Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
FIFTH SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2018
Course Code: CE301
Course Name: DESIGN OF CONCRETE STRUCTURES I (CE)

Max. Marks: 100   Duration: 3 Hours

Instructions:
1. Use of IS 456:2000 is permitted
2. Furnish reinforcement detailing of sections designed

PART A
Answer any two full questions, each carries 15 marks.   Marks

1 a) Determine the central concentrated load that can be carried by a simply   (9)
      supported singly reinforced beam of 250 mm x 500 mm reinforced with 4 bars
      of 20mm diameter with an effective cover of 50mm. Effective span of beam is
      5.5m. Use M20 concrete and Fe415 steel.
   b) Differentiate between flexural bond and development bond   (6)

2 a) Distinguish between under reinforced and over reinforced sections in reinforced   (5)
      concrete beams.
   b) A 250 mm wide RC beam with 400mm effective depth is reinforced with 3   (10)
      numbers 20mm diameter bars of Fe 415 grade steel. The beam is provided with
      8mm diameter 2 legged vertical stirrups at 150mmc/c as shear reinforcement
      and one of the longitudinal bars is bent up at 45^0 nearer to support as per IS
      456:2000. Determine the design strength of the section in shear if the concrete
      used is of M20 grade.

3 a) Design the shear reinforcement for a simply supported RC beam of effective   (10)
      span 6m with width 300mm and depth 500mm and carrying a superimposed
      load of 12kN/m. The beam is reinforced with 4 bars of 20 mm diameter. Use
      M20 concrete and Fe 415 grade steel. Effective cover to reinforcement 50mm.
   b) What are the advantages and disadvantages of providing large clear cover to   (5)
      reinforcement in flexural members?

PART B
Answer any two full questions, each carries 15 marks.

4   Design a simply supported beam of span 6m subjected to a live load of 5kN/m.   (15)
       Use M20 concrete and Fe415 steel.

5   Design a simply supported RC slab for a room having inside dimensions 3m   (15)
       x 7.5m. Thickness of supporting wall is 230mm. The Live Load on slab is 2
       kN/m^2. Floor finish $1kN/m^2$. Use M20 concrete and Fe 415 steel.

6 a) Design the shear reinforcement required for a reinforced concrete beam 300   (9)
      mm x 600 mm to carry a factored moment of 120 kNm, a factored shear force
      of 100 kN and a factored Torsional moment of 60 kNm. Use M25 concrete and
      Fe415 steel. Effective cover to reinforcement 50 mm.

b) Draw the reinforcement detailing of (i) cantilever slab (ii) one way continuous   (6)
   slab

PART C
Answer any two full questions, each carries 20 marks.

7   Design a reinforced concrete slab 4m x 5m simply supported on all the four   (20)
sides subjected to a live load of $4kN/m^2$. Use M25 concrete and Fe 415 steel.
Assume that the corners of the slab are held down.

8   Design a short circular column of effective length 3.3m to carry an axial load of   (20)
1200 kN. Provide helical reinforcement as transverse reinforcement. Use M25
concrete and Fe415 steel.

9   a)   Differentiate between short columns and long columns in RC construction   (4)

   b)   A reinforced concrete beam of size 250 mm x450 mm is provided with 4 bars (12
of 20mm with an effective cover of 50 mm. Bending moment to be resisted is
50kNm. Determine the crack width at point which is the midpoint of tension
edge. Adopt M20 concrete and Fe415 steel.

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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
FIFTH SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2018
Course Code: CE303
Course Name: STRUCTURAL ANALYSIS -11

