4E4111

Roll No. _____ Total No of Pages: 4

4E4111

B. Tech. IV Sem. (Main/Back) Exam., June/July-2014

Civil Engineering

4CE1A Strength of Materials-II

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 24

Instructions to Candidates:-

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination.

1._____ 2._____

UNIT-I

Q.1 (a) Derive the differential equation of the deflection curve of a beam assuming the symbols and stating accordingly with a neat diagram curve. [9]

(b) A cantilever beam AB of span L has uniform section. End B is free end and carries a point load W, while end A is fixed. Find the slope and deflection at a point C distant L/4 from the end A. [7]

OR

Q.1 (a) A beam AB of 9m Span is simply supported at the ends and is loaded as shown in Fig.1. Determine - [16]

(i) Deflection at C

(ii) Maximum deflection and

(iii) Slope at end A.

Take $E = 2\times10^5$ N/mm^2 & $I = 2\times10^7$ mm.^{4}

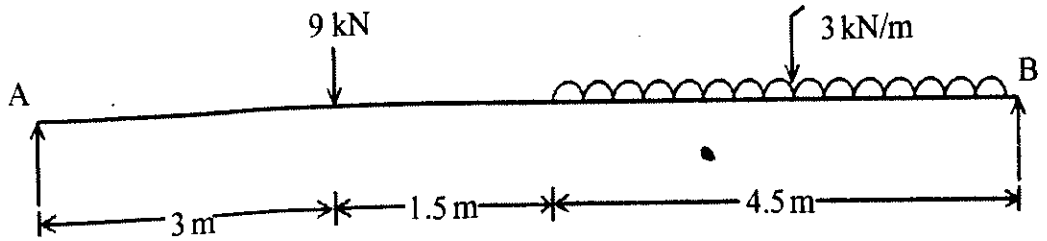

Fig.1

UNIT-II

Q.2 (a) State and derive Mohr's theorems for area moment equations assuming & stating symbols used. [8]

(b) Determine the angle of rotation and deflection at free end of a cantilever beam AB with a uniform load w acting over middle third of the length as in Fig 2. [8]

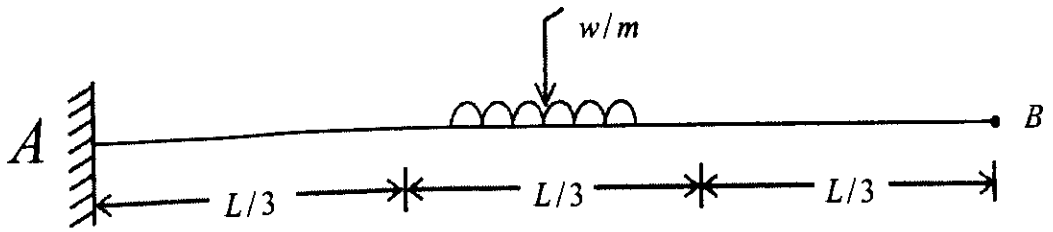

Fig.2

OR

Q.2 (a) A cantilever AB is fixed at end A and rigidly propped at end B. Find [8]

(i) The prop reaction, and

(ii) The slope at the propped end by conjugate beam method.

The beam UDL of w over its entire span

(b) A simply supported beam carries a UDL of 50 kN/m over a spam of 2m, along with an axial compression force 50 kN. The beam section is rectangular with width 120 mm and depth 240 mm. Compute - [8]

(i) Maximum fibre stress

(ii) Fibre stress at a point o.5 m from the left end and 80 mm below N.A.

UNIT-III

Q.3 What do you understand by a fixed beam? A fixed beam of span L carries a UDL 'w' over entire span. The second moment of area of the beam section is not same throughout, for a length L/4 from each end its value is 2I and for a middle length L/2, it is I. Determine the B.M. at ends and sketch the SFD and BMD for the beam stating principal values. [16]

OR

Q.3 Using Clapeyron's theorem of three moments, analyse a continuous beam shown in Fig.3. Also plot BMD and SFD indicating principal values, the supports of the beam being at same level. [16]

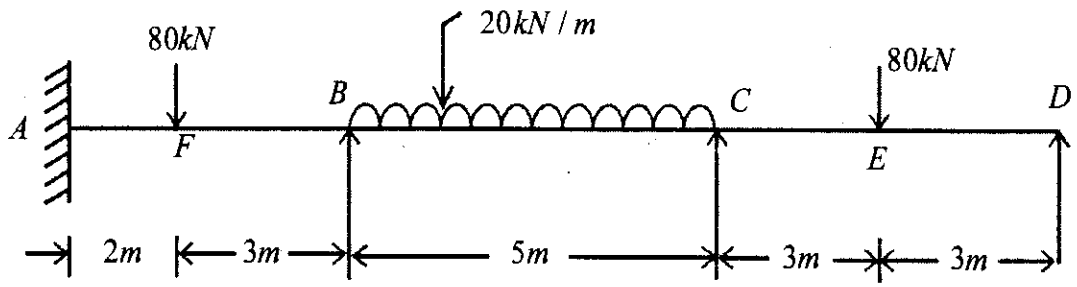

Fig.3

UNIT-IV

Q.4 (a) Derive the following relation for intensity of shear stress at any point in the cross- section of a shaft subjected to pure torsion stating the assumptions made.

