USN | | | | | | | | | | **18ENG15**

First Semester B.Arch. Degree Examination, Aug./Sept.2020
Building Structures – I

Time: 3 hrs.   Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Follow the written dimension, do not scale.

Module-1

1 a. Explain the following with example:
      (i) Dead load   (ii) Live load   (iii) Horizontal loads   (iv) Impact load.   **(12 Marks)**
   b. What is workability of concrete? What are the factors that would affect the property of workability?   **(08 Marks)**

OR

2 a. What are the properties of concrete, steel?   **(10 Marks)**
   b. What are tests conducted on fresh and hardened concrete?   **(05 Marks)**
   c. What are admixtures used in concrete.   **(05 Marks)**

Module-2

3 a. Differentiate between
      (i) Rigid body and Deformable body
      (ii) Concurrent force system and collinear force system
      (iii) Resultant of a force and equilibriant
      (iv) Law of triangle of force and law of polygon of forces   **(10 Marks)**
   b. Determine the magnitude of F for the resultant of forces shown to be an angle of 15° with respect to x axis. Also determine the magnitude of resultant. [Refer Fig.Q3(b)]
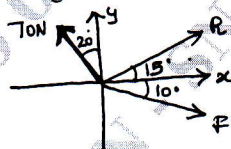

Fig.Q3(b)   **(10 Marks)**

OR

4 a. What are statically determinate beams and statically indeterminate beams? Explain with examples.   **(06 Marks)**
   b. What is Varignon's theorem?   **(02 Marks)**
   c. Parallel forces F_1, F_2, 2 kN and 10 kN have a downward resultant of 5 kN and it acts at a distance of 1.8 mts from A. Determine the values of F_1 and F_2. [Refer Fig.Q4(c)]   .
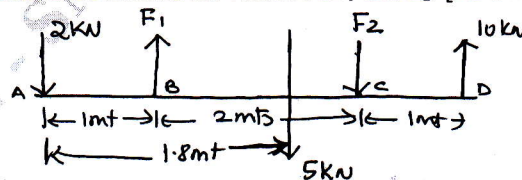

Fig.Q4(c)   **(08 Marks)**

d. What is free body diagram? Write free body diagram for following cases:
   (i) Ball kept on the table
   (ii) Beam resting on a Hinge at one end and Roller at other end.   (04 Marks)

Module-3

5   For the following cases shown in the Fig.Q5(i) and Fig.Q5(ii), determine the magnitude, direction and line of action of the resultant force.
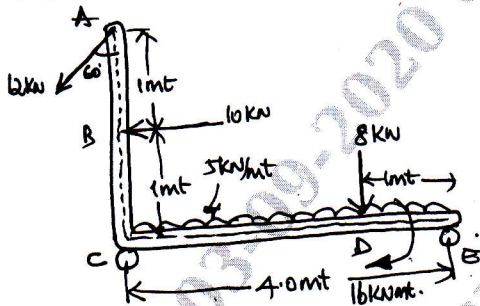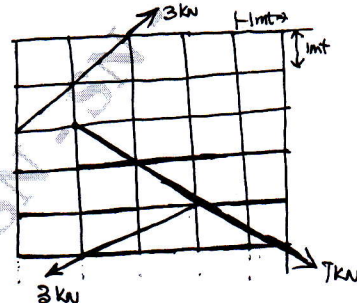

Fig.Q5(i)

[Each Block is 1mt × 1mt]
Fig.Q5(ii)   (20 Marks)

OR

6   a. What are different types of supports briefly explain with sketches.   (08 Marks)
    b. Determine the support reactions at A and B. Refer Fig.Q6(b).
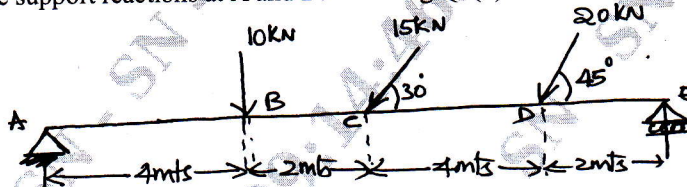

Fig.Q6(b)   (12 Marks)

Module-4

7   Locate the centroid for the composite section shown in below in Fig.Q7(i) and Fig.Q7(ii).
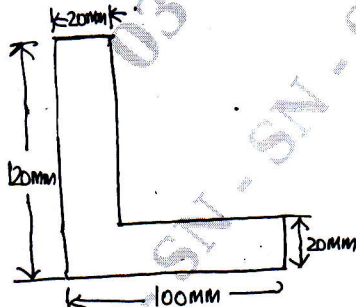

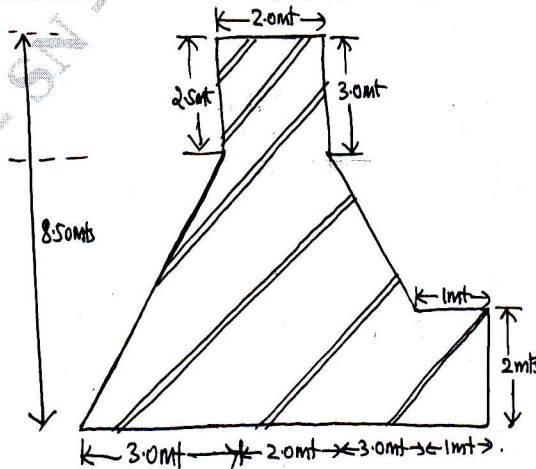Fig.Q7(i)   Fig.Q7(ii)   (20 Marks)

OR

8 a. State and prove Parallel Axis theorem. **(06 Marks)**
   b. Determine the moment of inertia about both horizontal and vertical centroidal axis. Refer Fig.Q8(b).
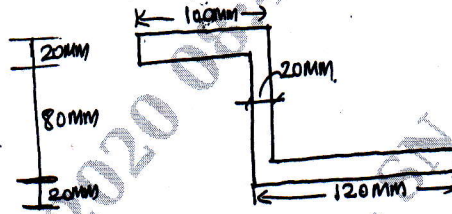

Fig.Q8(b) **(14 Marks)**

Module-5

9 a. With examples explain briefly the following :
       (i) Perfect frame   (ii) Deficient frame   (iii) Redundant frame **(09 Marks)**
   b. What are the assumptions made in Analysis of Truss? **(05 Marks)**
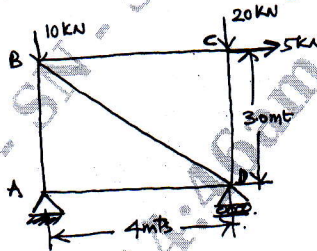   c. Determine the support Reactions for the Truss shown in Fig.Q9(c).

Fig.Q9(c) **(06 Marks)**

OR

10 Determine the forces in the truss shown in Fig.Q10, which is subjected to horizontal and vertical loads. Mention the nature of forces in each case by Method of Joints.
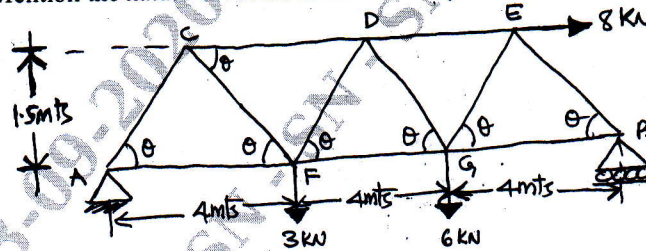

Fig.Q10 **(20 Marks)**

* * * * *