Max. Marks: 100   Duration: 3 Hours

PART A
Answer any two full questions, each carries 15 marks.   Marks

1   Analyse the three-span continuous beam ABCD, with overhang DE, for the loading,   (15)
     end support conditions, spans and flexural rigidity as shown in Fig. 1, by applying
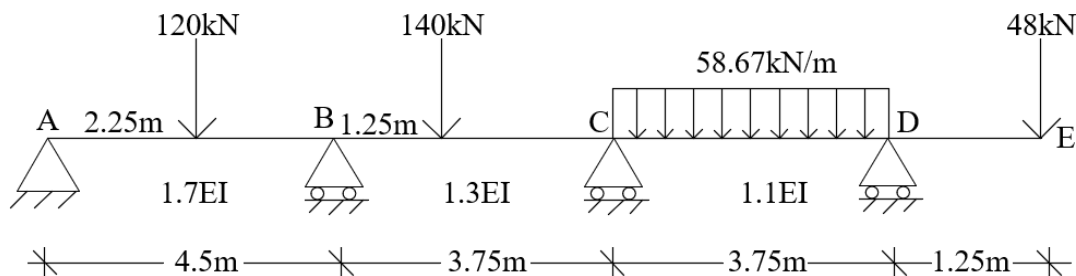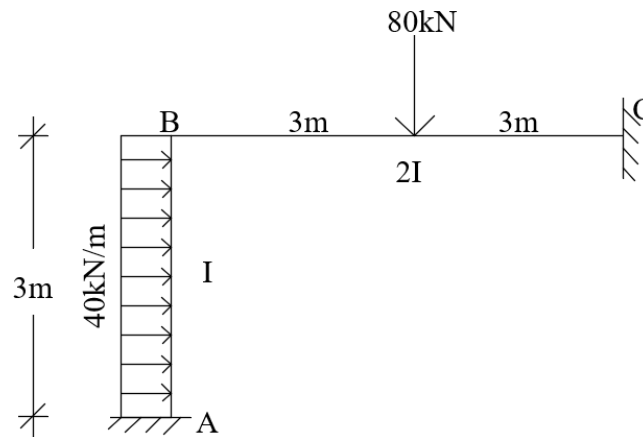   the theorem of three moments. Draw the BMD and SFD.

Fig. 1

2   a)   Differentiate between force and displacement methods of analyses. Give one
         example for each case.
    b)   Determine the moments at A, B and C using slope deflection method for the frame
         shown in Fig 2. Draw the BMD.

3   a)   What are the reasons for sway in frames?   (4)

    b)   Set up the slope deflection equations for a beam considering support settlement.   (4)

    c)   Write down the analysis procedure of a continuous beam ABC fixed at the ends A   (7)
         and C by three moment equation. Roller support is provided at B. Moment of inertia
         and span length of AB and BC are I_1, L_1 and I_2, L_2. Span AB carries UDL and span
         BC supports a central concentrated load.

PART B
Answer any two full questions, each carries 15 marks.

4   Analyse the continuous beam shown in Fig. 1 by moment distribution method. Draw   (15)
         BMD and SFD

5   Analyse the frame in Fig. 2 by Kani's method. Draw BMD.   (15)

6   a)   Formulate Kani's analysis procedure using a prismatic beam element AB having   (10)
         length l and flexural rigidity EI

    b)   Differentiate distribution factor and rotation factor in structural analysis.   (5)

PART C
Answer any two full questions, each carries 20 marks.

7   a)   Explain the following terms.   (8)
         (i) Plastic hinge (ii) Load factor (iii) Shape factor (iv) Plastic Moment

    b)   Determine the shape factor of a circular section with diameter D.   (6)

    c)   Locate the plastic hinges in a propped cantilever beam carrying UDL.   (6)

8   a)   Determine the collapse load for the fixed beam AB of span L. At point C, 0.2L   (10)
         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.

    b)   Determine the deflection at free end of a beam in the shape of a quadrant of a circle (10)
         in plan, fixed at one end and free at the other, with a point load at the free end.

9   Determine the expression for bending moment and twisting moment for circular ring   (20)
         beam supported by a no: of columns placed at regular intervals.

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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
FIFTH SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2018
Course Code: CE305
Course Name: GEOTECHNICAL ENGINEERING - II
Max. Marks: 100   Duration: 3 Hours

PART A
Answer any two full questions, each carries 15 marks.   Marks

1 a) State any 3 assumptions in Boussinesq's equation   (3)
   b) Determine the vertical stress intensity at a point 3 m below ground level and 2.5   (8)
       cm away from the line of action of a vertical point load of 150kN acting on the
       ground surface by Boussinesq's equation.
   c) State two important differences between Rankine's and Coulomb's earth   (4)
       pressure theories.
2 a) Define active earth pressure. Explain how the intensity of earth pressure exerted   (4)
       by a backfill depends on the movement of wall.
   b) A retaining wall with a vertical smooth back is 6 m high. It supports a cohesion   (8)
       less soil (γ = 19kN/m3, ϕ =30°). The surface of the soil is horizontal and carries a
       surcharge of 15kPa. Determine the active thrust on the wall.
   c) What is the use of Newmark's chart? Explain the procedure for using the chart.   (3)
3 a) Define depth of tension crack in cohesive soils and derive an expression for its   (4)
       evaluation.
   b) A 4 m high retaining wall contains a cohesion less backfill having the following   (8)
       properties: γ = 16 kN/m^3, γsat =19 kN/m^3,ϕ = 35°. The water table is 1.5 mbelow
       the top of the backfill. Determine the total active thrust exerted by the backfill.
   c) Define isobar and specify its practical significance.   (3)