$\frac{fs}{R} = \frac{q}{r} = \frac{N\theta}{L}$ where symbols have got their usual meaning. [10]

(b) Find the maximum torque that can be safely applied to a shaft of 200 mm dia, if permissible angle of twist is 1° in a length of 5m and the permissible shear stress is 45N/mm2. Take modulus of rigidity (N) = 0.8×10^5 N/mm^2. [6]

OR

Q.4 (a) An open coiled helical spring made of 4mm dia steel wire, has 8 coils of 40 mm diameter and 30 mm pitch. The spring is subjected to a winding torque about the axis of the spring, resulting in an increase in the number of coils by 0.8, the length remaining the same (i.e. 240 mm), Determine -

(i) The torque required

(ii) Minimum elastic limit strength of steel to permit this amount of winding.

Take $E = 2\times10^5$N/mm2 and $N = 0.83 \times 10^5$N/mm^2 [8]

(b) Design a laminated steel spring, simply supported at the ends and centrally loaded with a span of 800 mm, given the following:

(i) Proof load = 8.5 kN, $E = 2\times10^5$N/mm^2

(ii) Maximum central deflection = 50mm

(iii) Ratio of width to thickness = 10

(iv) Permissible bending stress = 370 N/mm2

The plates are available in the multiple of 1 mm for thickness and in the multiple of 3 mm for width. [8]

UNIT-V

Q.5 Write Short notes on the following: [4×4=16]

(a) Critically damped system

(b) Logarithmic Curve

(c) D' Alembert's principle and its Utility

(d) Resonance and Natural Time Period of Oscillations

OR

Q.5 Define and derive the solution of differential equation of motion. Also define the differential equation of mass. [16]

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4E4112

Roll No. _____ Total No of Pages: 3

4E4112

B. Tech. IV Sem. (Main/Back) Exam., June/July-2014

Civil Engineering

4CE2A Concrete Technology

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 24

Instructions to Candidates:-

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination.

1. IS:10262 Code of Practice for concreter mix design 2. _____

UNIT-I

Q.1 (a) Write the names of basic compounds of cement and their role in hydration of cement. [6]

(b) Explain the role of water-cement ratio in concrete. [3]

(c) Explain flowability & segregation of concrete and their methods of determination. [6]

(d) Write the approximate value of air content in concrete made with 20 mm maximum size of aggregate. [1]

OR

Q.1 (a) Discuss bleeding of concrete and factors affecting it. [4]

(b) Discuss the significance of

(i) Heat of hydration and

(ii) C-S-H gel [4]

(c) How is workability of fresh concrete determined? Explain with figure. Also discuss factors affecting it. [8]

UNIT-II

Q.2 (a) What is meant by creep of concrete? Discuss factors affecting it. [8]

(b) Explain application and use of rebound hammer. [8]

OR

Q.2 (a) What is meant by shrinkage of concrete? Discuss factors affecting it. [8]

(b) Explain application and use of ultrasonic pulse velocity meter. [8]

UNIT-III

Q.3 (a) Discuss various methods of placing of concrete. [2]

(b) Discuss various methods of transportation of concrete and their suitability. [8]

(c) Discuss various types of vibrators and their use in compaction of concrete. [6]

OR

Q.3 (a) What do you understand by the terms: 'Immediate curing' and 'Final curing'. Explain with methods and suitability for each. [6]

(b) What is 'Durability' of concrete? Explain the factors affecting it and means to ensure a 'durable' concrete. [10]

UNIT-IV

Q.4 Design a M40 concrete mix with maximum size of aggregate 20mm, using IS code method. Make necessary assumptions and state them. [16]

OR

Q.4 (a) Describe the types of super-plasticizers, their chemical composition difference and their effect in concrete. [6]

(b) Explain the properties of flyash and their effect in concrete. [6]

(c) Explain the role of retarders and their applicability. [4]

UNIT-V

Q.5 (a) Discuss formwork for columns. [4]

(b) Discuss slip formwork and its application areas. [4]

(c) Describe salient properties and application of sulphate resisting concrete. [8]

OR

Q.5 (a) Discuss properties and application of pumpable concrete. [4]

(b) What is self compacting concrete? Discuss its rheological properties and methods to measure the same. [12]

4E4113

Roll No. _____ Total No of Pages: 4

4E4113
B. Tech. IV Sem. (Main/Back) Exam., June/July-2014
Civil Engineering
4CE3A Hydraulics & Hydraulic Machines

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 24

Instructions to Candidates:-

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination.

