Subject : Design of Reinforced Concrete Structures 1 (S5 CE)

MODULE 1

1. (a) Define characteristic load How to estimate the design loads in limit state method ? *(KU,JAN 2018)*

   (b) Derive the expression for limiting depth of neutral axis if the yield strength of steel is 250 N/mm2 *(KU, JAN 2018)*

2. (a) Explain design loads and design strength of material ? *(KU, SEPT 2016)*

   (b) Briefly explain working stress method of RCC design ? *(KU, SEPT 2016)*

   (c) Define limit state and discuss various limit state *(KU, NOV 2014)*

3. (a) Why is partial safety factor for concrete is greater than of reinforcing steel *(KU, NOV 2011)*

   (b) Differentiate between working stress and limit state method ? *(KU, NOV 2011)*

4. (a)Define characteristic strength of material ? *(AU, MAY 2014)*

   (b)What are the objectives of RCC Design ? *(AU, MAY 2013)*

   (c)Give 4 reasons to justify the design of structures by limit state method? *(AU, DEC 2012)*

5. (a)Differentiate under reinforced , over reinforced and balanced section ? *(AU, MAY 2011)*

   (b)What are the assumptions made in elastic theory of RCC structures *(AU, MAY 2015)*

6. (a)How balanced section is defined in limit state method ? *(CU, DEC 2010)*

   (b) Explain the significance of modular ratio ? *(MG,NOV 2011)*

   (c)Distinguish between load factor and factor of safety ? *(MG,NOV 2011)*

7. Derive the expression for stress block parameters in the limit state of flexure *(KTU , DEC 17)*

8. Diffeentiate between flexural bond and development bond *(KTU, DEC 2018)*

MODULE 2

1. Calculate the development length of 10 mm diameter bars in M25 concrete if the steel is

   (i) fy= 230 N/mm2

   (ii) fy= 415 N/mm2 *(,AU, MAY 2011)*

2. A simply supported beam with clear span 6000 mm , b=400 mm, d-560mm carries a limit state load of 175 kN/m (including self weight, live load, dead load) . It is reinforced with 4 bars of 28 mm diameter tension steel. Fck= 20 N/mm2 , fy= 250N/mm2 .Design Shear reinforcement *(AU, MAY 2011)*

3. (a) Explain briefly theprocedure for the design of shear reinforcement ? *(MG DEC 2011)*

(b) Explain (i) Shrinkage deflection

(ii) Long term Deflection

(iii)Differentiate between flexural bond stress and anchorage bond stress

(AU ,MAY 2011)

4. (a)How to overcome torsion in beams ? *(AU, NOV 2014)*

   (b)Why and how shear reinforcements are provided in beams ? *(KU, NOV 2014)*

   © What are the different forms of shear reinforcement ? *(KU, NOV 2011)*

5. An R.C. beam of span 5 m is 250 mm wide and 500 mm deep to the centre of tensile reinforcement, which consist of 4 bars of 22 mm diameter.The beam carries a load of 30 KN/m inclusive of its weight. Design the shear reinforcement by stirrups. Use M20concrete and Fe415 steel. *(KU, NOV 2010)*

6. An R.C. beam of span 6.50 m is 300 mm wide and 750 mm deep to the centre of tensile reinforcement which consist of 6 bars of 20 mm diameters. The beam carries a load of 45 KN/m including its weight. Design the shear reinforcement if 50 % of the tensile reinforcement is curtailed near the support. Use M20concrete and Fe415steel.

7. A simply supported beam of 230mmX 550 mm effective depth is reinforced with 4 bars of 20 mm diameter on the tension face . If the beam is subjected to a vertical shear of 100kN at the critical sectiona, check the adequancy of the section in shear and design shear reinforcement. Use M25 concrete and Fe415 grade steel *(KTU, DEC 2017)*

MODULE 3

1. Design a doubly reinforced concrete beam to carry a UDL of 30 kN/m ,exclusive of self weight .The depth of beam is limited to 400 mm .The span is 7m.Use M20 concrete and Fe 415 steel *(KU, JAN 2018)*

2. Design a simply supported rectangular beam of effective span 6m carrying a super imposed load of 35kN/m. The overall depth of beam is restricted to 550 mm and width 300 mm .Use M20 and Fe 415

(KU, SEPT 2016)

3. Determine the ultimate moment of resist ance of a T beam having an effective flange width of 800mm , effective depth 500 mm , web width 300 mm , depth of flange 100 mm .area of tension steel 1962 mm2 , Use M20 and Fe415 *(KU,SEPT 2016)*

4. *(a)*Distinguish between singly and doubly reinforced sections *(KU, NOV 2014)*

(b)Design a simply supported beam to carry a superimposed load of 20KN/m over a clear span of 7m.Depth of he beam is limited to 500 mm .Support width is 250 mm .Use M20 concrete and Fe415 Steel

(*KU, NOV 2014)*

MODULE 4

1. (a)Differentiate one way and two way slab ? *(KU SEPT 2016)*

   (b) Design a simply supported alab for a room of size 4m X 5m clear size .Thickness of support 300 mm .the corners are held down.Live load 3 KN/m2 .Use M20 and Fe 415

   (KU,SEPT 2016)

2. Design a RCC slab for a room with claear interior dimensions 4m X 5m .Assume live load 3KN/m2 .The slab is simply supported on all four sides with corners free to lift up.Support width is 230 mm.Use M20 concrete and Fe415 steel. *(KU,NOV 2014)*

3. (a)Design a one way slab of clear span 4.5 m simply supported on 230 mm thick masonry walls and subjected to a live load of 3KN/m2 .Use M20 concrete and Fe415 steel

   (b) Sketch the typical reinforcement details in continuous slab ? *(KTU DEC 2017)*

MODULE 5

1. Design a two way slab 3.5m X 3.5 m simply supported in all four sides .the corners are held down .The live load on slab is 3 kN/m2.Assume M20 concrete and Fe415 steel.

   (KU,JAN 2018)

2. Design a two way slab 4mX 5m clear in size supported on 300 mm thickwalls on all four sides and corners not held down .the live load is 4 KN /m2.Use M20 and Fe415 steel

3. (a) Explain the procedure to determine the crack width

   (b) Shrinkage deflection

   (c) Long term Deflection

4.(a) Differentiate between flexural bond stress and anchorage bond stress

(b) Briefly explain the IS code stipulations for crack width (*AU ,MAY 2011)*

MODULE 6

1. Determine the ultimate load carrying capacity of a column of size 400 mmX 400 mm reinforced with 8 nos 16 mm dia with lateral ties and assuming M20 and Fe415 *(KU, NOV 2013)*

2. (a)Briefly explain the importance of tranverse reinforcemenr in the reinforced concrete column

(*(KU, NOV 2011)*

(b) Why does the code specifylimits to minimum and maximum reinforcements in columns *(KU, NOV 2014)*

© Explain long and short Column *(KU, SEPT 2016)*

3. Design a circular helical reinforced circular column to carry an axial load of 1800 kN .Use M20 and Fe415 *(KU, JAN 2018)*

CE369 - DISASTER MANAGEMENT(S5CE)

MODULE 1

1. a) Surface and subsurface water have major roles in determining the vulnerability of a terrain to landslides. Explain 10 Marks KTU 2019

   b) Explain the impacts of landslides on the natural and built environment of an area

   c) How will you mitigate the impacts of landslides? 15 Marks KTU 2019

2. a) What are the main differences between risk management and crisis management?

   b) The stages in risk management that are to be given maximum consideration in a practical situation depend on the type of disaster under consideration. Do you agree with this? Support your answer with an example 15 Marks KTU 2019

   c) Explain the role of social factors in determining the intensity of risk

   20 marks KTU 2019

3.a Give the classification of different types of Disasters 5 marks GTU 2018 b. b. Describe natural disasters and man-made disasters. 5 marks GTU 2016 c. What is the role of GIS in Disaster management? 10 marks GTU 2016

4. a. Explain structural and nonstructural mitigation of disasters. 10 marks GTU 2015 b. What do you mean by Human Induced Disasters? 10 marks
5. a. Explain in brief the causes of climate change? 12 marks GTU2016 b. What do you mean by vulnerability? 8 marks GTU2016
6. a. What is remote sensing and how it is useful in Disaster management?

   10 marks GTU2016 b.

   Explain the relationship between disaster and sustainable development

   10 marks KTU 2018
7. a. What do you mean by Risk in Disaster Management? 10 marks GTU2016 b. What is the importance of crisis management in disaster management

   10 marks KTU2018

8. a. Explain the prevention of Biological Disasters. 10 marks GTU2017 b. Explain Disaster Management Cycle? 10 marks GTU2017
9. a. Explain the term Hazard and its characteristics? 10 marks GTU2016 b. Explain Disaster Mitigation Planning. 10 marks

10. a. Explain the following terms: Preparedness, mitigation and risk mapping

10 marks GTU2017 b.