PART B
Answer any two full questions, each carries 15 marks.

4 a) Distinguish between general and local shear failure of shallow foundations   (4)
   b) A square footing of width 2.00 m is constructed at 1.20 m below the ground level   (7)
       in a homogeneous dry sand (γ = 17kN/m^3, ϕ = 30°). Determine the safe bearing
       capacity of footing against shear failure with factor of safety 3. N_c =65.4, N_q =
       49.4, N_γ = 5.4
   c) With a neat sketch of well foundation mark the various components of well   (4)
       foundation.
5 a) Define the terms safe bearing capacity and allowable bearing capacity   (3)
   b) Determine the ultimate bearing capacity of a strip footing 1.2 m wide and having   (8)
       the depth of foundation of 1.0 m. The water table reaches at the ground surface

during rainy season. (γsat = 19 kN/m^3, C = 15 kN/m^2, N_c =57.8, N_q = 41.4 and N$_\gamma$ = 42.4).

        c)   What are the two criteria for design of rectangular combined footings ?   (4)

6   a) Design a rectangular combined footing to support two adjacent columns (size 40   (8)
             cm x 40 cm). The centre lines of the columns are placed on footing at a distance
             of 5. 0 m between them. The boundary is 0.5 m away from centre line of column
A. The column A and B carry load of 3 MN and 4 MN respectively. The allowable soil pressure is 400 kN/m^2.

        b)   State any two major problems in well sinking and describe any two methods to   (4)
             correct them.

        c)   What are the limitations of Terzhaghi's bearing capacity theory?   (3)

PART C
Answer any two full questions, each carries 20 marks.

7   a)   A 50 cm concrete pile is driven in a normally consolidated clay deposit 15 m   (5)
             thick. Cu = 70 kN/m^2, α = 0.9 and Factor of safety is 2.0. Estimate the safe load.

        b)   List five major objectives of site investigation.   (5)

        c)   What is negative skin friction? What is its effect on the pile capacity?   (6)

        d)   What are corrections applied to standard penetration test value?   (4)

8   a)   Write IS guide lines for choosing spacing of boreholes   (3)

        b)   Write any two advantages of auger boring compared to wash boring.   (4)

        c)   A bored pile in a clayey soil failed at an ultimate load of 400kN. If the pile is 50   (8)
             cm diameter and 10 m long, determine the capacity of a group of nine piles
             spaced 1 m centre to centre both ways. Take Cu = 70 kN/m^2 and α =0.5.

        d)   Write Modified Hiley formula and describe each terms in the formula   (5)

9   a) What is meant by vibration isolation? List two methods of vibration isolation of   (3)
             footings

        b)   Determine the natural frequency of a machine foundation having base area 2.2 m   (5)
             x 2.2 m and a mass of 15200kg, including the mass of the machine. Taking Cu = 4x10^4 kN/m^3 .

        c)   Explain the procedure of determination of safe load from static pile load test   (12)

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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
FIFTH SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2018

Course Code: CE307
Course Name: GEOMATICS

Max. Marks: 100   Duration: 3 Hours

PART A
Answer any two full questions, each carries 15 marks.

Marks

1 a) Using a neat sketch explain axis method for balancing a traverse   (5)

   b) In a closed traverse *ABCDEFA,* the angles and the lengths of sides were
       measured as given below. Balance the traverse using Bowditch's method and
       compute the corrected co-ordinates if the co-ordinate of station A is (1500, 1500)

Line	Length (m)	WCB
AB	355.52	58°30'00"
BC	476.65	185°12'30"
CD	809.08	259°32'40"
DE	671.18	344°35'40"
EF	502.20	92°30"30"
FA	287.25	131°22'00"

(10)

2 a) Mark the elements of a compound curve on a neat sketch and write down the   (5)
       relation ship between different elements.

   b) Two straights intersect making a deflection angle of 59°24', the chainage at the   (10)
       intersection point being 880 m. The straights are to be joined by a simple curve
       commencing from chainage 708 m. If the curve is to be set out using 30-m
       chords by the method of offsets from the chord produced, determine the first
       three offsets.