(Mentioned in form No.205)

1._____ 2._____

UNIT – I

Q.1 (a) What do you understand by distorted river model? Explain with stating its advantages and disadvantages. [6]

(b) A river model is to be constructed to a vertical scale of 1:50 and a horizontal of 1:20. At the design flood discharge of 450m^3/s, the average width and depth of flow are 60m and 4.2 m respectively. Determine the corresponding discharge in model using Reynold's similarity. [10]

OR

Q.1 (a) What do you mean by dynamic similarity and dimensional homogeneity? Write down Reynold's Number, Froude's Number, Weber Number, Euler Number and Mach Number. [8]

(b) A pipe of diameter 1.5m is required to transport an oil of specific gravity 0.90 and viscosity 3×10^{-2} poise at the rate of 3000 lit/sec. Tests were conducted are a 15cm diameter pipe using water at 20°C (μ_ω = 1 x 10^{-2} poise). Find the velocity and rate of flow in the model. [8]

UNIT – II

Q.2 (a) Write the expression of velocity distribution in the flow between two infinite parallel plates clearly stating the assumptions and explaining the terms used. [8]

(b) For a laminar fully developed flow between infinite parallel plates, μ = 0.5 N-s/m^2, $\frac{\partial p}{\partial x}$ = -1200 N/m^2/m. The gap between plates = 3mm. Find shear stress in upper plate and volumetric flow rate / unit width. [8]

OR

Q.2 (a) What do you mean by hydro dynamically smooth and rough boundaries? How the velocity is distributed in pipes of smooth & rough boundaries? [6]

(b) A smooth pipe of 90mm dia and 1000m length is carrying water at the rate of 0.009 m^3/sec. Calculate the head loss, wall shearing stress. Also calculate the thickness of laminar sublayer and velocity at centre of pipe. [10]

UNIT – III

Q.3 (a) What are the differences between open channel & pipe flow. [6]

(b) What do you understand by most economical section? [2]

(c) Derive the conditions of most economical trapezoidal section and triangular section. [8]

OR

Q.3 (a) What do you understand by critical, subcritical and super critical flow. Explain with reference to specific energy curve. [6]

(b) What is the equation of gradually varied flow? What are assumptions taken in deriving the equation? [6]

(c) Enumerate with neat sketches various profile of gradually varied flow. [4]

UNIT – IV

Q.4 (a) What are the assumptions in deriving the general expression of hydraulic jump. [4]

(b) Derive the expression $\frac{y_2}{y_1} = \frac{1}{2}\left(-1+\sqrt{1+8F_1^2}\right)$, starting from momentum principle. y_1& y_2 are conjugate depths and F_1 is Froude number at start of jump. [12]

OR

Q.4 (a) What do you understand by inlet and outlet velocity diagram? Explain with neat sketches. [6]

(b) A 4cm diameter water jet with a velocity of 35m/sec impinges on a single vane moving in the same direction at a velocity of 20m/s. The jet enters the vane tangentially along x-direction. The vane deflects the jet by 150°. Calculate the force exerted by water on wheel. [10]

UNIT – V

Q.5 (a) What are the differences between reaction and impulse turbines? [6]

(b) Describe manometric, mechanical and overall efficiency of centrifugal pump. [6]

(c) Write down the importance of characteristic curve of centrifugal pump. [4]

OR

Q.5 (a) What are the functions of draft tube? Briefly write about various types of draft tubes. [6]

(b) Find the power required to drive a centrifugal pump which delivers $0.04m^3$/sec of water to a height of 20m through a 15mm dia pipe and 100m long. The overall efficiency of pump is 70%. f = 0.15 in Darcy's Weisbach equation for loss of head in pipe. [12]

4E4114

Roll No. _____ Total No of Pages: 7

4E4114

B. Tech. IV Sem. (Main/Back) Exam., June/July-2014

Civil Engg.

4CE4A Surveying-I

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 24

Instructions to Candidates:-

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination.

1._____ 2._____

UNIT-I

Q.1 (a) Enumerate the classification of surveys based on equipment used. What are the applications of chain & compass survey? [8]

(b) A 30m chain was tested before the commencement of the work and found to be correct, After 100 chains, the chain was found 5 cm too long. A total chaining of 180 chains was done. At the end of work the chain was found 10cm too long. Find the correct distance measured. [8]

OR

Q.1 (a) Explain the following errors in chaining and precautions to avoid these errors. [8]

(i) Erroneous length of tape or chain.

(ii) Bad Ranging.

(iii) Personal mistakes.

(iv) Non – Horizontal.

(b) Give details of "Line Ranger" and its application to range a line. [8]

UNIT-II

Q.2 (a) Make neat sketch of prismatic compass and show all salient parts of this equipment. [8]

(b) Interior angles of a traverse as given below:

$\angle A = 120^\circ$, $\angle B = 95^\circ$, $\angle C = 60^\circ$ & $\angle D = 85^\circ$.

