**AKGEC/IAP/FM/01**

**AJAY KUMAR GARG ENGINEERING COLLEGE, GHAZIABAD**

**DEPARTMENT OF CIVIL ENGINEERING**

**Sessional Test–2**

Course: B.Tech. Semester: V

Session: 2017-18 Section: CE-1& 2 Subject: Design of Concrete Structures-I Sub. Code: NCE-505

Max Marks: 50 Time: 2 hours

*Note:* Answer all the sections. Any data if missing may be assumed suitably. Use of IS 456-2000 is allowed.

**Section– A**

1. Attempt **all** the parts.  **(5 x2 = 10)**

1. What do you mean by anchorage length? And also write its maximum value for Simply Supported beam.
2. When the shear reinforcement is necessary in a beam?
3. Enumerate types of shear reinforcement with neat sketch.
4. Define development length.
5. Under what circumstances a doubly reinforced beam is designed?

**SECTION B**

2. Attempt **all** the parts.  **(5 x5 =25)**

1. Determine ultimate moment of capacity of a doubly reinforced beam of 300mm×600mm overall depth. Area of steel in compression is equal to 804 mm²; area of steel in tension is equal to 2060 mm². If M-20 concrete and Fe-415 steel are used. Take the value of effective cover 50 mm.
2. What is the bond strength of concrete? Derive the expression for bond stress in reinforced concrete.
3. A simply supported beam is 25 cm by 50 cm and has 2-20 mm HYSD bars going into the support if the shear force at the centre of support is 110 KN at working loads, determine the anchorage length. Assume M-20 mix and Fe-415 grade HYSD steel.
4. Write difference between LSM and WSM.
5. A simply supported beam of 5m effective span is subjected to 24 KN/m Live Load. Size of beam 250mm wide and 400mm overall depth. Design reinforced beam. Use M-20 and Fe-415.

**SECTION C**

3. Attempt **all** the parts.  **(2 x 7.5 =15)**

1. A simply supported T-beam of span 6.0 m in reinforced concrete has following dimension:

Width of flange = 1600 mm.

Depth of flange = 100 mm.

Overall depth of beam = 850 mm.

Width of web = 400 mm.

Effective cover to reinforcement = 50 mm.

Use Fe-500 steel and M-30 concrete.

Design the beam for a factored B.M of 1250 KN-m.

1. A simply supported beam 300 mm wide and 500 mm effective depth carries a uniformly distributed load 50 KN/m over an effective span of 6 m. Design the shear reinforcement in the form of vertical stirrups. Assume that the beam contain 0.78% reinforcement throughout the length. The concrete is of M-20 grade and steel for stirrups is of Fe-250 grades. Take width of support as 400 mm.