3 a) Why should we avoid the use of reverse curve in highways and high-speed
       tracks   (4)

   b) Explain setting out of a simple circular curve using two theodolite method   (5)

   c) Sketch the different types of vertical curves   (6)

PART B
Answer any two full questions, each carries 15 marks.

4 a) Explain the signal structure used in GPS.   (5)

   b) Illustrate satellite ranging procedure.   (5)

   c) How does satellite geometry affect satellite positioning precision   (5)

5 a) List the advantages and disadvantages of GPS surveying methods   (6)

   b) What is static, rapid static and kinematic GPS positioning methods   (9)

6 a) What is code phase and carrier phase measurements   (6)

   b) Detail the procedure for data processing and report preparation in a GPS survey   (9)

PART C
Answer any two full questions, each carries 20 marks.

7 a) What is remote sensing and how is it carried out?   (6)

   b) With a neat sketch, explain spectral reflectance of vegetation   (6)

   c) Explain along track and across track scanning with figures.   (8)

8 a) List out the applications of remote sensing.   (4)

   b) Write a note on the energy interactions in the atmosphere.   (8)

   c) Explain spatial and attribute data, vector and raster data used in GIS.   (8)

9 a) Explain the step by step procedure for preparing a GIS map   (10)

   b) Detail the different types of map projections according to the projection surface   (10)
       used

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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
V SEMESTER B.TECH DEGREE EXAMINATION(S), MAY 2019

Course Code: CE309
Course Name: WATER RESOURCES ENGINEERING

Max. Marks: 100   Duration: 3 Hours

Graph sheets may be provided
PART A
Answer any two full questions, each carries 15 marks.   Marks

1 a) Describe the Non recording rain gauge with a neat sketch   (6)

   b) Determine the mean precipitation for the rectangular area given below by Thiessen Polygon method. Precipitation recorded at rain gauge stations A, B, C and D are 15 cm, 10 cm, 12 cm and 16 cm respectively. The distance between the rain gauge stations A and B is 12 km and that between A and D is 7 km.   (5)
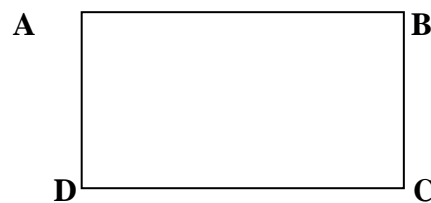
   c) The rate of rainfall for successive one hour periods of a 10 hour storm were recorded as 4.0, 6.3, 5.2, 7.5, 8.4, 2.3, 5.4, 4.5, 8.5 and 3.6 cm/hr.   (4)
Taking value of φ – index as 6.0 cm/hr, compute i) Total rainfall excess
ii) W- index.

2 a) The ordinates of a 4 hour unit hydrograph of a catchment area are given below.   (6)

Time in hr	0	4	8	12	16	20	24	28	32
Ordinates m^3/s	0	15	30	25	21	17	14	8	0

Find the ordinates of an 8 hour unit hydrograph for the same basin. Also sketch the hydrograph.

   b) Determine the total infiltration depth for a storm lasting for 5 hours , if the initial infiltration rate is 12 mm/hr, final infiltration rate is 8 mm/hr and constant value describing the rate of decay of the difference between initial and final infiltration   (5)

rate is 0.82/h.

   c)   What are the assumptions of Unit hydrograph theory?   (4)

                                                               (6)

3   a) What is runoff? What are the factors affecting Runoff?

   b)   In a catchment area, the annual rainfall recorded by rain gauges A, B, C, D, E   (5)
and F are 52, 63, 35, 56, 40 and 59 cm respectively. For a 10% error in estimation
of mean rainfall, calculate the optimum number of rain gauges in the area.

   c)   What are the different types of precipitation?   (4)

PART B

Answer any two full questions, each carries 15 marks.