Explain differences between hazards and disasters. 10 marks KTU2018

MODULE 2

1. a. How will you classify earthquake. Explain in detail 10 marks ktu 2019

   b) Explain the mechanism of origin of earthquake. 10 marks KTU2018

2. a. Magnitude and intensity of earthquake are important in seismic disaster management. How?

   10 marks KTU 2018

   b. Explain continental drift theory. 10 marks ktu 2019

3. a) How do earthquakes differ by their origin, magnitude and depth to focus?

   b) Discuss the response, resilience, rehabilitation and reconstruction stages of disaster management in the case of seismic disasters 15 marks KTU 2018

4. What are the effects of earthquake? 10 marks ktu 2019

5. How will you classify landslide? Explain in detail 20 marks KTU2018

6. What is the impact of landslide on streams? 20 marks

7. Explain the relationship between earthquakes and tsunamis. 20 marks KTU2018

8. a. Explain the mechanism of origin of earthquakes. 10 marks KTU2018

b. Enlist losses due to earthquake 10 marks GTU2018

MODULE 3

1. a) Write a note on the types of floods

   (b) Discuss the common causes of floods

   c) Explain the significance of flood plains in flood disasters management

   15 Marks KTU 2019

2 a. Give adverse effects of tsunami. Also discuss the tsunami mitigation measures. 20 marks

b.How are cyclone prevention and mitigation taken in India? 10 marks KTU 2019

c.What are the losses due to flood? 10 marks GTU2018

3. Write short notes on the mitigation measures to be adopted in the case of floods. 20 marks KTU2018

4. a) How do cyclones cause coastal floods?

b) Explain the nature of impacts caused by tropical cyclones

c) How will you mitigate the impacts of cyclones? 20 marks KTU 2019

5. a.Write a short note on prevention of flood. 10 marks KTU 2019

b.What are the conditions favorable for tropicalcyclones? 10 marks KTU2018

6. a Explain types of cyclone. 10 marks KTU 2018

b Describe initial development stage of Cyclone and mature tropical Cyclone 10 marks GTU2017

7. a.What are the characteristics of tropicalcyclones?10 marks KTU2018

b. Explain the probable impacts of Cyclone. 10 marks KTU2018

8. a.Write a shortnote on formation of cyclone. 10 marks

b.What are the impacts of cyclones in INDIA? 10 marks

MODULE 4

1. a) Desertification is completely a human induced disaster. Do you agree with it? Support your answer with valid reasons.

b) Describe the term "soil pollution" and write sources of soil pollution.

c) Explain the engineering measures to mitigate soil erosion 20 marks KTU 2019

2. a. Describe the types of soil degradation? 10 marks KTU 2019

b. What are the effects of desertification? 10 marks KTU 2019

3. a. Outline the reasons for desertification? 10 marks KTU2018 b. What are the solutions for soil degradation? 10 marks KTU2018

4. a.What are the effects of soil degradation?10 marks

b.What are the solutions for desertification?10 marks

5. a. Mention the reasons and impacts of the salination of soil. 10 marksKTU 2018

b.Explain the engineering measures to be adopted in the mitigation of soil erosion 20 marks KTU2018

MODULE 5

1.a) What is green house effect?

b) List the main green house gases.

c) Explain global warming and its main impacts.

d) Discuss climate change as an anthropogenic disaster 20 marks KTU2019

2. a.What are the sources of water pollution? 10 marks KTU2018 b. What are the causes of water pollution? 10 marks

3. a.How will you prevent water pollution? 10 marks

b.What are the causes of atmospheric pollution? 10 marks KTU 19

4. a.Explain the impacts of air pollution. Give details of different air pollutants. 10 marks KTU2019

b.How will you prevent air pollution? 10 marks

5. Write a short note on Green House effect and global warming 20 marks KTU2018

6. Explain the impacts of air pollution. Give details of different air pollutants

20 marks KTU2018

MODULE 6

1. a) How will you delineate the area that is going to be affected by river floods?

b) Describe the structural measures that are considered in flood mitigation planning

c) Explain the non-structural measures in flood mitigation 15 marks KTU 2019

2. a) How do tidal waves originate?

b) How will you assess the vulnerability of an area to the impacts of tidal waves?

c) Explain the formulation of plan to mitigate the impacts of tidal waves 20 marks KTU 2019

d) What are the crisis management plans for floods? 20 marks KTU2018

3. Outline the stages involved in the crisis management for floods. KTU2018

4. Explain the impacts of influx of tidal waves and explain how to manage them KTU2018

5. What are the hazard management plans for cyclones?

6. What are the hazard management plans for tidal waves?

7. How will you formulate the mitigation plans for cyclones? KTU2018

QUESTION BANK – ENVIRONMENT AND POLLUTION- S5 CE

MODULE -I

1. Illustrate the population growth curve in detail
2. What are the major pollution problem caused by Urban areas
3. Interpret the statement environment is multidisciplinary in nature?
4. Explain various components of environment ?
5. Illustrate the different processes involved in nitrogen cycle.

MODULE -II

1. What are the main sources and effect of fluride emission to the atmosphere.
2. What is meant by ambiant air quality standard?
3. Define the effects of air pollutants on vegetation
4. Classify primary and secondary pollutants with examples
5. Explain the types of air pollutants
6. What is lapse rate and stability of atmosphere?

MODULE –III

1. What is BOD ? What is it's environmental significance?
2. Compare point and non point sources of pollution?
3. List out major pollutants of water
4. Discuss physics chemical and biological characteristics of water
5. Differentiate the water quality characteristics between surface water and ground water sources

MODULE –IV

1. Give the importance of municipal solid waste management
2. Discuss the importance of pyrolysis
3. Elaborate the various MSW sources, it's classification and characteristics

4. Describe the recycling and reuse of solid waste
5. Define e waste, explain it's sources of generation
6. Identify the composition and characteristics of of solid waste

MODULE –V

1. What are tailings and give it's importance in land pollution
2. What are the various problems associated with management of plastics
3. Identify the various problems associated with ship breaking
4. Write the importance of pH of soil to control the soil pollution
5. Identify the various land pollution abatement process and explain each.
6. What are the various problems encountered in open dumping of wastes

MODULE –VI

1. List the major sources and effects of land pollution
2. Enlist and explain the measures to be adopted to protect the sound reception
3. Evaluate the effects of urbanization and land degradation
4. Explain the sources and effects of noise pollution
5. Distinguish between land and soil pollution
6. Write short note on measurement of noise
7. Define noise pollution.outline the term equivalent sound pressure level.
8. Elucidate abatement measures for land pollution

QUESTION BANK – GEOMATICS- S5 CE

MODULE -I

1. a. Briefly explain about various methods of Traversing? 10 marks
   b. Explain about the checks which can be applied in traverse surveying? 10 marks
2. a. Distinguish between Latitude and Departure? 5 marks
   b. Briefly explain about balancing the traverse? 15 marks
3. a .Compare the traversing by fast needle method and loose needle method? 5 marks
   b. The following are the length and magnetic bearings of the sides of a traverse ABCD. Find the errors of closure. 15 marks

Line	Length in m	Bearing
AB	470	$340^0 52'$
BC	640	$85^0 40'$
CD	430	$170^0 40'$
DE	560	$265^0 12'$

MODULE -II

1. a. List the various types of curves. Types of curves: 10 marks
   b. What are the three classes of circular curves? 10 marks
2. a. What are the elements of a simple Circular curve? 10 marks
   b. Define: Setting out of curves (curve ranging). What are the methods used for setting curves? 10 marks
3. a .Define: transition curve. 15 marks
   b. What are the functions of a transition curve? What are the types of transition curve? 15 marks
4. Explain the various methods of determining the length of a transition curve 20 marks
5. What are the difficulties in setting out simple curves? Describe briefly the methods employed in overcoming them. 20 marks
6. a. Briefly explain reverse curves and shift of a transition curve. 10marks

   b. Explain the elements of a compound circular curve 10 marks

MODULE –III

1. Briefly explain about Global Navigation System and its types? 20 marks
2. a. What you mean by Global Positioning System,
   what are the components of Gps 10 marks
   b. Explain about the principles of GPS? 15 marks
3. a. Explain errors in GPS ranging, Explain any two in detail 10 marks
   b. Briefly explain about the various applications of GPS 10 marks
4. Explain the principle of position determination by satellite ranging 20 marks

