Total No. of Questions : 8] [Total No. of Pages : 2

P1178

[3564] - 6
B.E. (Civil)
ARCHITECTURE AND TOWN PLANNING
(1997 Course)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answer any three questions from each section.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) What are the salient features of Gothic Architecture? Explain. **[8]**

b) Explain with sketches the importance of Aesthetical and Architectural aspect in building planning. **[9]**

Q2) a) What are the aims, objectives and contents of Urban Land Ceiling act? **[8]**

b) Describe the aims, objectives and contents of M.R.T.P. act. **[9]**

Q3) a) What is the concept of neighbourhood planning? What are the standards followed in it? **[8]**

b) Explain the planning considerations for Neighbourhood unit on a undulating terrain. **[8]**

Q4) Write short notes on: **[16]**

a) Concept of Garden City.

b) Solar scope.

c) Town planning scheme.

d) Three Magnet concept.

P.T.O.

SECTION - II

Q5) a) Describe in details the different landscaping elements. **[9]**

b) What are the contributions of Patric Geddes to town planning. **[8]**

Q6) a) What is landscape? How does it enhance the aesthetical appeal of a building? **[9]**

b) Write short note on: **[8]**

i) Soft landscape and

ii) Hard landscape.

Q7) a) Explain in detail how will you carry out a traffic and transportation survey for D.P. **[8]**

b) Explain the scope and purpose of development plan. **[8]**

Q8) Write short notes on: **[16]**

a) Demographic survey.

b) Gandhinagar.

c) Principles of Town planning.

d) Houting survey.

❄❄❄

Total No. of Questions : 10] [Total No. of Pages : 2

P1177

[3564] - 4
B.E. (Civil)
CONSTRUCTION MANAGEMENT
(1997 Course) (Elective - I)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Question Nos. 1 and 6 are Compulsory. Out of the remaining attempt 2 questions from section I and 2 questions from section II.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) State the important qualities of a successful construction Manager. Also, mention the responsibilities carried by him on site. **[10]**

b) Write your observations on the effect of recession on construction industry. **[8]**

Q2) a) Explain ABC analysis in detail. Also, state its applications in **[8]**

i) Store ii) Advertising agency

iii) Financial control iv) Production planning

b) Give the sources of raising working capital for a construction firm. **[8]**

Q3) a) Describe the process of preparing project feasibility report for a highway project on BOT basis. **[8]**

b) Write in detail the occupational Health hazards on construction site of a multistoreyed building. **[8]**

Q4) a) Prepare a safety programme to be followed on a Highway site with concrete road. **[8]**

b) Explain MUSIC 3D rule in detail with suitable examples. **[8]**

Q5) a) What are various accounting methods? Explain any two of them in detail with its advantages and disadvantages. **[8]**

b) Describe the technical feasibility report and environmental assessment study for a dam project. **[8]**

P.T.O.

SECTION - II

Q6) a) What are the factors affecting site layout for **[8]**
i) Tunnel construction ii) Earthen dam site

b) Discuss Works Contract Act and Workman's Compensation Act in detail as applied to Civil Engineering construction. **[10]**

Q7) a) Explain the concept of risk, applicable to the financing organisation. **[8]**

b) What are the applications of MIS to a construction company? **[8]**

Q8) a) Design a training programme for the project managers to be deputed for an international project. **[8]**

b) Prepare site layout for a multistoreyed building with three buildings in various phases as excavation, concreting & finishing. **[8]**

Q9) a) Give the salient points included in the child labour act as under **[8]**
i) Definition of child labour.
ii) Occupations & processes where child labour is prohibited.
iii) Regulations of work conditions
iv) Penalties for violation.

b) Give the list of various personal protective equipments used by workers working on a dam site, multistoreyed construction, and construction of flyovers and pneumatic caissons. **[8]**

Q10) Write Short notes on any Four: **[16]**
a) Role of Risk manager.
b) Importance of site layout
c) Accident cost
d) Minimum wages act
e) DBM on a construction site
f) Sources of injury on a construction site.

❄❄❄

Total No. of Questions : 12] **[Total No. of Pages : 3**

P1356

[3564]-113
B.E. (Civil)
EARTHQUAKE ENGINEERING (Elective - II)
(2003 Course)

Time : 3 Hours] ***[Max. Marks : 100***

Instructions to the candidates:

