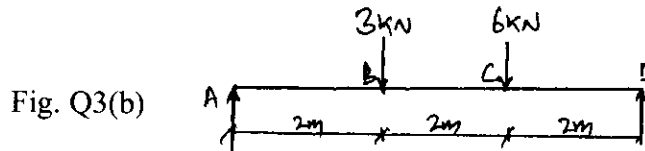

Fig. Q3(b)

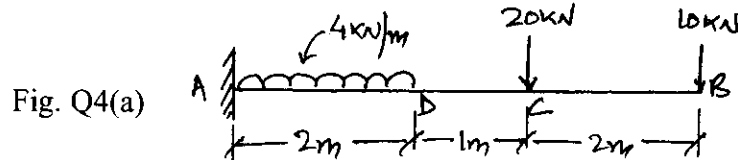4 a. Draw SFD and BMD for the cantilever beam shown in Fig Q4(a) **(10 Marks)**

Fig. Q4(a)

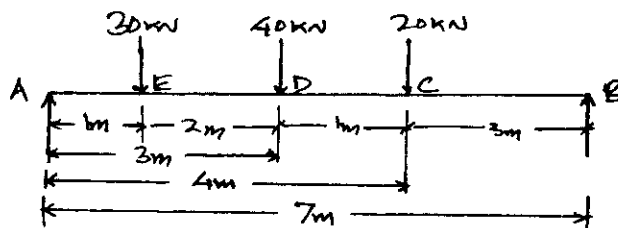   b. Draw SFD and BMD for the S.S beam shown in Fig. Q4(b) **(10 Marks)**

Fig. Q4(b)

MODULE - III

5 a. List out the assumptions made in theory of simple bending. **(04 Marks)**

   b. Calculate maximum stress induced in a steel pipe of external diameter 40mm and internal diameter 20mm and of length 4m. When the pipe is simply supported at its ends and carries a point load of 80N at its centre. **(16 Marks)**

6 a. Provide the expression for finding out section modulus for
   i) Rectangular section   ii) Hollow rectangular section   iii) circular section
   iv) Hollow circular section. **(04 Marks)**

   b. Calculate R_1, R_2, V_1, V_2, M_1 and M_2 with usual notations and mark these values into the given Fig. Q6(b) where P = 1000N and ℓ = 1m. Also find bending stress if I = 2235×10^3 mm⁴ and D = 400mm. **(16 Marks)**
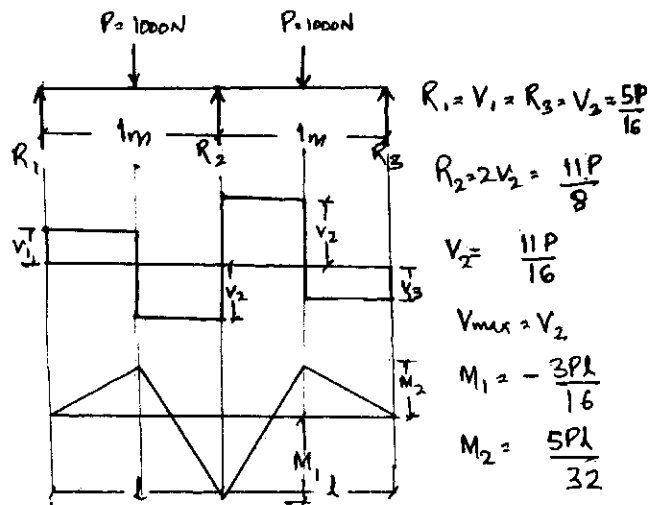

Fig. Q6(b)

MODULE - IV

7 a. Differentiate between short and long column. **(04 Marks)**

   b. A solid round bar 3m long and 50mm diameter is used as a strut. Determine the crippling load, when the given strut is used with the following conditions. Take E = 2×10^5 N/mm²
   i) Both ends Hinged
   ii) One end fixed and other end is free
   iii) Both the ends are fixed
   iv) One end fixed and other is hinged. **(16 Marks)**

8 a. Define : i) Column   ii) Slenderness ratio   iii) Buckling load   iv) Safe load. **(04 Marks)**

   b. A column of timber section is of 150mm×200mm is 6m long both ends being fixed. If E= 17.5×10^3 N/mm², determine   i) Crippling load   ii) Safe load , if Fs = 3 **(16 Marks)**

MODULE - V

9 Calculate the maximum load that can be carried by 400mm × 400mm square column reinforced with 8 bars of 22mm dia. Use σ_{cc} = 5 N/mm² and σ_{sc} = 190N/mm². **(20 Marks)**

10 Calculate the load carrying capacity of a column 300mm×400mm reinforced with 6bars of 16mm dia. Use M – 20 and Fe – 415 grade of concrete and steel respectively. Also find allowable service load if Fs = 1.50. **(20 Marks)**

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