MODULE –IV

1. Explain static and rapid static methods of GPS surveying 20 marks
2. What you mean by visibility diagram? Illustrate with sketch 20 marks
3. What is meant by DGPS? Explain code based and carrier based DGPS system 20 marks
4. Explain briefly about various phases of GPS survey? 20 marks

MODULE –V

1. a. What is meant by multi spectral scanning? 5 marks
   b. Explain along track and across track scanning? 10 marks
   c. What is meant by remote sensing? 5 marks
2. a. Describe the principles of remote sensing? 5 marks
   b. Explain passive and active remote sensing? 15 marks
3. What is meant by spectral reflectance? Explain the reflectance characteristics of soil, vegetation and water with the help of spectral reflectance curve? 20 marks

MODULE –VI

1. a .Briefly explain about Geographic information system and its applications 10 marks
   b. Describe the various components of GIS? 10 marks
2. a. Write short notes on spatial data and attribute data? 7 marks
   b. Explain geographic coordinate system and projected coordinate system? 13 marks
3. Explain Mercator projections; write down its properties and limitations? 20 marks
4. List down the types of map projections according to the projection surface. Explain any two with sketches? 20 marks
5. Briefly explain about any two vector data analysis? 20 marks

GEOTECHNICAL ENGINEERING 2

MODULE 1

1. (a) What are the assumptions made in boussinesq's formula for stress distribution***? (KU 2008 SCHEME)(5)***

(b) Explain the use of newmark's chart?***(5)***

(c) What are the limitations of Boussinesq's formula?***(5)***

2. (a) Two columns A and B are located 6m apart. Column A transfers a load of 500KN and column B a load of 259KN.Determine the resultant vertical stress on a horizontal plane 20m below the ground surface at a point vertically below A and B? ***(KU 2013 SCHEME)(10)***

(b) Write down the expression for vertical stress below the centre of circular loaded area and explain the terms?***(5)***

3. (a) Plot the variation of vertical stress beneath the centre of a strip footing of 3m width which carries a uniform pressure of 140kPa. ***(KU 2013 SCHEME)(8)***

(b) Differentiate between pressure bulb and isobar?***(7)***

4. (a) A circular footing of diameter 3m is subjected to a uniform pressure of 200 kPa. Compute the depth beneath the centre of the loaded area at which vertical stress would reduce to 20kPa***(KTU 2016 SCHEME)(15)***

5. (a) Describe the method of calculating the stress at a point below the corner of a rectangular load .How is this method used for points other than that below the corner? ***(KU 2016 SCHEME)(8)***

(b) Define the pressure bulb? What is it significance?***(7)***

6. (a) A rectangular raft of 30x 12m founded on a ground surface is subjected to a uniform pressure of 150kPa. .Assume the centre of the area is the origin of coordinates(0,0) and the corners have coordinates (6,15).Calculate the stress at a depth of 20m by equivalent point load. Use boussinesq's theory, at the coordinates of(0,0)and (6,15).? ***(KU 2013 SCHEME)(15)***

7. (a) Write down the expression for a vertical stress below the centre of a strip load***?(3)***

(b)Draw the isobar of strip loaded area? ***(KU 2013 SCHEME)(4)***

(c)The base of the tower consists of a equilateral triangular frame, on the corners of which the 3 legs of the tower is supported. The total weight of tower is 600KN.which is equally carried by 3 legs. Compute the increment in the vertical stress in the soil caused at a point 5m below one of the leg***?(8)***

MODULE 2

1. (a) Explain active and passive states of plastic equilibrium. Give any one practical example of each of these***(KU 2013 SCHEME)(5)***

(b)Draw a mohr's circle for active and passive earth pressure?***(5)***

(c) What is the effect of surcharge on depth of tension crack in case of a retaining wall with purely cohesive backfill? Explain?***(5)***

2. (a) Differentiate between rankin's and columb's theory of lateral earth pressure? ***(KU 2013 SCHEME)(8)***

(b) What is lateral earth pressure coefficient? Write down the expression for lateral earth pressure coefficient in at rest,passive and active case?Explain each term?***(7)***

3. (a) Determine the total lateral earth pressure in the case of a 6m high retaining wall carrying a uniform surcharge of 14kPa, for the soil data given below.

Upper stratum:

cohesion = 16kPa, angle of internal friction = 30°. unit weight of soil = 16kN/m3, Thickness = 2m

Lower stratum; angle of internal friction = 40°. Unit weight of soil above water table =18kN/m3,saturated unit weight of soil 20kN/m3.Water table is at a depth of 4m below the surface of backfill. Assume that tension cracks are not likely to develop***(KTU 2018 SCHEME)(15)***

4. Compute the total lateral earth thrust exerted by a layered backfill of height 10m if the wall has a tendency to move towards backfill. The upper layer of thickness 6m has angle of internal friction 32° and saturated unit weight 18kN/m3 The lower layer has angle of internal friction 28°, cohesion20kPa, and saturated unit weight 19kN/m3. The backfill also supports a uniform surcharge of intensity 8kN/m2 Water table is at a depth of 5m below the surface of the backfill. Also find the point of application. ***KTU 2018 SCHEME)(15)***

5. A wall of 8m height retains a non-cohesive backfill of dry unit weight 18kN/m3 and φ =30°. Using Rankine's theory find the total active thrust on the wall and the point of application if it carries a uniform surcharge load of 10kPa. ***KU 2015 SCHEME)(15)***

6. (a) What is the effect of tension crack in earth pressure of cohesive backfill?***(5)***
   (b) What are the assumptions of rankin's earth pressure theory?***(5)***
   (C)What are the Assumptions of columb's wedge theory? ***KTU 2018 SCHEME)(5)***

MODULE 3

1. (a) What are the assumptions in Terzaghi's bearing capacity theory***(10)***

(b) Differentiate between general and local shear failure of soil. ***KU 2015 SCHEME)(5)***

2. (a) A square footing of 2mx2m is provided at a depth of 1m, in a sandy soil with an angle of internal friction of 30°. Compute the net safe bearing capacity of the soil with a factor of safety of 3, when the water table is at a depth of 0.5m & 1.5m below the ground level. Given G = 2.65, e = 0.7, Degree of saturation above water table = 80%, Nc=95, Nq=80.4, Nγ=100.2. ***KU 2012 SCHEME)(10)***

   (b) Explain the functions of vertical drains in reducing the settlement?***(5)***

3. (a) Briefly discuss soil stabilization through pre- loading. ***KTU 2018 SCHEME)(5)***

   (b) What is equations and limitations of Terzaghi's bearing capacity theory . ***(5)***

   (c)What remedial measures can be taken to control the differential settlement of foundations***(5)***

4. Calculate the net safe bearing capacity of a rectangular footing 2m x 4m in plan, founded at a depth of 1.5 m below the ground surface. The load on the footing acts at an angle of 15° to vertical. Saturated unit weight of soil = 18kN/m3, cohesion = 15kPa, angle of internal friction = 30°. Natural water table is at a depth of 2m below ground surface. Use IS 6403- 1981 recommendations. Assume the soil to be fully saturated above water table and factor of safety against shear failure as 2.5 ***KTU 2018 SCHEME)(15)***

5. (a) What are the harmful effects of differential settlement? ***KTU 2016 SCHEME)(5)***

   (b) Differentiate between safe bearing capacity and safe bearing pressure? ***(5)***

   (c) Differentiate between ultimate bearing capacity, safe bearing capacity and allowable bearing capacity? ***(5)***

6. (a) Explain the term floating foundation? ***KTU 2018 SCHEME)(5)***

   (b)Write a note on influence of water table on bearing capacity? ***(5)***

   (d) Differentiate between total and differential settlement? ***(5)***

MODULE 4

1. (a) Under what situations raft foundation is preferred? ***KTU 2016 SCHEME)(5)***

   (b) Explain with neat sketches, the various elements of a well foundation.***(10)***
2. Design the plan dimensions of a trapezoidal footing to support two adjacent columns at a centre to centre distance of 5m carrying loads of 1500kN and 3000kN. The smaller column is of size 400mmx400mm and is at a clear distance of 250mm from the property line. The bigger column is of size 750mmx750mm. The permissible soil pressure is 300kPa.? ***KTU 2016 SCHEME)(15)***

3. Determine the plan dimension of a combined footing to support two columns (Column A: Q = 1000 kN, size = 0.3 m x 0.3 m ; Column B : Q= 800 kN, size = 0.2 m x 0.2 m). Centre to centre distance between columns is 3.6 m. Distance available beyond the outer face of the 1000 kN column is only 0.2 m. Assume safe bearing capacity of the column as 270 kPa. Also mention the situations wherein combined footings are needed. ***KTU 2018 SCHEME)(15)***
4. (a) Briefly explain any four methods for rectification of tilts and shifts with neat sketches. . ***KU 2015 SCHEME)(15)***
5. (a)What are the forces acting on well foundation? . ***KTU 2018 SCHEME)(5)***