1) ***Answer Q . 1 or Q. 2, Q. 3 or Q. 4, Q. 5 or Q. 6 from section-I and Q. 7 or Q. 8, Q. 9 or Q. 10, Q. 11 or Q. 12 from section-II.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Classify and describe with suitable sketches, the different types of waves generated by earthquake and their effects on structure. **[6]**

b) Briefly explain major earthquakes and their effects on structure. **[6]**

c) Explain with neat sketches, the elastic rebound theory. **[6]**

OR

Q2) a) Describe 'Source Effect' related with earthquake ground motion. **[6]**

b) Explain with sketches, the types of plate boundries. **[6]**

c) Describe the internal structure of earth. **[6]**

Q3) a) What are free vibrations and forced vibrations? Obtain differential equation of motion for a free and viscous damped SDOF system. (single degree of freedom). **[8]**

b) The roof on one storey building has mass 1000kg. All columns supporting roof together offer a lateral stiffness of 25000 N/m. The viscous damping coefficient is 500 N.m/s. Calculate undamped natural frequency and natural period. Assuming now damping, determine damping ratio, damped frequency and period. **[8]**

OR

Q4) a) Comment upon the structural response of earthquake due to ground motion characteristics. **[8]**

P.T.O.

b) Draw mathematical model and derive equation of motion of two degree of freedom system for damped and free vibrations. **[8]**

Q5) a) Explain advantages of shear wall and M.R.frame combination in resisting lateral loads due to earthquake. **[8]**

b) Describe behaviour of cantilever shear wall with reference to their typical mode of failure. **[8]**

OR

Q6) a) How to analyse the moment resting frame for earthquake. **[8]**

b) How the dynamic analysis to obtain designed seismic forces and its distribution to different levels along height of multistorey building is carried out? **[8]**

SECTION - II

Q7) Determine the lateral forces acting along the frame at CD due to Earthquake of Zone IV magnitude/intensity. Use response spectrum method as specified in IS 1893. Assume columns of size 300mm × 400mm and beams of size 300mm × 500mm. The floors including finish have a load of 4kN/m^2 and the imposed loading on floors is 3.5kN/m^2. Assume any other data as required. (see fig.7.1) **[18]**

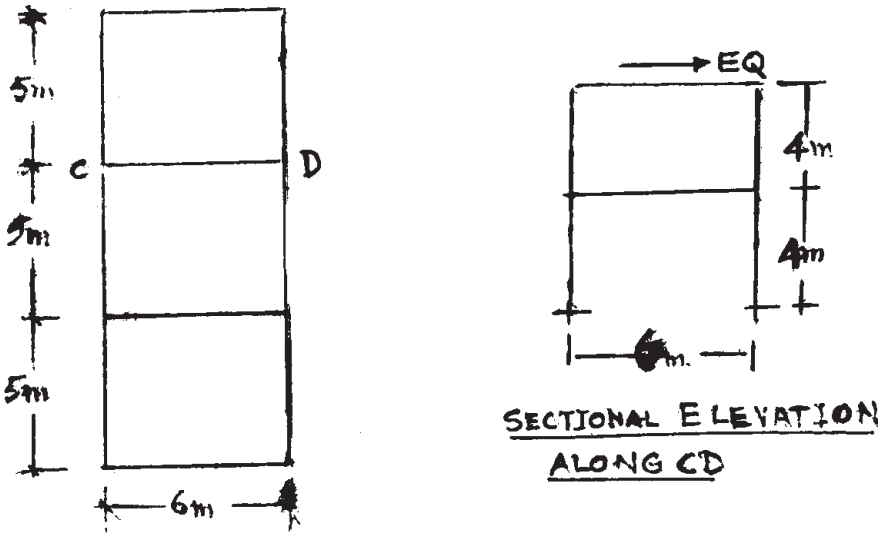


FIG 7.1

OR

Q8) a) Explain various base isolation techniques. **[6]**

b) Describe liquefaction of soil and typical remedial measures for the same. **[6]**

c) Explain the working of tuned mass dampner. **[6]**

Q9) Design a shear wall in an RCC frame with complete details of reinforcement. The design values of factored moment is 6000kNm, factored shear of 2500kN and factored axial load of 7500kN. The wall is 6m long and 4m in height. Assume other suitable data as required. **[16]**

OR

Q10) a) Explain the purpose of ductile detailing at rigid column beam joints. Explain specifications given in IS 13920 with comments on the same. **[8]**

b) Write a note on seismic evaluation techniques. **[8]**

Q11) Design an isolated column footing subjected to an axial load of 1000kN and a moment 60kNm along longer side of the column. Assume column size of 350mm × 600mm. Assume concrete of grade M25 and reinforcement of grade Fe 415. Take SBC of soil as 300kN/m^2. **[16]**

OR

Q12) a) Give details of damages that can be caused by Earthquakes due to **[8]**

i) Soft storey
ii) Floating columns
iii) Unsymmetric plan
iv) Irregular mass distribution.