If the bearing of AB is 50°. Find the bearings of other lines. [8]

OR

Q.2 (a) What do you understand by temporary adjustments of a theodolite. Explain how will you do these in the field. Also state why these are necessary. [8]

(b) The following bearings were measured in a compass traverse survey:

Line	F.B.	B.B
A B	124° 30'	304° 30'
B C	68° 15'	246° 0'
C D	310° 30'	135° 15'
D A	200° 15'	17° 45'

In which station do you suspect local attraction? Find the corrected bearings. [8]

UNIT-III

Q.3 (a) Explain what you understand by traverse surveying? What in 'closed' and 'open' traverse. Where these two kinds of traverse surveys will be applicable? [8]

(b) Bearings of two stations A & B were measured from a station C are 225° and 153° respectively. If the coordinates of A & B are

Station	Easting	Northing
A	250	150
B	350	100

Compute the independent coordinates of 'C'. [8]

OR

Q.3 (a) Enumerate the methods of traverse adjustment and explain axis method in detail. [8]

(b) A straight line 'AC' of length 1900m is required to be set out at right angle to a given line AB. This is done by running a traverse from A to C. The observations are as given below-

Line	Length	Bearing
A B	-	360°
A D	730	110°
D E	450	80°
E F	570	100°
F C	×	×
C A	1900	270°

Find the length and bearing of FC. [8]

UNIT-IV

Q.4 (a) What do you understand by profile leveling. In which kind of civil engineering works the profile leveling in required. Explain how will you conduct profile leveling? [8]

(b) The following data shown as (%) [illegible]
exposure of sudden rainfall. Find the [illegible]

Station	B. S.	L. S.	F. S.	H. I.	[illegible]	[illegible]
1	×			134.600	[illegible]	
2		×			132.[illegible]	
3	2.080		0.985	×	×	CPI
4		×			132.940	
5	0.605		×	×	134.440	
6		×			133.070	
7		1.045			×	
8			×		132.360	

Also provide usual check. [8]

OR

Q.4 (a) Why we need to provide curvature and refraction correction? Also give their magnitude, combined correction and their nature. [8]

(b) The following readings were successively taken with an instrument in leveling work:

0.32, 0.53, 0.62, 1.78, 1.91, 2.35, 1.75, 0.35, 0.69, 1.24, and 0.98.

The position of the instrument was changed after third, seventh are ninth reading. Enter the readings in a page of level book and find R. L. S. of points if RL of first point in 80.0 m. Apply usual check. [8]

UNIT-V

Q.5 (a) Explain following: [8]

(i) Vertical cliff.

(ii) Contours in saddle.

(iii) Water shed line.

(iv) Contour maps.

(b) Explain with neat sketches the use of contour map for

(i) Intervisibility between two points.

(ii) Estimation of Reservoir capacity. [8]

OR

Q.5 (a) Enumerate the instrument and accessories used in plane table surveying. Explain the use of: [8]

(i) Plumbing fork.

(ii) Alidade.

(b) Explain resection by two point problem. [8]

4E4115

Roll No. _____ Total No of Pages: 3

4E4115

B. Tech. IV Sem. (Main/Back) Exam., June/July-2014

Civil Engg.

4CE5A Building Planning

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 24

Instructions to Candidates:-

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination.

1. _____ 2. _____

UNIT-I

Q.1. (a) Discuss the different types of buildings in detail.

(b) Discuss the different methods of drawing sun chart. [8+8]

OR

Q.1. (a) Explain the criteria of site selection for a building and what do you mean by site plan.

(b) Discuss various sun shading devices. [8+8]

UNIT-II

Q.2. (a) Explain the various climate modulating devices and their importance.

(b) Explain the orientation of a building. Discuss the various factors affecting orientation of building. [8+8]

OR

Q.2. (a) What is the requirement of building by laws? Describe various regulations regarding covered area and open spaces.

(b) What is thermal comfort? Discuss uses of biclimatic chart. [8+8]

UNIT-III

Q.3. (a) Explain the term principles of planning. Discuss the various factors affecting the principles of planning. [8]

(b) Write down the various factors considered in 'Vaastushastra'. [8]

OR

Q.3. (a) Design a residential building on a plot of 10m × 20m. Assume suitable data. [10]

(b) Draw neat sketch and describe 'Aspects and Sun-diagram'. [6]

UNIT-IV

Q.4. Design and draw the plan of a Bank on a plot of 45m × 70m. Road is on the North side of the plot. [16]

OR

Q.4. Draw & design a residential house, having the following arrangements:-

(i) Bed room - 1: Size of 12' 6" × 10' 6"

(ii) Bed room – 2 ; Size of 10' × 16' 6"

(iii) Dining room : assume size

(iv) Living room : assume size

(v) Varenda : Width of 10' [16]

UNIT-V

Q.5. (a) Explain the different types of doors with sketches. [8]

(b) Write short note on noise control. [8]

OR

Q.5. (a) Discuss in detail the acoustics and sound insulation of a building. [10]

(b) Write short note on Fire fighting provision. [6]

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4E4116

Roll No. _____ Total No of Pages: 7

4E4116

B. Tech. IV Sem. (Main/Back) Exam., June/July-2014

Civil Engg.

4CE6A Quantity Surveying & Valuation of Structures

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 24

Instructions to Candidates:-

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination.