   (b) In what situation raft foundation is preferred? ***(5)***

   (c)What do you mean by a fully compensated raft? ***(5)***

MODULE 5

1. (a) What is negative skin friction?What are the effects of negetive skin friction in the load caarying capacity of pile? ***KU 2013 SCHEME)(5)***

   (b)What is dynamic pile capacity?***(5)***

   (c)Write down the dynamic formule for calculating load carrying capacity of a pile? ***(5)***

2. A group of 9 piles 12m long and 250mm in diameter is to be arranged in a square form in clay with an average unconfined compressive strength of 60kN/m2 Determine the centre to centre spacing of the pile for group efficiency of 1. Neglect bearing at the tip. α=0.9? ***KTU 2016 SCHEME)(5)***

3. Using modified Hiley'sformula, determine the safe load that can be carried by a pile. The gross weight of the pile is 1400kg, weight of hammer 2000kg, height of fall 91cm, hammer efficiency 70%, average penetration under the last 5 blows is 10mm , coefficient of restitution is 0.55 and the factor of safety is 2.5. assume C=2.5 and e = 0.5 ? ***KU 2015 SCHEME)(15)***

4. A 2 x 3 pile group (diameter of pile = 400 mm; length = 10m) is installed in a layered cohesive soil with the following properties.
   Upper layer: cohesion = 70 kPa; adhesion factor = 0.5; unit weight of soil=16 kN/m^3; Thickness=6m.
   Lower layer; cohesion = 150 kPa; adhesion factor = 0.4; unit weight of soil = 20 kN/m^3. Determine the safe load carrying capacity of the pile group? ***KTU 2018 SCHEME)(15)***

5. How can the safe load on a pile be estimated from static pile load test results? ? ***KU 2013 SCHEME)(15)***

6. (a)How will you estimate the group capacity of pile in sand and clay? ***KTU 2018 SCHEME)(5)***

   (b)Disuss any two dynamic formula? What are their limitations?***(10)***

MODULE 6

1. (a)Explain with a neat sketch, the wash boring method. What are its advantages and disadvantages? ***KTU 2017 SCHEME)(5)***
   (b)Explain mass spring model for undamped free vibration? ***(5)***

   (c) What are the main objectives of the site investigation? ***(5)***

2. (a) Explain in detail the procedure for standard penetration test. ***KU 2016 SCHEME)(5)***

   (b) Explain the corrections to be applied to Standard Penetration Test results.? ***(5)***

   (c) Write a note on uniform elastic compression? ***(5)***

(3) (a) What is meant by Coefficient of uniform elastic compression. Mention any two methods for vibration isolation ***KTU 2018 SCHEME)(5)***

b. Explain wash boring with neat sketches? ***(10)***

4(a) Explain mass spring analogy with reference to machine foundation? ***KU 2015 SCHEME)(5)***

b. Explain with neat sketches the isolation methods adopted in vibrations? ***(10)***

5.(a) A standard penetration test was conducted on saturated fine sand below the ground water table. The SPT value was found to be 32.Does the value represent the true SPT value?Explain? ***KTU 2018 SCHEME)(7)***

b.How will you select the depth of boring in soil exploration programme? ***(8)***

6(a). The standard peneration obtained in a course sand deposite at a depth of 6m was 24.The ground water table is at a depth of3m below the ground level.The dry density was 17.6Kn/m3.\ and saturation density 20.8kn/m3.What is the corrected N value after applying necessary corrections? ***(10)***

b.What is the natural frequency of a machine foundation having a base area of 2mx2m and weight 150Kn including the weight of machine.Total coefficient of elastic compression 4x10^4Kn/m3. ***KTU 2018 SCHEME)(5)***

STRUCTURAL ANALYSIS II

MODULE 1

1. Explain static determinacy and kinematic determinacy with two examples each.

(5 marks) [KU Nov 2014]

2. Derive the equations of three moment theorem (10 marks)[KU Jan 2018]

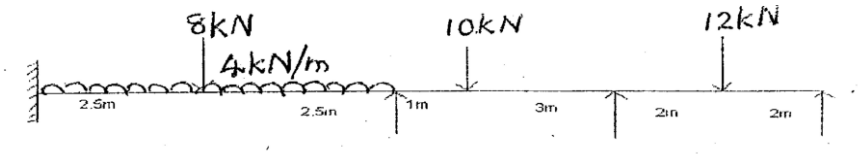
3. State and explain Clapeyron's method of three moments. (5 marks) [KU Sep 2016]

4. Derive the expression of Clapeyron's theorem subjected to general loading.

(10 marks)

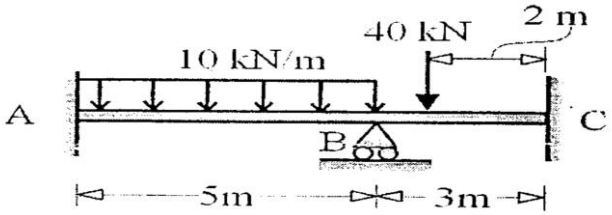
5. Analyse the continuous beam by three moment method and draw the SFD and BMD.

(15 marks) [KU Sep 2016]



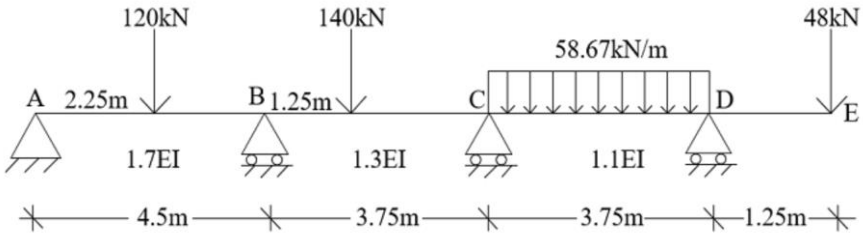
6. Analyse the continuous beam by three moment method and draw the SFD and BMD.

(15 marks)[KU Sep 2016]

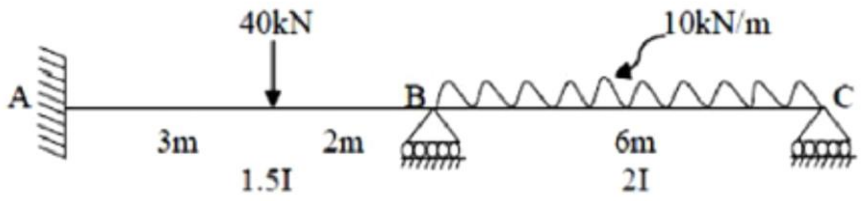


7. Analyse the three-span continuous beam ABCD, with overhang DE, for the loading, end support conditions, spans and flexural rigidity as shown in Figure by applying the theorem of three moments. Draw the BMD and SFD.

(15 marks) [KTU Dec 2018]



8. Analyse the continuous beam shown in figure by Three moment equation and draw the SFD and BMD. EI = 3200 kNm^2 (10 marks) [KTU Apr 2018]



MODULE 2

1. What are the causes of side sway in portal frames?

(5 marks)[KU Nov 2014, Nov 2013, Sep 2016]

2. Explain the slope deflection method of analysis of structures?

(5 marks) [KU Nov 2014, Nov 2013]

3. Explain how the shear equation is developed for a single bay single storey frame.

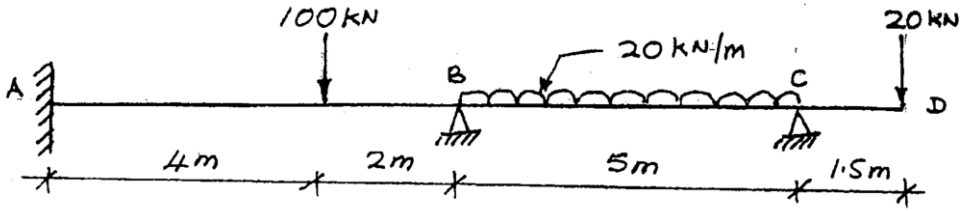
(5 marks)[KU Nov 2011]

4. Explain approximate method of analysis for multi-storeyed frames.

(5 marks) [KU Sep 2016]

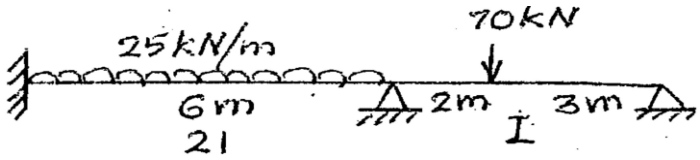
5. Analyse a propped cantilever carrying udl using slope deflection method.