Suggest suitable remedies for the same.

b) Explain the techniques of retrofitting that can be used in RCC frames, Masonry load bearing structures and girder bridges. **[8]**

Total No. of Questions : 8] **[Total No. of Pages :2**

P1332

[3564] - 115
B.E. (Civil)
ADVANCED STRUCTURAL DESIGN
(2003 Course) (Elective - II) (401007)

Time : 3 Hours] ***[Max. Marks:100***

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4 from section I and Q.5 or Q.6, Q.7 or Q.8 from section II.***
2) ***Answers to the two sections should be written in separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of electronic calculator, steel table and relevant I S Code is allowed.***
6) ***Assume suitable data, if necessary.***
7) ***Use of cell phone is prohibited in the examination hall.***

SECTION - I

Q1) Design an open web (castellated beam) for a span of 16 m. The dead load of the roofing is 750 N/m^2 and the live load on the roof is 2000 N/m^2. Cut the section at 45° and adjust the section such that overall depth of section should not exceed 900 mm. Assume f_y = 250 N/mm^2. **[25]**

OR

Q2) Select suitable configuration of the truss and determine the maximum compressive and tensile force in the leg at the base for A 50 m microwave antenna tower is to be built near Pune. The terrain at the location is a level ground. It has to carry a 3 m diameter hemispherical antenna disc at the top. The necessary data is as given below: **[25]**

a) The width at the top of the tower = 3.2 m.
b) Weight of the platform at top = 0.8 kN/m^2.
c) Weight of railing at top = 0.25 kN/m.
d) Weight of ladder and cage = 0.6 kN/m.
e) Weight of antenna disc and fixture =8.5 kN.
f) Self weight of truss = 4.5 kN/m.
g) Weight of miscellaneous = 2.5 kN.
h) Terrain category II and class of building B.

P.T.O.

Q3) Two channel sections without bent lips 200 mm x 50 mm and 2.5 mm thick are connected with webs to act as a beam. The effective span of simply supported beam is 6 m. The beam is laterally supported throughout its length. Determine the maximum uniformly distributed load inclusive of self weight which can be supported by the beam. Assume σ_y = 232 N/mm^2 and I_{xx} = 2 x 390.307 x 10^4. **[25]**

OR

Q4) The bottom chord tension member of roof truss is subjected to an axial pull of 400 kN. A differential chain hoist arrangement is attached to the bottom chord and gives a point load of 20 kN at the centre. The length of the member between panel points is 6 m. Design the section consisting of two unequal angles with long legs kept back to back and turn upward. Also design the connection. Assume f_y = 250 N/mm^2. **[25]**

SECTION - II

Q5) Design an exterior panel of size 6 m x 6 m of a flat slab with suitable drop to support a live load of 4000 N/m^2. The slab is provided with floor finish of 1000 N/m^2. The floor system is supported by columns of size 500 mm x 500 mm. Floor to floor distance is 3.5 m. Use M_{20} grade of concrete and Fe_{415} grade of steel. **[25]**

OR

Q6) Design an Intz type water tank of capacity 8,00,000 liters. The height of staging is 12 m up to the bottom of tank. The bearing capacity of soil may be assumed to be 120 kN/m^2. Wind pressure intensity is 1.8 kN/m^2. Use M_{20} grade of concrete and Fe_{415} grade of steel. **[25]**

Q7) Design a counterfort retaining wall for the following data: **[25]**

a) Height of wall above the ground level = 5.5 m.
b) Safe bearing capacity of soil = 175 kN/m^2.
c) Angle of friction ϕ = 30º.
d) Unit weight of backfill = 17000N/m^2.
e) Spacing of counterfort = 3m.
f) Coefficient of friction between soil and concrete, μ = 0.5.
g) Use M_{20} grade of concrete and Fe_{415} grade of steel.

OR

Q8) Design simply supported circular slab of 5 m diameter, subjected service live load of 4 kN/m^2 and floor finish 1 kN/m^2. Using M_{20} grade of concrete and Fe_{415} grade of steel. **[25]**

✪✡✪✡

Total No. of Questions : 12] **[Total No. of Pages : 4**

P1095

[3564]-121

B.E. (Civil)

FOUNDATION ENGINEERING

(401010) (2003 Course)

Time : 3 Hours*]** **[*Max. Marks : 100

Instructions to the candidates:

1) ***Answer Q1 or Q2, Q3 or Q4, Q5 or Q6 from Section-I and Q7 or Q8, Q9 or Q10, Q11 or Q12 from Section-II.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Your answers will be valued as a whole.***
6) ***Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.***
7) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Explain why density index is a significant parameter in Foundation Engineering. **[3]**

b) How is the number and depth of exploratory holes determined? **[3]**

c) What are penetration methods of investigations? Are they reliable in all soils? **[3]**

d) What are the factors that influence SPT data? **[3]**

e) Compare standard penetration test with dynamic cone test, in a tabular form. **[5]**

OR

Q2) a) List the methods of soil investigation. State advantages of sampling in open pits. Explain factors influencing cost of site investigations. **[6]**

b) An erratic soil deposit is known to extend to more than 18 m depth and overlies rock at about 21 m. What soil investigations would you plan for designing foundations for a factory complex? **[6]**