1. NIL 2. NIL

UNIT – I

Q.1. (a) State and explain various types of estimates giving at least one example of each type. [8]

(b) What are measurement sheet and abstract sheets? What are bill of quantities? Explain schedule A and Schedule B. [8]

OR

Q.1. (a) Write short notes on:

(i) Centre line method for building estimate. [4]

(ii) Purposes of deriving civil estimates. [4]

(b) State unit of measurement for following item of works: [8]

(i) Damp proof course (D.P.C)

(ii) Skirting

(iii) R.C.C. lintels

(iv) Half brick thick masonry wall

(v) Reinforcement

(vi) R.C.C. slab

(vii) Filling in plinth and foundation

(viii) Rain water pipes.

UNIT – II

Q.2. (a) Discuss various factors affecting the rate analysis in detail. [6]

(b) Prepare detail rate analysis for providing and laying cement concrete work M20 grade (1 : 1.5 : 3) excluding the cost of reinforcement for reinforced concrete work. [10]

OR

Q.2. (a) Prepare schedule of bar for R.C.C. Beam of size 230 × 450× 3000mm from given details:

Type	Size b×d	Top Bars	Bottom Bar	Bent up Bar	Stirrups
GB	230 × 450 mm	2 nos. 10mm diameter Tor bars	2 nos. 12mm diameter Tor bars	1 nos. 16mm diameter Tor bars	6mm diameter 120mm c/c

GB : Ground Beam [8]

(b) Prepare detailed rate analysis for providing and laying brick masonry work for 230 mm thick wall using 1:4 (Cement : Sand) mortar in foundation and plinth.

[8]

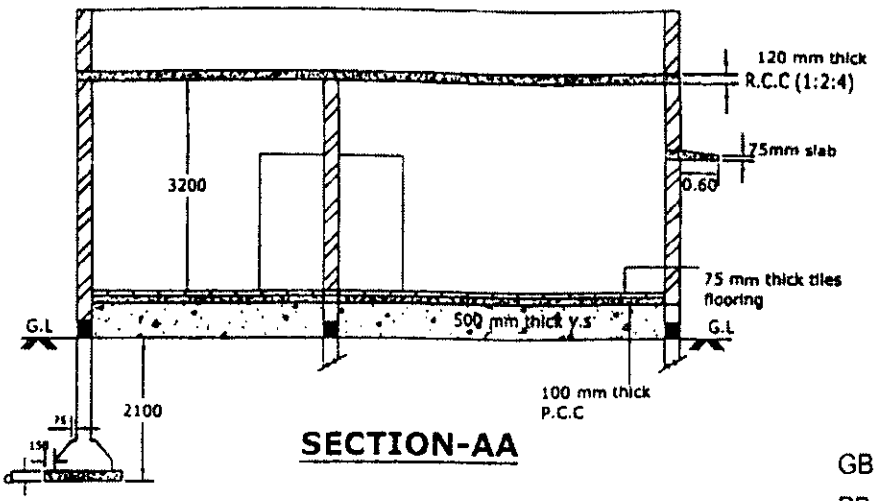
UNIT – III

Q.3. Work out quantities for following items from given plan and sectional elevation (fig.1)

(i) Providing and laying the cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate nominal size) for R.C.C. Ground Beam and Plinth Beam including cost of form work but excluding cost of reinforcement.

(ii) Providing and laying marbo granite tiles in all the rooms and bath / W.C passage excluding Verandah / Otta. [16]

(iii) Providing and laying polished kotah stone flooring in verandah /otta.