4   a)   What are the factors affecting Duty of water of a canal system?   (6)

   b)   What is Gross Commanded Area, Culturable commanded area and Unculturable   (5)
commanded area?

   c)   What are the general features of Meandering of rivers?   (4)

5   a) What are River Training works? What are the classifications of River Training   (6)
works?

   b)   A stream of 120 litre/s was diverted from a canal and 100 litre/s were delivered in   (5)
the field. An area of 2 hectares was irrigated in 10 hours. The runoff loss in the
field was 420 m^3. Effective depth of root zone was 1.5 m. Determine Water
conveyance efficiency and Water application efficiency.

   c)   What is Consumptive use of water? List the methods by which it is determined?   (4)

6   a)   What is Stream Gauging? What are the factors to be considered while selecting a   (6)
Stream gauging site?

   b)   What is a Stage – Discharge curve?   (5)

   c)   What is Field capacity and Permanent wilting point?   (4)

PART C

Answer any two full questions, each carries 20 marks.

7   a)   Describe the types of Tube wells?   (8)

   b)   What are the factors affecting selection of site for a reservoir?   (6)

   c)   A 30 cm diameter well penetrates 20 m below the static water table. After 24   (6)
hours of pumping at the rate of 4000 litre/minute ,water level in a test well 85m
away from the main well is lowered by 0.48 m, and in a test well 35 m away from

the main well, the drawdown is 1m.   a)What is the Transmissibility of the aquifer? b) Also determine the drawdown in the main well.

8 a) What is a Mass Inflow curve? How is it used to calculate the reservoir capacity?   (8)

   b) What are the methods adopted for controlling silting of a reservoir?   (6)

   c) What is a confined aquifer? Derive an expression to obtain the discharge through a confined aquifer.   (6)

9 a) Describe the Recuperation test used to find yield of an open well.   (8)

   b) Explain the procedure to calculate the Life of a reservoir.   (6)

   c) What is i) Firm yield ii) Secondary yield and iii) Average yield of a reservoir?   (6)

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Total Pages: 1

Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
FIFITH SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2017

Course Code: CE361

Course Name: ADVANCED CONCRETE TECHNOLOGY (CE)

Max. Marks: 100   Duration: 3 Hours

PART A
Answer any two full questions, each carries 15 marks.

Marks

1	a)	Explain the classification of aggregates.	(5)
	b)	List the advantages and disadvantages of artificial aggregates.	(5)
	c)	Explain segregation and bleeding in concrete.	(5)
2	a)	What are the effects of properties of aggregate on concrete?	(5)
	b)	In hot weather condition blended cements are advised for construction. Justify the statement.	(4)
	c)	Why admixtures used in Concrete? What are the different types of Chemical admixtures?	(6)
3	a)	Explain the chemical and physical process of hydration.	(8)
	b)	Explain the process of concreting.	(4)
	c)	Properly manufactured M Sand is superior to river sand. Justify the statement.	(3)

PART B
Answer any two full questions, each carries 15 marks.

4	a)	Explain any one method of proportioning of concrete.	(8)
	b)	Differentiate between compressive strength and characteristic compressive strength.	(3)
	c)	Define Creep. What are the factors affecting creep?	(4)
5	a)	Explain the procedure of determination of modulus of elasticity of concrete	(8)
	b)	List different types of shrinkage. What are the factors affecting shrinkage	(4)
	c)	What is the advantage of using silica fumes in manufacturing of concrete?	(3)
6	a)	What is the importance of compressive strength, tensile strength and flexural strength in concrete?	(6)
	b)	What are the effect of creep on concrete?	(3)
	c)	List some mineral admixtures along with their advantages	(6)

PART C
Answer any two full questions, each carries 20 marks.

7	a)	What are the factors affecting durability?	(6)
	b)	What do you meant by self compacting concrete? What are its advantages?	(6)
	c)	Explain any two non destructive tests in concrete.	(8)
8	a)	Explain how can we reduce sulphate attack in concrete.	(6)
	b)	What do you meant by reinforcement cover? How it is measured?	(6)
	c)	Explain light weight concrete. How it is manufactured. What are its advantages	(8)
9	a)	Explain alkali Silica reaction. Write notes on concrete in sea water.	(8)
	b)	How roller compacted concrete is prepared? What are its applications?	(6)
	c)	Write notes on under water concreting and mass concreting.	(6)

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