P.T.O.

c) How is degree of disturbance of soil samples measured? Determine the area ratios of samplers of the following description and comment on degree of disturbance of soil sample obtained. **[5]**

i) Split spoon sampler D_o=50 mm, D_i=36 mm

ii) Drive tube D_o=100 mm, D_i=85 mm

iii) Shelby tube D_o=50 mm, D_i=45 mm

Q3) a) Distinguish between elastic settlement and consolidation settlement and explain how they are estimated? **[6]**

b) What is "active zone" in soil? Explain it with reference to the pressure bulb concept? **[6]**

c) Determine the elastic settlement of a footing 3 m × 3 m resting on a sandy soil with E_s=45,000 kN/m^2, μ=0.3, I_s=0.82, if the footing carries a load of 2000 kN. **[5]**

OR

Q4) a) With a neat sketch explain laboratory consolidation test and list the various consolidation parameters of soil obtained from test data. **[8]**

b) Explain, with neat sketch, square root of time fitting method to find coefficient of consolidation. **[5]**

c) A consolidation test gives time for 90% consolidation as 16 min on a 20 mm thick specimen. Determine the time for 50% consolidation for a clay bed, 3 m thick with single face drainage. **[4]**

Q5) a) What are the basic characteristics of failure mechanisms in general shear and local shear failure. Explain with neat sketch. **[6]**

b) Explain how water table and depth influence bearing capacity. **[5]**

c) Explain the concept of floating foundation with a neat sketch. **[5]**

OR

Q6) a) Describe a plate load test, as carried out in the field with a neat sketch of experimental setup. **[6]**

b) Explain how SPT test data is used to find bearing capacity of cohesionless soil. **[5]**

c) Determine the safe bearing capacity of a rectangular footing 1.5 m × 2 m on a sandy soil with average blow count of N=28, resting at a depth of 1.5 m. **[5]**

SECTION - II

Q7) a) Explain with sketches threefold basic classification of piles, based on method of construction. **[6]**

b) Explain the concept of bearing capacity of single pile by (i) Static method (ii) Hiley's method. **[6]**

c) Describe with sketches construction of any one type of cast in situ single bulb pile. **[5]**

OR

Q8) a) Compare with sketches in tabular form open and pneumatic caisson in respect of (i) component parts (ii) method of formation (iii) use. **[6]**

b) For railway bridge pier, well foundation is to be provided. Draw a neat figure in cross section and elevation of superstructure to foundation. Name component parts. State magnitude and point of action of forces acting on it. **[6]**

c) Explain with sketches method of sinking of well foundation by using sand island method. **[5]**

Q9) a) For anchored sheet pile compare in tabular form (i) deflection (ii) pressure distribution (iii) bending moment, patterns for free and fixed earth support condition. **[6]**

b) For cantilever sheet pile, using approximate method work out depth of embedment. **[6]**

c) Work out stability conceptionally by indicating forces acting thereon for strutted excavation. **[5]**

OR

Q10) a) Explain how would you identify soils as swelling soil by using soil properties such as voids ratio, liquid limit etc. **[6]**

b) Define (i) Swelling pressure (ii) Free swell (iii) Differential free swell and state how would you measure any one of them. **[6]**

c) Name three different methods of preventing cracks in buildings to be founded on expansive soils and describe any two of them with sketches. **[5]**

Q11) a) Enlist and explain the classification of earthquakes based on mode of generation. **[6]**

b) State and explain five factors influencing ground motion with sketches. **[5]**

c) Explain with diagrams five effects of liquefaction on built environment. **[5]**

OR

Q12) a) Explain with figures the construction of nailed soil wall. **[6]**

b) Explain with diagrams five different types of geosynthetics and where each of them is used. **[5]**

c) Enlist eight different functions of geosynthetics with sketches and explain any three of them in details. **[5]**

❐❐❐

Total No. of Questions : 12] **[Total No. of Pages : 4**

P1094

[3564]-120
B.E. (Civil)
TRANSPORTATION ENGINEERING - II
(401009) (2003 Course)

Time : 3 Hours] [***Max. Marks : 100***

Instructions to the candidates:

1) ***Answer Q1 or Q2, Q3 or Q4, Q5 or Q6 from Section-I and Q7 or Q8, Q9 or Q10, Q11 or Q12 from Section-II.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of logarithmic tables, electronic pocket Non programmable calculator and steam tables is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) With the help of a neat sketch, describe the concept of Star and Grid pattern. **[4]**

b) Explain how Spot speed and Accident studies are carried out? **[3+3=6]**

c) Describe in detail the various steps involved in determining the road Lengths of different categories of roads by Lucknow Road development plan. **[7]**

OR

Q2) a) Write a detail note on: **[3+3=6]**

i) Traffic volume studies.

ii) Parking studies.

b) Describe the method of preparation of Master plan and its phasing for the Road development plan based on saturation system with the help of suitable example. **[6]**

c) There are 3 alternate plan proposals P, Q and R with different road Length in addition to the existing roads in the area and the details of the population and products served are given below. **[5]**

P.T.O.

