IES COLLEGE OF ENGINEERING, CHITTILAPPILLY
DEPARTMENT OF CIVIL ENGINEERING

QUESTION BANK

MODULE – I

1. Explain the failures of bolted joints.
2. Design a lap joint between the two plates of width 150 mm, if the thickness of one plate is 12 mm and the other is 10 mm. The joint has to transfer a working load of 100 kN. The plates are of Fe 410 grade. Use bearing type bolts.Explain under reinforced, balanced and over reinforced sections in the context of limit state design procedure?
3. Write any six features of structural steel
4. Explain types of welded joints
5. Sketch various failure patterns of bolted connections
6. Recognize the efficiency of a butt joint with double cover plates connecting 2 plates of 8mm thickness with 16mm diameter bolts of grade 4.6.
7. A tie member in a truss girder is 250mmX14mm in size. It is welded to a 10mm thick gusset plate by fillet weld. The overlap of the member is 300mm and the weld size is 6mm. Identify the strength of joint if the welding is done all around. Assume shop welding..
8. Discuss in brief, the principles and assumptions of working stress method?
9. What are the different grades of steel available in market?
10. Explain in detail the properties of steels

MODULE – II

1. State simple, rigid and semi rigid joints
2. Summarize design step of tension member
3. Explain the concept of shear log
4. Describe a double angle tension member connected on each side of a 10mm gusset plate to carry an axial factored load of 450kN. Use 20mm black bolts. Assume shop connection
5. The tension member of a truss consistd of 2 angles ISA 80X80X8. If two angles are welded on either sides of a gusset plate, illustrate the joint with a proper design. Axial tension in the member is 220kN. Use 6mm fillet weld
6. Write a brief note on loads and its types.
7. Differentiate between flexural bond and development bond.
8. Explain how the longitudinal reinforcement bent up bars nearer to the supports contribute to the shear resistance of RC beams?
9. A beam with b=350mm and d=550mm is subjected to a factored shear force of 400kn. The beam is reinforced with 4 number of 32mm diameter bars as tension steel. Two bars are symmetrically bent up at the ends at 45 degree. Concrete grade is M25 and steel Fe415. Design the shear reinforcements.
10. . Design a suitable double angle section to carry a factored tensile load of 450 kN.

The length of the member is 2.9m.Use M20 bolts of 4.6 grade. The grade of steel

is Fe410.

MODULE – III

1. Summarize gusset base with a neat sketch
2. A rolled steel section ISHD 350is used as a column. If the height of the column is 4m and that is pin ended. Summarize the design axial load on the column.
3. Explain about laced column and its design.
4. A laced column 10m long restrained in position, but not in direction carries a factored axial load of 1100kN. Illustrate the column with two channels back to back by providing a single lacing system with bolted connection.
5. A battened column with 2 channels back to back of length 10m carry an axial factored load of 1400kN. The column is restrained in position, but not in direction. Illustrate the column with a neat sketch.
6. Design a simply supported beam of span 6m subjected to a live load of 4kN/m. Use M20 concrete and Fe415 steel.
7. Design and detail a singly reinforced concrete beam of rectangular section subjected to a uniformly distributed live load of 12kN/m over the entire span. Clear span is 5m. The beam is supported on masonry wall, 230mm thick on both sides. Assume moderate exposure conditions. Use M25 grade concrete and Fe 415 grade steel.

8. A reinforced concrete rectangular beam b = 300 mm, d = 600 mm and D = 650 mm is subjected to factored shear force Vu = 70 kN in one section. Assuming the percentage of tensile reinforcement as 0.5 in that section, determine the factored torsional moment that the section can resist if (a)no additional reinforcement for torsion is provided, (b) maximum steel for torsion is provided in that section, Assume M 30 concrete.

9. A reinforced concrete rectangular beam b = 300 mm, d = 600 mm and D = 650 mm is subjected to factored shear force Vu = 70 kN, Mu = 215 kNm, Tu = 100 kNm Assume M 30 concrete, Fe415 steel design the reinforcement.

10. Determine the ultimate moment capacity of the doubly reinforced beam of b = 350 mm, d' = 60 mm, d = 600 mm, Tension Steel = 6- #25 , Compression Steel = 4- #20, using M 20 and Fe 415.