SECTION-AA

GB Ground Beam
PB Plinth Beam

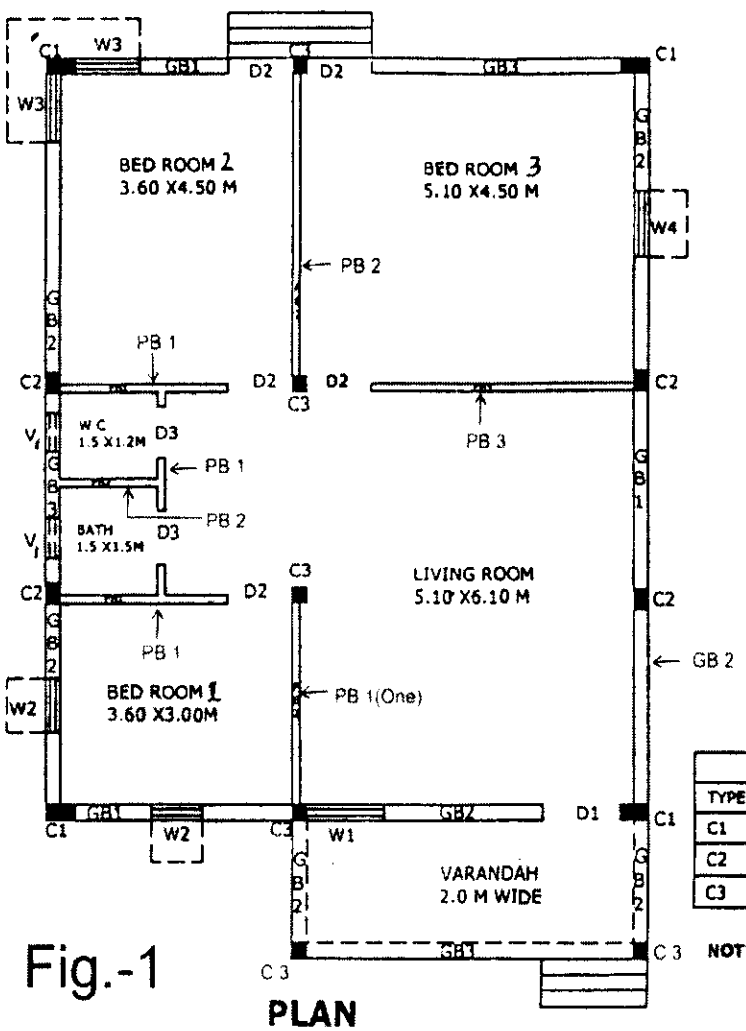


Fig.-1

PLAN

SCHEDULE OF OPENING	
D1	1200 X 2100
D2	1000 X 2100
D3	800 X 2100
W1	1200 X 1200
W2	800 X 1200
W3	1000 X 1200
W4	1000 X 900
V1	600 X 600

BEAM DETAILS	
TYPE	SIZE
GB 1 & PB 1	230 X 450
GB 2 & PB 2	230 X 400
GB 3 & PB 3	230 X 300

COLUMN & FOOTING DETAILS				
TYPE	SIZE	P.C.C	d	D
C1	230 X 450	1200 X 1800	150	600
C2	230 X 300	1200 X 1500	150	450
C3	230 X 230	1200 X 1200	150	300

NOTE : 1) All external walls 230 mm thick & internal walls 120 mm thick.
2) All dimensions are in mm.

OR

Q.3. Prepare a detailed abstract for R.C.C. underground water tank from given detail drawing. (fig.2). The tank is designed to store 42,750 liters. The major items of works are excavation, P.C.C., R.C.C. Walls, R.C.C. slab, Plastering, man hole etc. [16]