(15 marks)[KU Nov 2011]



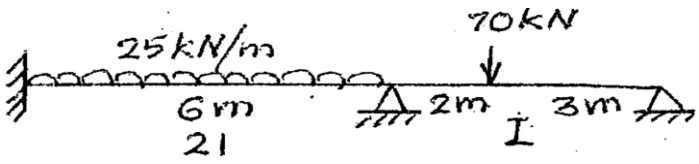
6. Analyse the continuous beam shown in the figure by using slope deflection method. The support B sinks by 15 mm. Take E = 200 X 105 kN/m2 and I = 120 x 10-6 m4.

(20 marks) [KU Jan 2018]

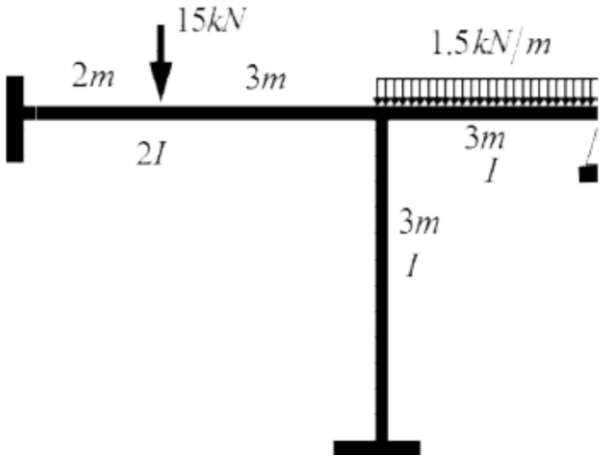


7. Analyse the continuous beam by slope deflection method and draw the SFD and BMD.

[KU Sep 2016]

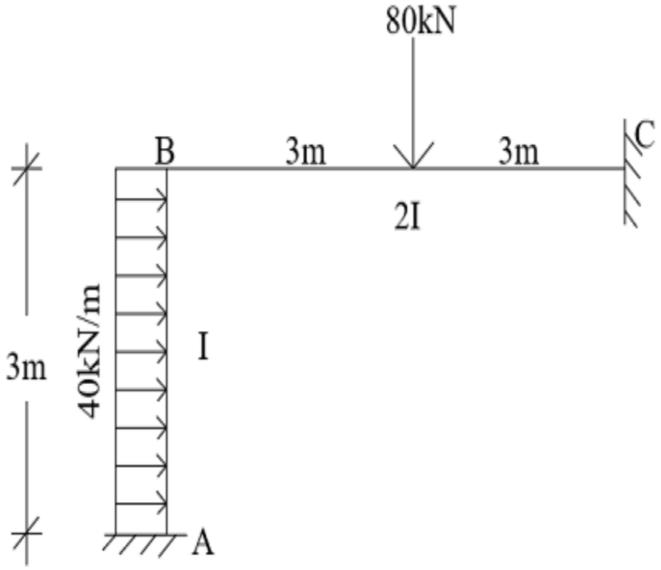


8. Find the bending moments at B and C of the portal frame shown in the figure using slope deflection method. (15 marks) [KTU Dec 2017]



9.Differentiate between force and displacement methods of analyses. Give one example for each case. (3 marks) [KTU Dec 2018]

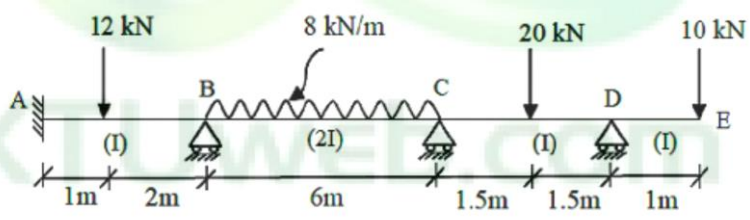
10. Determine the moments at A, B and C using slope deflection method for the frame shown in Figure. Draw the BMD. (12 marks) [KTU Dec 2018]



11. Set up the slope deflection equations for a beam considering support settlement.

(4 marks) [KTU Dec 2018]

12. Analyse the continuous beam shown the BMD.



MODULE 3

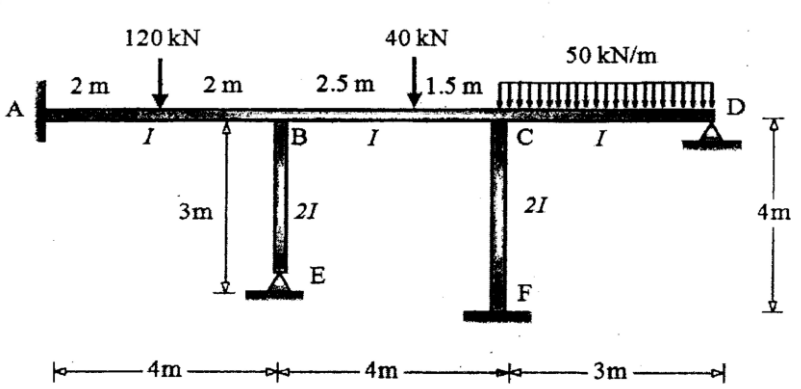
1. Explain the moment distribution method for portal frames with side sway.

(5 marks) [KU Nov 2014, Sep 2016]

2. Explain the concept of carry over moment in moment distribution method.

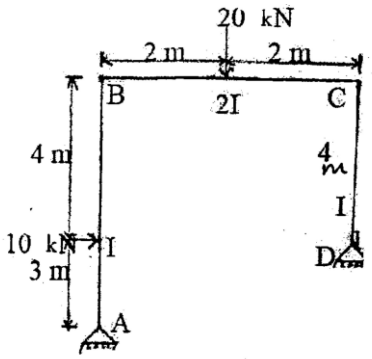
3. Analyse the portal frame by moment distribution method and draw the BMD (EI Constant)

(15 marks) [KU Nov 2014]

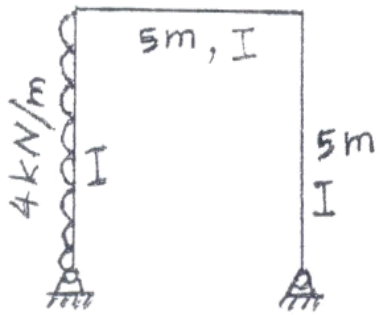


4. Analyse the portal frame by moment distribution method and draw the BMD.

(15 marks) [KU Dec 2016]

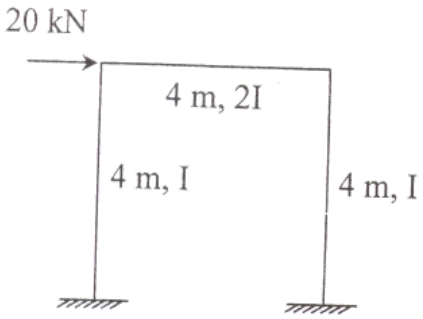


5. Analyse the rigid frame shown in the figure using moment distribution method and draw the BMD. (15 marks)[KU Jan 2018]



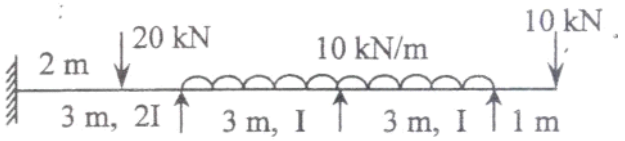
6. Analyse the portal frame by moment distribution method and draw theBMD.

(15 marks) [KU Nov 2011]



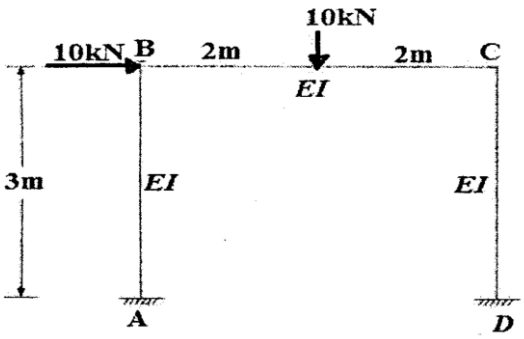
7. Analyse the continuous beam by moment distribution method and draw the BMD.

(15 marks) [KU May 2012]



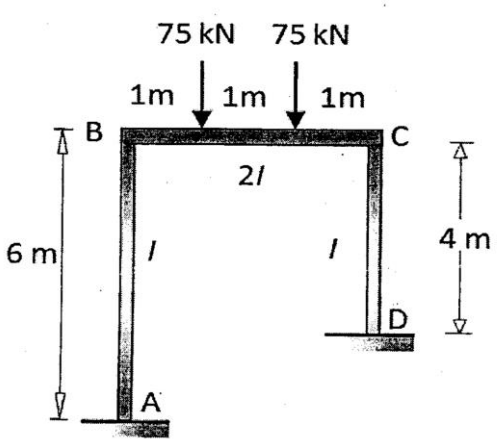
8. Analyse the portal frame by moment distribution method and draw the BMD.