Road Plan Proposal	Total Road Length (km.)	No. of Towns and Villages served with population ranges				Total Agricultural & Industrial products, [Thousand tonnes]
		1,001-2,000	2,001-5,000	5,001-10,000	> 10,000	
P	300	160	80	30	6	200
Q	400	200	90	60	8	270
R	500	240	110	70	10	315

Workout the utility per unit length for each of the systems and indicate which of the plans Yields the maximum utility based on saturation system. Assume utility units as given below.

i)

Population	Unit
1,001-2,000	0.25
2,001-5,000	0.50
5,001-10,000	1.00
> 10,000	2.50

ii)

Productivity	Unit
1,000 tonnes	1.0

Q3) a) State the functions of Transition curves. **[3]**

b) Carry out the analysis of overtaking sight distance with the aid of neat sketches. **[7]**

c) State the requirements of an ideal alignment and also explain with neat sketches how this is achieved? **[2+5=7]**

OR

Q4) a) What special considerations should be taken during the alignment of Hill roads? **[4]**

b) Write short note on Highway drainage. **[4]**

c) State the necessity of widening of roads on horizontal curves. **[3]**

d) Find the total width of a pavement on a horizontal curve for a new N.H. to be aligned along a rolling terrain with a ruling minimum radius. Assume all the necessary data as per I.R.C. **[6]**

Q5) a) Write a note on pavement failures and remedial measures to be taken during maintenance. **[2+2=4]**

b) State the various steps recommended by IRC:37-1970 for the C.B.R. method of Design for flexible pavements. **[6]**

c) State the importance of following tests. **[(1×2)×3=6]**

i) Shape test and Impact test on aggregates.

ii) Ductility test and Flash & Fire point test on bituminous material.

iii) Marshall stability test on bituminous mix.

OR

Q6) a) Discuss in detail the Design steps to be followed in case of Rigid pavements. **[6]**

b) Describe w.r.t. i) Gradation of materials and ii) Equipments & machinery required during W.B.M. road construction. **[3+3=6]**

c) Write a note on temperature stresses as suggested by Westerguard. **[4]**

SECTION - II

Q7) a) Write an explanatory note on the following: **[5 each=10]**

i) Three controls of an airplane.

ii) Wind rose type II for orientation of runway.

b) Explain the term "Minimum Turning Radius" with the aid of suitable sketch. **[2+2=4]**

c) Differentiate between: **[1 each=3]**

i) Runway and Taxiway.

ii) Airport and Aerodrome.

iii) Apron and Hangars.

OR

Q8) a) What are the points to be considered during the selection of a site for Heliport construction? **[5]**

b) The length of runway under standard conditions is 1620 mtr. The airport site has an elevation of 270 mtr. Its reference temperature is 32.90°C. If the runway is to be constructed with an effective gradient of 0.2%, determine the corrected runway length. Also, apply usual check as per ICAO. **[8]**

c) Discuss the various factors affecting Airport capacity. **[4]**

Q9) a) Give detail classification of bridges. **[5]**

b) Draw plan and elevation of a R.C.C. slab bridge showing all the components. **[6]**

c) Explain with formulae, how the following Loads are accounted while designing a bridge. **[3+3=6]**

i) Impact Load ii) Dead Load

OR

Q10) a) What is known as Economical span? Derive the formula you use. **[1+4=5]**

b) Explain in brief: **[2 each=6]**

i) Abutment pier.

ii) Forces acting on abutments.

iii) Remedial measures to minimise scour.

c) The normal velocity of flow in a river is 1.50 m/sec. The normal waterway under the bridge, the artificial waterway under the bridge and enlarged area upstream of the bridge are respectively, 8000 m^2, 7000 m^2 and 10,000 m^2. Assume g=9.81 mtr per sec^2. Calculate the height of afflux and increase in velocity due to afflux by Merriman's formula. **[6]**

Q11) a) Write a neat labelled sketches of **[3+3=6]**

i) Flying bridges.

ii) Cable stayed bridges.

b) Describe with sketch, the importance of cantilever bridges. **[4]**

c) Why bearings are required for bridges? Also, sketch any one free bearing and one fixed bearing which are commonly used. **[2+2+2=6]**

OR

Q12) a) Write a note on Maintenance of bridges. **[4]**

b) Explain any 2 techniques of erection of bridges. **[2+2=4]**

c) Sketch any 2 types of culverts and Label all the parts. **[3+3=6]**

d) Differentiate between: **[1+1=2]**

i) Permanent and Temporary bridges.

ii) Expansion and Rocker bearings.