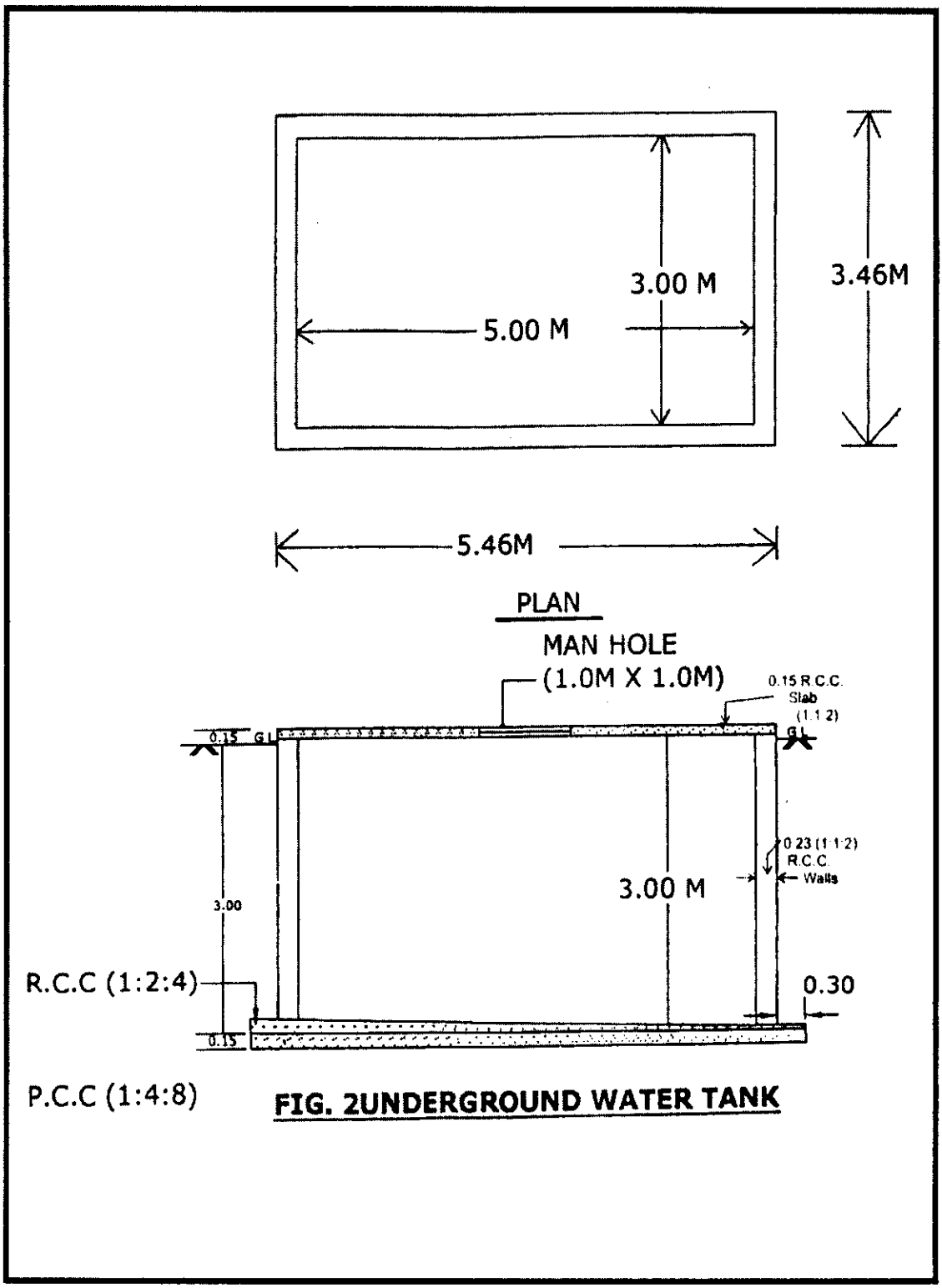


FIG. 2UNDERGROUND WATER TANK

UNIT – IV

Q.4. (a) List various items of water supply and sanitary fittings in residential building. [8]

(b) State and explain factors affecting cost of work. [8]

OR

Q.4. (a) Write short note on :-

(i) Contingencies and work change establishment.

(ii) Standard measurement book. [8]

(b) Estimate of single storied frame structure is given as shown in table below. Making suitable calculations. [8]

Fill in the blanks :-

Consider height of building as 3.5m.

S.r	Particulars	Amount (Rs.)
1.	Built up Area (square meter)	122.10
2.	Total Civil Cost of plinth (sub structure)	11,59,950
3.	Total Civil Cost of plinth (per sq. mt.)	?
4.	Total Civil Cost of Super structure	36,63,000
5.	Total Civil Cost of Super structure (per sq. mt.)	?
6.	Total Civil Cost of building	?
7.	Total Civil Cost of building (per sq. mt.)	?
8.	Total Civil Cost of building (per cubic meter content)	?

UNIT –V

Q.5. (a) What is depreciation? State and explain methods of calculating depreciation. What is year's purchase? Differentiate between single rate and dual rate year's purchase. [8]

(b) The owner of a property gets a net annual income of Rs. 40,500/- that he invests at 6% interest. At the end of 13 years he carries out certain repairs at the cost of Rs. 1,22,000/-. He then gets on offer from a buyer to purchase the property for R.s 6,00,000/-. Determine who is at advantage owner or buyer? [8]

OR

Q.5. (a) State and discuss factors affecting valuation. [8]

(b) Work out valuation of a cinema house with the following data: [8]

Cost of land for life time period of the house = Rs. 55,00,000/-

Gross income per year = Rs. 1,50,00,000/-

Expenses required per year:

(i) To run the cinema house: 25% of gross income.

(ii) For repairs 10% of capital cost of cinema house Rs. 25,00,000/-

(ii) Sinking fund to be accumulated for a period of 20 years at 4% rate of interest considering 10% salvage value of capital cost.

(iv) Insurance premium: Rs. 25,000/-

Assume years purchase for 60 years at the rate of 8% on capital cost and 4% on sinking find.

4E2033

Roll No. _____ Total No of Pages: 4

4E2033
B. Tech. IV Sem. (Back) Exam., June/July-2014
Civil Engineering
4CE2 Concrete & Construction Technology

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 24

Instructions to Candidates:-

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination.

(Mentioned in form No.205)

1. IS383 2. IS10262

UNIT-I

Q.1 (a) Describe the term 'Grade' of Concrete. [2]

(b) Design a Concrete mix of M30 Grade with the following data: maximum size of aggregate 20mm, fine aggregate conforming to Zone II of IS383, Cement – 43Grade OPC, Slump required = 40mm, Quality control – Good, standard deviation value may be assumed as 4.5 N/mm^2 to arrive at the target strength, specific gravities of cement, fine aggregate and coarse aggregate are 3.15, 2.65 and 2.80 respectively. Water absorption values for the fine and coarse aggregate may be taken as 1.0% and 1.20% respectively. Water content value for 20 mm

MSA concrete required is 186 kg/m^3. Air content may be assumed as1%. Any other data required may be assumed suitably and stated. Coarse aggregate contains two fractions: 20 mm size is passing 89% from 20 mm sieve and is 10% passing through 10 mm sieve. The 10 mm fraction is passing 100% from the 20 mm sieve and 70% from the 10mm sieve. Use appropriate blending to result in grading as per the norms for the concert mix. [14]

OR

Q.1 Discuss following properties of concrete and factors affecting these properties - [4x4=16]

(a) **Permeability**

(b) **Workability**

(c) **Compressive strength**

(d) **Flowablity**

UNIT-II

Q.2 (a) Discuss various methods of transportation of concrete and applicability along with suitability for each. [8]

(b) Discuss the role of fly ash in concrete. [4]

(c) Discuss properties of high Strength concrete and application. [4]

OR

Q.2 (a) Discuss batching of concrete in a batching plant and the related issues. [4]

(b) Discuss different curing methods of concrete, applicability and suitability of each. [6]

(c) Discuss properties of silica fume, its effect, and use in concrete [6]

UNIT-III

Q.3 (a) Explain DPC treatment in buildings with sketches. [8]

(b) Describe methods and materials for anti termite treatment. [8]

