USN

First/Second Semester B.E. Degree Examination, May/June 2010
Elements of Civil Engineering

Time: 3 hrs.   Max. Marks:100

Note: *Answer any FIVE full questions.*

1 a. Discuss briefly the impact of civil engineering infrastructural developments on the national economy.   (08 Marks)
   b. What are the alternate materials? Mention the alternate building materials and give their uses.   (08 Marks)
   c. Briefly explain how cost overturn and time overturn can be checked in construction.
                                                                                 (04 Marks)

2 a. What are the requirements of a good building stone?   (06 Marks)
   b. What are the tests to be conducted on bricks to find their suitability for the construction work?   (06 Marks)
   c. Explain the properties of fresh concrete. List the specific uses of plain and reinforced concrete.   (08 Marks)

3 a. List the principles of surveying. Explain the importance of each of these principles.
                                                                                 (10 Marks)
   b. What is a total station? Explain its utility in surveying.   (10 Marks)

4 a. Explain the following with an example:
      i)   Coplanar concurrent forces
      ii) Coplanar non-concurrent forces
      iii) Non coplanar non-concurrent forces.   (06 Marks)
   b. State and explain principles of transmissibility.   (04 Marks)
   c. Determine the magnitude and direction of the resultant of the system of forces shown in Fig.4(c).   (10 Marks)
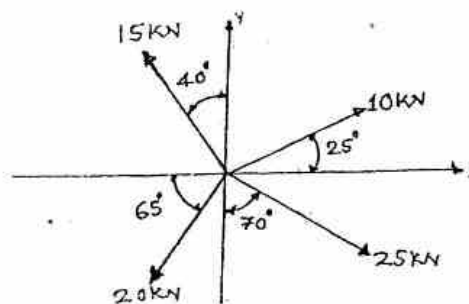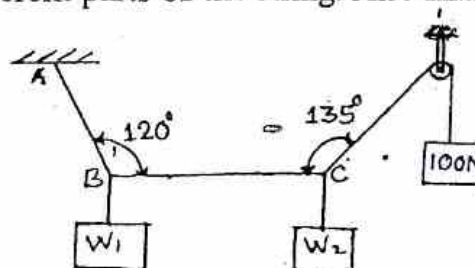

Fig.4(c).

5 a. State the conditions of static equilibrium for coplanar non-concurrent force system.
                                                                                 (03 Marks)
   b. In the Fig.5(b), the portion BC of the string is horizontal and the pulley is frictionless. Determine the tension in different parts of the string. Also find W_1 and W_2.   (08 Marks)


Fig.5(b).

c. Determine the reactions developed at supports A and B in the beam shown in Fig.5(c).

(09 Marks)

Fig.5(c).
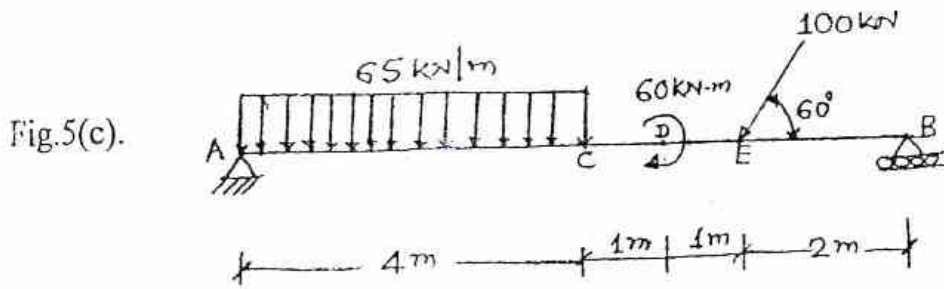
6 a. Define centroid and centroidal axis. (04 Marks)
   b. Locate the centroid of a quarter circle of radius R, from first principles. (06 Marks)
   c. Locate the centroid of the plane area shown in Fig.6(c). (10 Marks)

Fig.6(c).
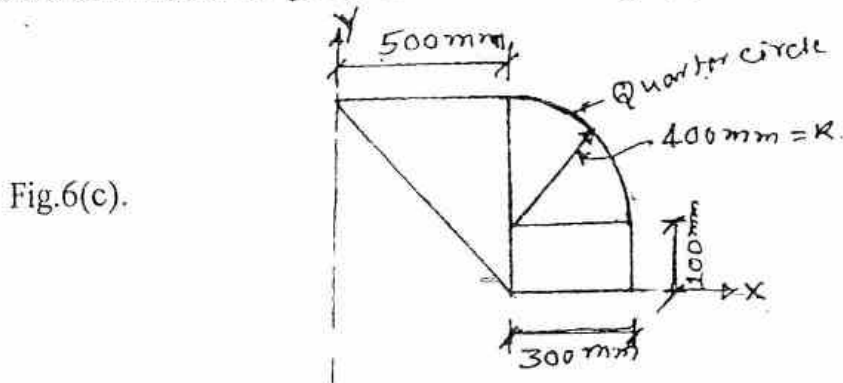
7 a. Derive the expression for moment of inertia of a circle of diameter 'D' about its diameteral axis. (08 Marks)
   b. Determine the second moment of the area about the horizontal centroidal axis as shown in Fig.7(b). (12 Marks)

Fig.7(b).
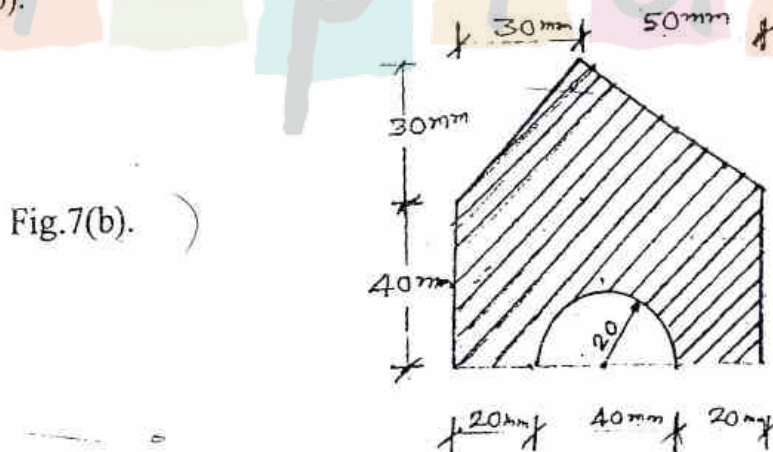
8 a. Define : i) Angle of friction ; ii) Angle of repose. (04 Marks)
   b. State the laws of dry friction. (04 Marks)
   c. What is the value of 'p' in the system shown in Fig.8(c), to cause the motion to impend? Assume the pulley is smooth and the co-efficient of friction between the other contact surfaces is 0.2. (12 Marks)

Fig.8(c).

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