❐❐❐

Total No. of Questions : 12] **[Total No. of Pages : 4**

P1093

[3564]-119

B.E. (Civil)

DAMS & HYDRAULIC STRUCTURE

(401008) (2003 Course)

Time : 3 Hours*]** **[*Max. Marks : 100

Instructions to the candidates:

1) ***Answer Q1 or Q2, Q3 or Q4, Q5 or Q6 in Section-I and Q7 or Q8, Q9 or Q10, Q11 or Q12 in Section-II.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) Answer any two of the following: **[16]**

a) Enumerate the various considerations in the selection of type of dam with specific emphasis on spillway location and availability of construction materials.

b) Write the concept of an arch dam and short note on constant radius arch dam. Draw the neat sketch.

c) Write a short note on 'Strengthening of Dams'.

OR

Q2) Answer any two of the following: **[16]**

a) Write a short note on 'Problems in Dam construction'.

b) Briefly explain the meaning of storage dams, diversion dams, overflow dams and rigid dams.

c) Explain clearly the procedure of carrying out detailed investigation of the dam site.

P.T.O.

Q3) A concrete gravity dam 40 m high has a top width of 5 m. The maximum depth of water to be retained is 37 m. The upstream and downstream faces of the dam have slopes of 1H:

10V and 0.8H : 1V respectively. Check the stability of the dam for the reservoir full condition for the data given below. **[18]**

a) Unit weight of water = 10 kN/m^3

b) Unit weight of concrete = 24 kN/m^3

c) Horizontal earthquake with α = 0.1

d) Coefficient of sliding friction = 0.75

e) Average sheer strength of foundation = 1400 kN/m^2

f) Other computed data is as follows.

Sr.No.	Description	Force (kN)	Lever Arm from toe of dam (m)	Moment about toe of dam (kN-m)
1	Weight of Dam	22080	25.67	566794
2	Weight of water on upstream face	684.5	39.77	27223
3	Uplift force	7585	27.33	207298
4	Horizontal pressure due to water	6845	12.33	84399

OR

Q4) a) What do you understand by the term 'Reservoir'? Describe briefly the different types of reservoirs and their purposes. **[6]**

b) What do you understand by storage zones of a 'Reservoir'? Discuss live storage and dead storage. Does dead storage constitute a loss in a reservoir feeding a hydel power plant. **[6]**

c) Write a note on grouting of gravity dams. **[6]**

Q5) a) Give the list of all input parameters for design of an ogee spillway. Also write in sequence the design steps for an ogee spillway. **[8]**

b) Discuss briefly the causes of failure of an earth dam. **[8]**

OR

Q6) a) Write short notes on: **[8]**

i) Chute spillway

ii) Side channel spillway

b) Determine the factor of safety of downstream slope of an earthen dam (homogenous section) drawn to a scale of 1 : 500, with the following data: **[8]**

i) Length of slip circle arc = 15 cm

ii) Total area of N- rectangle = 16.5 cm^2

iii) Total area of T- rectangle = 7 cm^2

iv) Area of U rectangle = 5 cm^2

v) Angle $\varphi = 26°$

vi) C' = 0.2 kg/cm^2 (for cohesion)

vii) Specific weight of soil = 1.8 gm/cm^3

SECTION - II

Q7) a) Draw a neat sketch of a typical layout of diversion head works and explain the function of its component parts. **[8]**

b) Explain with neat sketch the Bligh's creep theory for seepage flow below weir. **[8]**

OR

Q8) a) Explain clearly with neat sketches the Khosla's method of independent variables for design of weirs on permeable foundation. **[8]**

b) Write short notes on: **[8]**

i) Lake tapping

ii) Head regulator

Q9) a) Design a stable alluvium channel by using Lacey's method to carry a discharge of 30 m^3/s and mean sediment size of 0.3 mm. Take Lacey's silt factor = 1.0. **[8]**

b) Draw a neat sketch of an aqueduct and state the conditions for adopting this type of cross drainage work. **[8]**

OR

Q10) a) Explain the necessity of providing canal fall. With the help of neat sketch, describe Sarda type fall. **[8]**

b) Explain the importance of canal lining. What are the different types of Canal lining. **[8]**

Q11) a) State the various types of river training works and explain the purpose served by any two of them. **[9]**

b) Write a brief note on use, type and selection of turbines in hydro-power plants. **[9]**

OR

Q12) Write short notes on any three of the following: **[18]**

a) Guide bunds.

b) Groynes.

c) Hydro-power station - layout - components - functions of components.

d) Run-of-river plant.