(15 marks)[KU Oct 2016]



9. Analyse the portal frame by moment distribution method and draw the BMD.

(15 marks) [KU Dec 2016]



10. Define the following terms (5 marks) [KTU Apr 2018]

(i) Carry Over factor (ii) Carry over moment (iii) Distribution Factor

11. Differentiate between moment distribution method and Kani's method.

(7 marks) [KTU Dec 2017]

12. Derive expressions for stiffness at the near end and carry over factor for a beam with hinged far-end (8 marks) [KTU Dec 2017]

MODULE 4

1. Derive rotation factor used in Kani's method. (5 marks)[KU Jan 2018]

2. Is it possible to determine the joint rotations and storey displacements in Kani's method of analysis? Explain. (5 marks) [KU Jan 2018]

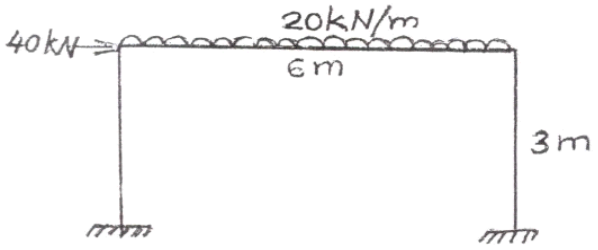
3. What are the advantages of Kani's method? (5 marks) [KU Dec 2015]

4. Discuss the following terms:

- Displacement factors
- Distribution factors
- Storey moments

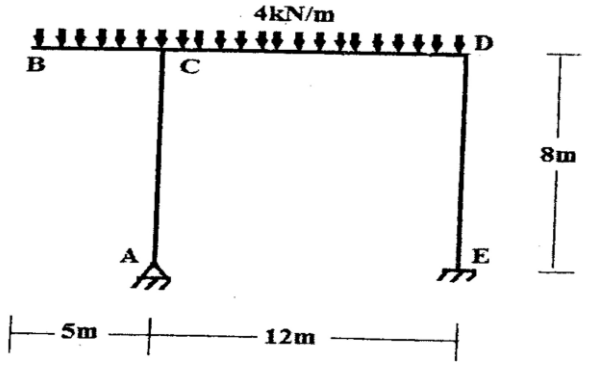
5. Analyse the portal frame by kani's method and draw the BMD.

(15 marks) [KU Nov 2011]



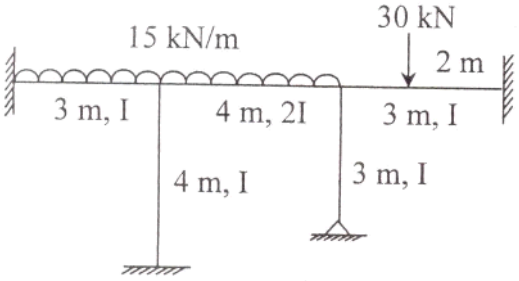
6. Analyse the portal frame by kani's method and draw the BMD.

(15 marks) [KU Nov 2013]



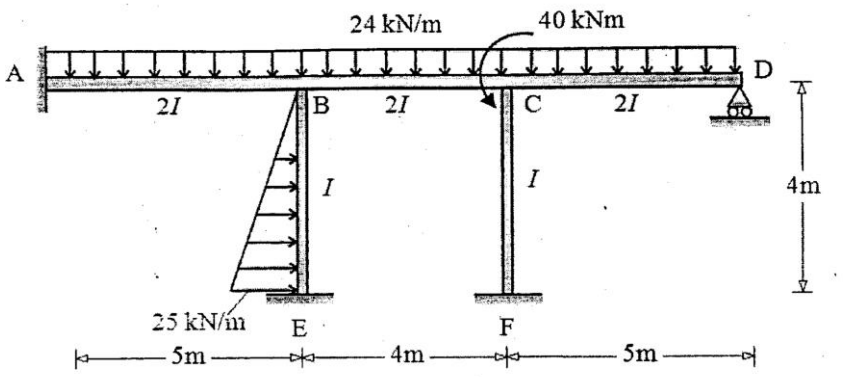
7. Analyse the portal frame by kani's method and draw the BMD.

(15 marks) [KU Oct 2016]



8. Analyse the portal frame by kani's method and draw the BMD.

(15 marks) [KU Dec 2016]



9. Differentiate distribution factor and rotation factor in structural analysis.

(5 marks)[KTU Dec 2018]

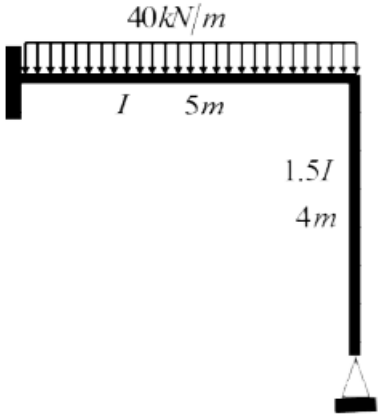
10. Formulate Kani's analysis procedure using a prismatic beam element AB having length l and flexural rigidity EI. (10 marks)[KTU Dec 2018]

11. Describe the procedure for analysis of indeterminate structures by Kani's method

(5 marks)[KTU Dec 2018]

12. Analyse the portal frame by kani's method and draw the BMD.

(15 marks)[KTU Dec 2017]



MODULE 5

1. Give example of beams curved in plan. (3 marks)[AU May 2018, AU May 2016]

2. Mention the components of forces acting on the beams curved in plan.

(3 marks)[AU May 2017]

3. Analyse the quarter span beam of radius 'r' subjected to a point load at the free end. Draw SFD, BMD and TMD. Determine the vertical deflection at the free end.

(20 marks)[KTU May 2017]

4. Analyse the quarter span beam of radius ‘r’ subjected to a point load at the mid span. Draw SFD, BMD and TMD. Determine the vertical deflection at the free end and under the load. (20 marks) [KTU Dec 2018 Dec 2017, May 2017]

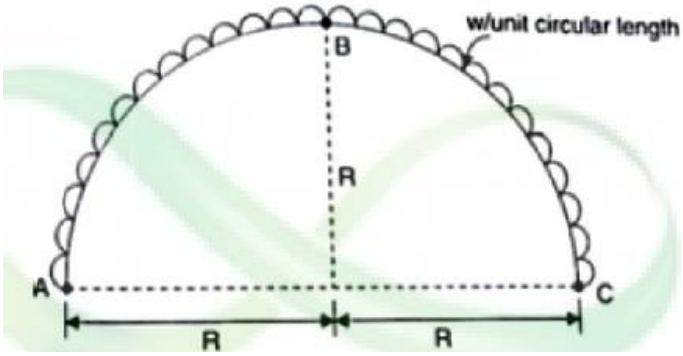
5. What are curved beams? (5 marks) [AU Dec 2015]

6. Analyse the circular beam supported using 6 columns. Draw SFD, BMD and TMD. (10 marks)

7. Determine the expression for bending moment and twisting moment for circular ring beam supported by a no: of columns placed at regular intervals. (20 marks) [KTU Dec 2018]

8. List out the circumstances where curved beams are provided. (4 marks) [KTU Apr 2018]

9. A beam shown in figure is semi-circular in plan supported on three equally spaced supports. The beam carries a uniformly distributed vertical load of w/unit of the circular length. Analyse the beam and sketch the bending moment and twisting moment diagrams.



MODULE 6

1. Explain about plastic collapse of steel structures. (5 marks)[KU Dec 2016]

2. What is meant by shape factor? Determine shape factor for a rectangular section of size b x d. (5 marks) [KU Dec 2016]

3. Explain the term ‘mechanism’ as used in plastic analysis. What are the various independent mechanisms? (5 marks)[KU Apr 2014]

4. Define (a) Plastic Hinge (b) Shape Factor (5 marks)[KU May 2013]

5. Define the mechanism in plastic theory. (5 marks)[KU May 2013]

6. What are the assumptions made in plastic analysis of structures? (5 marks) [KU Mar 2017, AU May 2016]

7. Find the shape factor of a circular section. (5 marks)[KU May 2014]

8. Explain the various theorems in plastic analysis. (5 marks) [KU Nov 2017]

9. Determine the shape function of T section of size 120mm x 120mm x 10mm.

(10 marks) [AU May 2018]

10. Determine the length of plastic zone of a simply supported beam of rectangular section supporting a point load at the centre. (5 marks) [KU May 2011]

11. A portal frame ABCD fixed at A and D is loaded with a point load of 20kN at the middle point of BC and a horizontal point of 10kN at the joint B towards right. The length of AB = 5m, BC = 4m and CD = 2m. If the plastic moment of AB, BC and CD are respectively 2mp, mp and mp, determine the values of plastic moment.