OR

Q.3 (a) Describe the method for centering and shuttering for columns, loads on the formwork of columns and the general associated related practices [12]

(b) Discuss issues for earthwork in dry and loose soil. [4]

UNIT-IV

Q.4 (a) Discuss requirements of a good staircase. [4]

(b) Describe various types of arches and their construction details with figures. [12]

OR

Q.4 (a) Discuss advantages and disadvantages of prefabrication and its use in constriction. [6]

(b) Discuss - [8]

(i) lift slab system

(ii) Concrete skeleton system both with figures

(c) Discuss requirement of a construction joint in brief. [2]

UNIT-V

Q.5 (a) Describe general floor components with figure and particular to a typical ground floor. [6]

(b) Discuss selection of flooring and floor types. [6]

(c) Describe various types of pitched roofs with figures. [4]

OR

Q.5 (a) Explain detail of a roof truss with figures. [10]

(b) Explain contrition detail of a typical upper floor with figure. [6]

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4E2039

Roll No. _____ Total No of Pages: 4

4E2039
B. Tech. IV Sem. (Back) Exam., June/July-2014
Civil Engineering
4CE6.2 Optimization Techniques

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 24

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(Mentioned in form No.205)

1._____ 2._____

UNIT-I

Q.1 (a) Write a short note on historical development of Optimization Techniques. [8]

(b) Write the main applications of Optimization Techniques in Engineering. [8]

OR

Q.1 (a) Define the Optimization Techniques. Classify the Optimization Techniques. [2+6=8]

(b) Discuss the formulation of an engineering problem as a mathematical programming problem. [8]

UNIT-II

Q.2 (a) Solve the following LPP by Big M- Method [10]

Min $z = 5x_1 + 2x_2$

s.t. $3x_1 + x_2 = 4$

$2x_1 + x_2 \geq 3$

$x_1 + 2x_2 \leq 3$

and $x_1, x_2 \geq 0$

(b) Find the dual problem of the following LPP. [6]

Max. $z = x_1 + 3x_2$

s.t. $-3x_1 - 2x_2 \geq -6$

$3x_1 + x_2 = 4$

and $x_1, x_2 \geq 0$

OR

Q.2 Solve the following LPP by using revised simplex method: [16]

Max. $z = 6x_1 - 2x_2 + 3x_3$

s.t. $2x_1 - x_2 + 2x_3 \leq 2$

$x_1 + 4x_3 \leq 4$

and $x_1, x_2, x_3 \geq 0$

UNIT-III

Q.3 A company is spending Rs. 1000 on transportation of its units to four warehouses from three factories. What can be the maximum saving by optimal scheduling? Solve the following transportation problem: [16]

Factory ↓	← Warehouses →				Factory capacity
	W1	W2	W3	W4	
F1	19	30	50	10	7
F2	70	30	40	60	9
F3	40	8	70	20	18
Warehouses requirement	5	8	7	14	34

OR

Q.3 Define the unbalanced Assignment Problem. Five wagons are available at stations 1, 2, 3, 4, and 5. These are required at five stations I, II, III, IV and V. The kilometers between various stations are given by the following table. How should the wagons be transported so as to minimize the total distance covered? [16]

	I	II	III	IV	V
1	10	5	9	18	11
2	13	9	6	12	14
3	3	2	4	4	5
4	18	9	12	17	15
5	11	6	14	19	10

UNIT-IV

Q.4 (a) Find the maximum value of the function - [8]

$$f(x) = \begin{cases} 2x+1, & x \leq 2 \\ -5x+15, & x > 2 \end{cases}$$

by the unrestricted search method starting from $x_1 = 0$ and moving with the step size of S = 0.4. [8]

(b) Write a short note on direct search methods.

OR

Q.4 (a) Minimize -

$f(x) = x_1 - x_2 + 2x_1^2 + 2x_1 x_2 + x_2^2$

from the starting point $x_1 = \begin{bmatrix} 0 \\ 0 \end{bmatrix}$ by Powell's method. [8]

(b) Using the steepest descent method, minimize

$f(x) = 2x_1^2 + 2x_1 x_2 + x_2^2 + x_1 - x_2$, starting from $x_1 = \begin{bmatrix} 0 \\ 0 \end{bmatrix}$ [8]

UNIT-V

Q.5 (a) State the Bellman's principle of optimality. Use dynamic programming to solve the following - [8]

Max. $z = x_1 x_2 x_3$

s.t. $x_1 + x_2 + x_3 = 9$

and $x_1, x_2, x_3 \geq 0$

(b) Use dynamic programming to Solve the following. [8]

Min. $z = x_1^2 + x_2^2 + x_3^2$

s.t. $x_1 + x_2 + x_3 \geq 30$

and $x_1, x_2, x_3 \geq 0$

OR

Q.5 (a) Write a short note on application of dynamic programming in LPP. [8]

(b) Solve the given LPP by using dynamic programming: [8]

Max. $z = 2x_1 + 5x_2$

s.t $2x_1 + x_2 \leq 43$

$2x_2 \leq 46$

and $x_1, x_2 \geq 0$