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MODULE – IV

1. List out the difference between one way and two way slab.
2. Explain about the load distribution in a slab?
3. Design a cantilever slab of span 2m to carry imposed load of 2kN/m^2 over its entire span. Finish load=0.5kN/m^2. Use M20 concrete and Fe415 steel. The slab is supported by a beam of size 300mmx500mm.
4. A simply supported one way slab of clear span 3m is supported on masonry walls of thickness 350mm. Slab is used for residential loads. Design the slab. Use M20 concrete and HYSD, Fe415 bars. Give load as 2kN/m^2
5. Illustrate a reinforced concrete slab for a hall measuring 8m x 16m. The slab is supported on RCC beams 250mm wide and spaced at 4m centre to centre. The superimposed load is 4kN/m^2. Use M20concrete and Fe415 steel. Bearings of beams is 200mm
6. Design a simply supported RCC slab for a roof of a hall 4m x10m (clear dimensions) with 230 mm thick wall all round. LL = 4kN/m2 , Floor finish = 1 kN/m2 . M20 and Fe 415
7. Design a Floor slab for an office building (14m x 8m) measured to the centre of supports of width 230 mm. Beams are spaced 3.5m c/c. LL = 3 kN/m2 , Floor Finish = 1kN/m2 .M20, Fe415
8. Determine Ast,lim and Mu,lim of the flanged beam. bf = 1000 mm, Df = 100 mm, bw = 300 mm, cover = 50 mm and d = 450 mm. Use M 20 and Fe 415.
9. Determine the moment of resistance of the beam with Ast as (4 - #25 and 2- #20). bf = 1000 mm, Df = 100 mm, bw = 300 mm, cover = 50 mm and d = 450 mm. Use M 20 and Fe 415.
10. Determine the moment of resistance of the beam with Ast = 4825 mm2 bf = 1000 mm, Df = 100 mm, bw = 300 mm, cover = 50 mm and d = 450 mm. Use M 20 and Fe 415.

MODULE – V

1. Design a Floor slab 7 x 5 m ,clear dimensions supported all four sides by 230 mm thick walls. Slab is subjected to LL = 4kN/m2 , Floor Finish = 1kN/m2 . M20, Fe415
2. Design a Floor slab 7 x 5 m ,clear dimensions supported all four sides by 230 mm wide beams. Slab is subjected to LL = 4kN/m2 , Floor Finish = 1kN/m2 . M20, Fe415. Corners are held down
3. Design a Floor slab 7 x 5 m ,clear dimensions continuous on all four sides over 230 mm wide beams. Slab is subjected to LL = 4kN/m2 , Floor Finish = 1kN/m2 . M20, Fe415.
4. Design a Floor slab 7 x 5 m ,clear dimensions supported over 230 mm wide beams with two adjacent edges discontinuous. Slab is subjected to LL = 4kN/m2 , Floor Finish = 1kN/m2 . M20, Fe415.
5. A rectangular beam section is 200mm wide and 400mm deep up to the centre of reinforcement. Determine the reinforcement required at the bottom if it has to resist a factored moment of 40kN-m. Use M20 grade concrete and fe415 grade steel.
6. A rectangular beam section is 250mm wide and 500mm deep up to the centre of tension steel which consists of 4-22mm dia. bars. Find the position of the neutral axis, lever arm, forces of compression and tension and safe moment of resistance if concrete is M20 grade and steel is Fe500 grade.
7. A rectangular beam is 200mm wide and 450 mm overall depth with an effective cover of 40mm. Find the reinforcement required if it has to resist a moment of 35 kN.m. Assume M20 concrete and Fe250 grade steel.
8. Determine the moment of resistance of the T-beam Given data: bf = 1000 mm, Df = 100 mm, bw = 300 mm, cover = 37.5 mm, D = 500 mm and Ast = 1963 mm2 (4 - #25). Use M 20 and Fe 415.
9. In example 2, the strain in concrete at the extreme fibre in compression εcu is 0.00069 and the tensile stress in bending in steel is 199.55 N/mm2 . Determine the depth of neutral axis and the moment of resistance of the beam section.
10. Determine the moment of resistance of a section 300mm wide and 450mm deep up to the centre of reinforcement. If it is reinforced with (i) 4-12mm fe415 grade bars, (ii) 6-18mm