❐❐❐

Total No. of Questions : 6] **[Total No. of Pages : 2**

P1255

[3564]-118

B.E. (Civil)

ADVANCED ENGINEERING GEOLOGY WITH ROCK MECHANICS

(2003 Course) (Elective - II)

Time : 3 Hours] ***[Max. Marks : 100***

Instructions :

1) ***All questions are compulsory.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

SECTION - I

Q1) Write notes on:

a) Field characters of fractures occurring in Deccan Trap area. **[6]**

b) Engineering significance of Kaladgis and Vindhyan rocks occurring in Maharashtra State. **[8]**

c) Width of Dykes in Deccan Trap area. **[4]**

OR

Write notes on:

a) Varieties of Basalt. **[5]**

b) Flow Groups. **[4]**

c) Engineering significance of Archaean and Dharwarian rocks occurring in Maharashtra State. **[9]**

Q2) a) Discuss in detail, case histories of Varasgaon and Mula dam sites and how economy has been achieved at these dam sites. **[9]**

b) Discuss in detail, the old and recent theories about the origin of Tachylytic basalt. **[7]**

OR

a) Explain the importance of Preliminary Geological investigations along a Tail Channel of a dam in Deccan Trap area. Explain suitable case histories. **[8]**

b) Write a note on, the Tachylytic basalts occurring in a dam project area. Mention suitable case histories. **[8]**

P.T.O.

Q3) a) Discuss in detail, Geo-Mechanical classification of rock masses, suggested by Bieniawski. **[12]**

b) What is R.Q.D. ? How to calculate it? **[4]**

OR

a) Explain in detail ,Wickeham's concept of classification of rock masses. **[8]**

b) List only various Geophysical methods of prospecting of rock masses. **[3]**

c) Explain 'Strength' as a mechanical property of rock masses. **[5]**

SECTION - II

Q4) What are fractures? Mention their important field characters. Discuss their engineering significance from tunnelling point of view with case histories. **[18]**

OR

a) What treatment to a fracture zone should be given if it is occurring below the foundation of a pier of bridge? **[6]**

b) Discuss importance of subsurface investigations for foundation of bridges. **[8]**

c) State stand up time of a rock mass during tunnelling. **[4]**

Q5) Write notes on the following:

a) Chances of getting groundwater along flow contacts. **[4]**

b) Waterbearing character of amygdaloidal basalts. **[4]**

c) Characters of transported soils derived from Deccan Trap basalts and discuss their suitability in earth dam activity. **[8]**

OR

Write notes on the following:

a) Waterbearing character of dykes. **[4]**

b) Residual soils of Maharashtra. **[4]**

c) Granular disintegration. **[4]**

d) Multiaquifer system. **[4]**

Q6) Write notes on the following:

a) Objections and facts about using amygdaloidal basalts as rubble for masonry. Give examples. **[8]**

b) Foundations of monumental buildings. **[4]**

c) Engineering significance of active faults. **[4]**

OR

Write notes on the following:

a) Will dam building activity cause a major earthquake? Give example. **[8]**

b) Use of dyke rock as construction material. **[4]**

c) Problems with 'made grounds' in cities. **[4]**

❐❐❐

Total No. of Questions : 12] **[Total No. of Pages : 2**

P1296

[3564]-117
B.E. (Civil)
INTEGRATED WATER RESOURCES PLANNING & MANAGEMENT
(2003 Course) (Elective - II)

Time : 3 Hours] ***[Max. Marks : 100***

Instructions :

1) ***Answer Three questions from each section.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.***
5) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Give the distribution of world water resources in percentage and explain the need of conservation of surface water. **[8]**

b) Explain history of water resources development in India. **[8]**

OR

Q2) a) Explain problems and perspectives of water infrastructure in India. **[8]**

b) State salient features of existing institutional framework for water management. **[8]**

Q3) a) With the help of constitutional provisions, enlist the different laws related to water resources. **[8]**

b) What are riparian rights? Explain any two. **[8]**

OR

Q4) a) State significance of prior appropriation. **[8]**

b) Write a short note on scope for privatization in field of water resources. **[8]**

Q5) a) Explain use of systems engineering in Integrated Water Resources Planning and Management. **[10]**

b) State & define any four statistical parameters used in statistical methods. **[8]**

OR

Q6) a) Define flood. State causes of flood. State salient features of flood mitigation plan. **[8]**

b) Write short notes on (Any 2) : **[10]**

i) Use of Geoinformatics in drought management.

ii) Application of ANN in flood prediction.

iii) Use of Fuzzy logic in water resources planning and management.

P.T.O.