(20 marks) [KU May 2011]

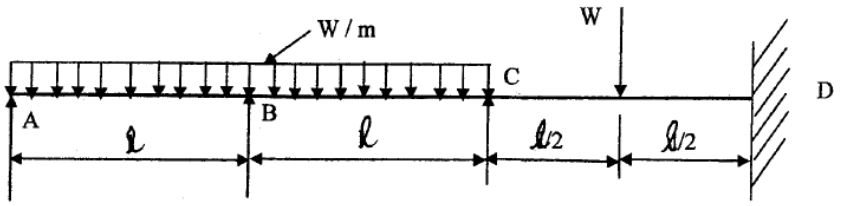
12. A beam is fixed at both ends is subjected to udl 'w' on the ¾ length of the right support. Determine the value of collapse load, Wc. The beam is of uniform plastic moment 'Mp'.

(20 marks) [KU Apr 2014]

13. Find the plastic moment capacity of a propped cantilever carrying udl w/m by using static method of analysis. (5 marks) [KU Apr 2014]

14. Find the collapse load for a continuous beam of a uniform cross section shown in the figure.

(20 marks) [KU Mar 2017]



15. Determine the collapse load for the fixed beam AB of span L. At point C, 0.2L distance from the left support A, there is a concentrated load of 1.25 W and another concentrated load of W is acting at point D which is 0.25L from the support B. The plastic moment of resistance of the beam is Mp. (10 marks) [KTU Dec 2018]

16. Locate the plastic hinges in a propped cantilever beam carrying UDL.

(6 marks) [KTU Dec 2018]

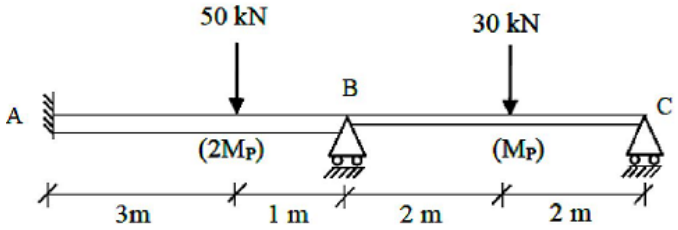
17. Explain the following terms.

(i) Plastic hinge (ii) Load factor (iii) Shape factor (iv) Plastic Moment

(8 marks) [KTU Dec 2018]

18. Calculate the plastic moment carrying capacity required for the continuous beam with the working loads as shown in figure. Take load factor =1.5

(10 marks) [KTU Apr 2018]

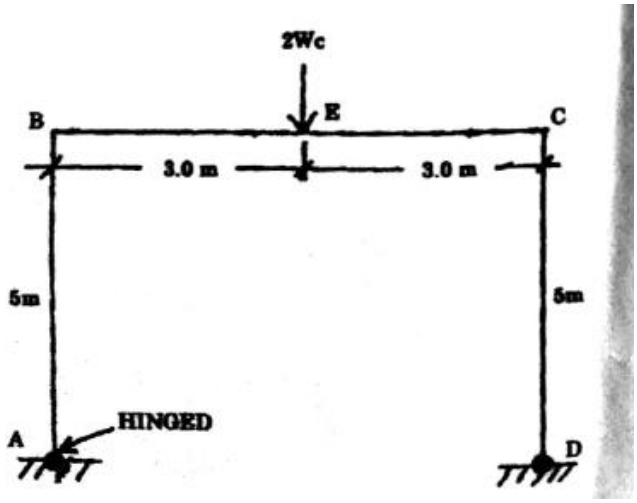


19. Locate the plastic hinges in a propped cantilever beam carrying UDL.

(6 marks) [KTU Dec 2018]

20. A portal frame ABCD shown in the figure has uniform cross section throughout. Determine the plastic moment of resistance in terms of the load, Wc at the collapse.

(20 marks) [AU Dec 2017]



MODULE 1

1. What are the different types of precipitation? 6 marks KTU Dec 2018
2. How will you determine optimum number of rain gauges for an area? 4marks,KTUMay 2018
3. The areas enclosed by the adjacent isohyets of a catchment are given in table below. Determine the average depth of rainfall. 10 marks KTU may 2019

Isohyets (cms)	25 - 30	30 - 35	35 - 40	40 - 45	45 - 50
Area (sq.km)	10.0	11.2	11.6	9.3	8.4

4. What are the various methods of computing average rainfall over a basin?
   10 marks KTU Dec 2018
5. The average annual rainfall depths recorded at 5 rain gauge stations are 910,1070,1410,810 and 500mm respectively. If the average depth of rainfall over the basin is to be estimated within 10% error, determine the additional number of gauges needed. 10 marks KTU Dec 2018
6. State the uses and limitations of unit hydrograph. 5 marks KTU Dec 2018
7. Ordinates of a 4hr unit hydrograph are given below. Derive the ordinates of a 12hr unit hydrograph 10 marks KTU Dec 2018

Time (h)	0	4	8	12	16	20	24	28	32	36	40	44
Ordinates of 4hr UH (Cumec)	0	20	80	130	150	130	90	52	27	15	5	0

8. Write a short note on IMD land pan for measuring evaporation?
   5 marks KTU Jun 2018
9. What are the factors that affect evaporation from a water body? 7 marks KTU may 2018
10. What is Φ index? 5 marks KTU Dec 2018
11. Explain the experimental method of determination of infiltration capacity using double ring infiltrometer? 8 marks KTU Dec 2018
12. Explain hydrologic cycle with a neat sketch and state its importance? 7 marks KTU Dec 2018
13. Explain the components in a hydrological cycle with a neat sketch. 7 marks KTU may 2018
14. How can you obtain the optimum number of rain gauges in a catchment area?
    6 marks KTU may 2019
15. Differentiate mass curve and hyetograph. 5 marks KTU Dec 2018

16. Explain the methods to find the average precipitation over a catchment area. 5 marks
17. The isohyets for annual rainfall over a catchment were drawn and areas of strips between isohyets are obtained as below. Determine the average depth of annual rainfall over the area. 5 marks KTU Dec 2018

Isohyets(mm)	450-550	550-650	650-750	750-950	950-1150	1150-1250
Area (km^2)	1200	3000	2800	1000	900	600

18. Define infiltration indices. 5 marks KTU May 2018

MODULE 2

1. With neat sketches discuss any two methods of base flow separation. 4 marks
2. The rate of precipitation observed over a catchment of 30km2 for successive 30 min are 16, 20, 24, 36, 28, 12 and 4mm/hr. If the φ index is 22mm/hr, find the runoff volume in m3 from the catchment. 10 marks KTU May 2019
3. A water course has culturable command area of 2600 hectares out of which the intensities of irrigation for perennial sugar cane and rice crops are 20% and 40 % respectively.The duty for these crops at the head of the water course are 750 hectares per cumec and 1800 hectares per cumec respectively. Find the discharge required at the head of water course if the peak demand is 120% of the averagerequirement. 10 marks KTU May 2019
4. State the uses and limitations of unit hydrograph. 5 marks KTU May 2019
5. What are the factors affecting Run-Off? 5 marks KTU May 2019
6. Define Flow and lift irrigation. 10 marks KTU May 2019
7. The following is the set of observed data for successive 15 minutes period of 100 minutes storm in a catchment :

Duration (min)	15	30	45	60	75	90	105
Rainfall (cm/h)	2.0	2.0	8.0	7.0	1.25	1.25	4.5

If the value of φ- index is 3 cm/h, estimate the net runoff, the total rainfall and the value of W-index? 10 marks KTU May 2018

8. Describe the S curve method of developing a 6- h UH by using 12-h UH.? 5 marks
9. What is unit hydrograph? Stating the assumptions, explain the derivation of a unit hydrograph from a storm hydrograph. 5 marks KTU May 2019
10. Ordinates of 2 hourunit hydrograph are given below. Using this derive the ordinates of a 6 hour unit hydrograph using S hydrograph method. 10 marks KTU Dec 2018

Time (hrs)	0	2	4	6	8	10	12	14	16	18	20	22
Ordinate of 2 hour unit hydrograph (cumec)	0	25	100	160	200	170	110	70	30	20	8	0

MODULE 3

1. Explain the various methods of surface irrigation.? 5 marks
2. What are the different flooding methods of irrigation? 8 marks KTU May 2019

19. Define the terms (i) root zone depth (ii) permanent wilting (ii) consumptive use (iv) conveyance efficiency 8 marks
3. What are the factors affecting duty? 5 marks KTU May 2019

4. A water course has culturable command area of 2600 hectares out of which the intensities of irrigation for perennial sugar cane and rice crops are 20% and 40 respectively .The duty for these crops at the head of the water course are 750 hectares per cumec and 1800 hectares per cumec respectively. Find the discharge required at the head of water course if the peak demand is 120% of the average requirement.? 10 marks KTU Dec 2018

5. Define Flow and lift irrigation.? 5 marks KTU May 2019
6. Explain the “frequency and intensity of irrigation”.? 5 marks KTU Dec 2018

7. Distinguish between field capacity and permanent wilting point? 5 marks KTU Dec 2018
8. Define culturable command area and intensity of irrigation? 5 marks KTU Dec 2018

9. The irrigated area of a water course is 800 ha. The intensity of rice in this area is 65%. The duration for transplantation of rice is 15 days and the total depth of water required by the crop is 60 cm, on the field, during transplantation period. The useful rain falling during transplantation period is 15 cm. Find the duty of the irrigation water for the crop on the field during transplantation at the head of the field channel and at the head of the distributary, if the losses of water in the water course is 25%. Also find the discharge in the water course?

   10 marks KTU Dec 2018

10. Write short notes on furrow irrigation? 5 marks KTU May 2018
11. Write short notes about types of irrigation? 5 marks KTU Dec 2018

12. Find the delta of a crop when its duty is 864hectares/cumec on the field, the base period of the crop being 120days?

    The following data pertains to the healthy growth of a crop

    Field capacity of soil =30%

    Permanent wilting percentage =11%

    Density of soil =1300kg/m3

    Effective depth of root zone =700mm

    Daily consumptive use of water for a given crop =12mm

For healthy growth moisture content must not fall below 25% of the water holding capacity between the field capacity and the permanent wilting point. Determine the watering interval in days?

10 marks KTU Dec 2018

13. Write the environmental effects of irrigation. 5 marks KTU may 2018
14. Differentiate between flow and lift irrigation systems. 5 marks KTU Dec 2018

15. Gross command of a reservoir is 50,000 hectares. The CCA is 80% of GCA. Find out the capacity of the reservoir which is able to irrigate areas as given below. Reservoir and canal losses may be taken as 5% each of water required by crops.

Crop	Base period (days)	Duty (hectares/cumec)	Intensity of irrigation as % of CCA
Wheat	120	2000	25
Rice	140	900	18.75
Cotton	180	1600	12.50

15marks KTU Dec 18

16. Define field capacity, permanent wilting point and available moisture. 5 marks
17. Define duty and delta. Derive the relation between them 5 marks KTU may 2018
18. A loam soil has field capacity 27% and permanent wilting percentage 12%. The dry weight of the soil is 13.73 kN/m^3. If the depth of the root zone is 1 m, determine the storage capacity of the soil. Irrigation water is applied when the moisture content drops to 15%. If the water application efficiency is 75%,determine the water depth require to be applied in the field.

15 marks KTU Dec 2018

MODULE 4

1. List the objectives of river training. Discuss repelling, attracting and deflecting groynes.
2. What are the objectives and classification of river training works?10 marks KTU May 2018
3. Explain the stream flow measurement by area velocity method? 10 marks KTU Dec 2018
4. Define stage discharge curve.? 10 marks KTU may 2018
5. Explain the purpose of providing guide banks? 5 marks KTU may 2018
6. List the objectives of river training works? 5 marks KTU Dec 2018

7. With the help of sketches, describe briefly the various methods of river training works?

   12 marks KTU Dec 2018

8. What is river training? What are the objectives of river training? What are the classifications? 8 marks KTU Dec 2018

9. Explain Guide banks and groynes with neat sketches. 10 marks KTU May 2018

10. Explain meandering of rivers 10 marks KTU May 2018

20. The current meter readings taken during gauging of a stream are given in the table below. The current meter rating is given as v=0.05 + 0.3N, v in m/s and N in rev/s. Compute the discharge in the stream.

Distance from bank m	0.8	1.6	1.6	2.4	2.4	3	3	3.8	3.8	4.6	5.2
Flow depth m	0.5	1	1	1.6	1.6	1.8	1.8	1.2	1.2	0.6	0
Meter depth m	0.3	0.8	0.2	1.28	0.32	1.44	0.36	0.96	0.24	0.36	-
no. of revs	12	23	36	27	41	28	42	24	35	14	-
time sec	48	52	51	54	60	53	58	50	50	45	-

10 marks KTU Dec 2018

MODULE 5

1. Explain process of reservoir sedimentation and control measures for reducing it.

   6 marks KTU may 2018

2. The following information is available regarding the relationship between trap efficiency and capacity inflow ratio for a river Capacity. Find the probable life of the reservoir with an initial reservoir capacity of 30 million cubic meters if the annual flood inflow is 60 million cubic meters and the average annual sediment inflow is 3600000KN. Assume a specific weight of sediment

equal to 12KN/m2. The useful life of the reservoir will terminate when 80% of initial capacity is filled with sediment 10 marks KTU may 2018

3. What is a flow duration curve? 5 marks KTU may 2018
4. What are the methods for the control of river sedimentation? 5 marks
5. Explain the method of calculating reservoir capacity for a specified yield from the mass inflow curve.? 10 marks KTU may 2018
6. The amounts of water flowing from a certain catchment area at the proposed dam site are given in the following table. Determine the minimum capacity of the reservoir if water is to be used to feed the turbines of the hydropower plant at a uniform rate and no water is to be spilled over. 10 marks
7. Briefly explain what is meant by useful life of a reservoir and how it is estimated? 5 marks
8. What are the storage zones in a reservoir? 5 marks KTU may 2018
9. Define trap efficiency. Explain the method to find useful life of a reservoir. 5 marks
10. Differentiate mass curve and demand curve. 5 marks KTU may 2018
11. Define Porosity, specific yield, specific retention. Write the relation between them. 8 marks
12. Derive an expression for steady radial flow in a confined aquifer. 8 marks

10 marks KTU May 2018

13. What is Flow duration curve? What are its practical applications? 8 marks
14. Define Porosity, specific yield, specific retention. Write the relation between them. 8 marks
15. Derive an expression for steady radial flow in a confined aquifer. 8 marks

10 marks KTU May 2018

MODULE 6

1. Derive an expression for the yield of an open well using Recuperation test.? 7 marks
2. Explain process of reservoir sedimentation and control measures for reducing it 8 marks

3. What are the various factors affecting selection of site for a reservoir.
4. The data regarding trap efficiency and capacity inflow ratio of a reservoir is given in the table below.

capacity/inflow	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
trap efficiency, η (%)	86	92	94	95	95.5	96	96.5	97	97.4	97.7

Derive the useful life of reservoir with an initial capacity of 50 million cu. m, if average inflow rate is 50 million cu. m and annual sediment inflow is 300,000 tons. Assume density of sediment as1250 kg/m3 . Useful life terminates when capacity reduces to 20%

15 marks KTU may 2018

5. With a neat sketch describe the vertical distribution of ground water.? 6 marks
6. Derive an equation for steady radial flow to a well for an unconfined aquifer?

7 marks KTU Dec 2018

7. Distinguish with sketches if necessary, the difference between an unconfined and a confined aquifer? 10 marks KTU may 2018
8. Derive a formula for discharge of a well in homogenous confined aquifer? 5 marks

   State the assumptions on which the above derivation is based? 5 marks
9. Explain the method of determining the coefficient of transmissibility of a confined aquifer by pumping out test. How can this method be applied for unconfined aquifer? 10 marks
10. Define porosity, specific yieldand specific retention. Establish a relation betweenthem. 8 marks
11. Explain and derive steady state flow to wells in a confined aquifer. 7 marks
12. Explain Darcy's law. 5 marks KTU may 2019
13. Explain recuperation method to find yield from an open well. 5 marks KTU may 2018
14. A well is to be constructed in a fine sandy subsoil formation. The discharge of the well is anticipated to be 0.004 m^3/sunder depression head of 4 m. Find the diameter of the well. Given

(K/A) for sandy soil = 0.5 $m^3/hr/m^2$ of area under depression head of 1 m.

10 marks KTU may 2018

15. Explain with sketch strainer type tube well 5 marks KTU may 2019
16. A recuperation test in an open well yielded the following water levels: Initial water table level – 250.00m; water table level when pumping was stopped – 243.00m; water table level in well 2hr after pumping was stopped – 245.00m Find the safe yield of the well if working head is 3m.

10 marks KTU may 2019