SECTION - II

Q7) a) Explain the issue and key features of interlinking of rivers in India in the context of inter basin water transfer. **[8]**

b) What do you mean by demand and supply based water management? What are different demands? **[8]**

OR

Q8) a) Give classification of water demands and state atleast six demands of water. **[8]**

b) Write short note on import and export of water. **[8]**

Q9) a) Explain significance of environmental management in protection of ecosystem. **[8]**

b) What are different water requirements for environmental management? Enlist the same. **[8]**

OR

Q10)a) State different water quality standards for maintaining the environmental system. **[8]**

b) Write short note on Acquaculture. **[8]**

Q11)a) What are causes of silting of reservoirs? State the measures to control the same. **[10]**

b) Write short note on social impact of water resources development. **[8]**

OR

Q12)a) Write short note on Decision Support System for integrated water Resources Planning and Management. **[8]**

b) Explain the factors governing the perspective plan for basin development and management. **[10]**

❐❐❐

Total No. of Questions : 12] **[Total No. of Pages : 3**

P1092

[3564]-116
B.E. (Civil)
CONSTRUCTION MANAGEMENT
(2003 Course) (Elective - II)

Time : 3 Hours*]** **[*Max. Marks : 100

Instructions to the candidates:

1) ***Answer 3 questions from each section.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) As a Construction Manager on a Flyover site which is at a busy location in the city, discuss in detail the planning, execution and controlling for the project. (Assume that the event of launching of Precast girders is taking place.) **[9]**

b) Brief about CIDC and its objectives. **[4]**

c) Give the qualities required by a successful Construction Manager. **[5]**

OR

Q2) a) Draw the site layout of a construction site you have visited by giving salient features of the same. Also, discuss the safety programme followed on the site. **[9]**

b) In case of a fatal accident on site, how you will control the situation? **[4]**

c) Explain the role of construction industry in the economic development of nation. **[5]**

P.T.O.

Q3) a) What is inventory? What do you mean by Inventory Control? Also explain the saw tooth Graph for material ordering. **[8]**

b) Explain 4M's of construction in detail. **[8]**

OR

Q4) a) What are the objectives of MRP system. Also, describe the working of MRP system. **[8]**

b) Explain MUSIC 3D rule in detail. Also, discuss the advantages and disadvantages over ABC analysis. **[8]**

Q5) a) Discuss the role of WB in construction sector. Also state the procedure involved for sanctioning of a project under World Bank. **[4+4]**

b) Differentiate between Economical analysis and financial analysis of a project. **[8]**

OR

Q6) a) What is the role of CIDB in the development of construction industry? **[8]**

b) What is the necessity of Project appraisal? Explain various feasibility analysis reports to be written before the start of project. **[8]**

SECTION - II

Q7) a) Define: (i) Disaster **[3+5]**

(ii) Disaster Management

(iii) Mitigation of Disaster

What are the National and International organisations working in the field of Disaster & Emergency Management? Explain them in brief.

b) Enlist the common preparedness measures to be followed in case of disasters. **[4]**

c) What are the emergency services to be given on site after a major earthquake? **[6]**

OR

Q8) a) What are the different phases involved in Disaster Management? Explain each of them in brief. **[2+8]**

b) Enlist the onsite and offsite emergency planning after hurricane. **[8]**

Q9) a) What are the different applicable to construction field? Explain the Workman's compensation Act with respect to following point: **[8]**

i) Necessity

ii) Details of compensation.

b) Highlight the important clauses of Child Labour Act. **[8]**

OR

Q10) a) Design a training programme for the skilled labours involved for a multistoreyed construction. **[8]**

b) Write short notes on: **[8]**

i) Employees Provident Fund Act.

ii) Payment of Bonus Act.

Q11) a) Explain in detail necessity and importance of RAMP handbook. **[8]**

b) Explain the risk faced by owner, consultant and contractor for a private construction. Give examples wherever possible. **[8]**

OR

Q12) a) Write a note on CIDC and its policies for risk mitigation. **[8]**

b) What are the measures to be adopted for effective implementation of Management Information System on a Construction site? **[8]**

❐❐❐

Total No. of Questions : 12] **[Total No. of Pages : 12**

P1306 **[3564]-114**

B.E. (Civil)

ADVANCED TRANSPORTATION ENGINEERING

(2003 Course) (Elective -II)

Time : 4 Hours] ***[Max. Marks : 100***

Instructions to the candidates :

1) ***Answer Q1 or Q2, Q3 or Q4, Q5 or Q6 from Section I and Answer Q7 or Q8, Q9 or Q10, Q11 or Q12 from Section - II.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) With a flow diagram only explain the comprehensive transport planning process in detail. **[6]**

b) Explain in brief the salient features of the GQ and the N-S-E-W corridars. **[4]**

c) Solve the following O-D matrix using the Furness method. **[8]**

O \ D	1	2	3	4	Total present trips	Future predicted trips (total)	Origin growth factor
1	8	3	16	15	?	147	?
2	6	9	8	5	?	42	?
3	10	8	3	8	?	32	?
4	2	4	7	12	?	30	?
Total Present trips	?	?	?	?	?	-	
Predicted future trips	39	24	68	120	-	251	
Destination Growth Factors	?	?	?	?			

OR

Q2) a) Explain in brief the following projects- **[6]**

i) Bharat Jodo Pariyojana.

ii) PMGSY.

b) Explain the importance of conducting various surveys in the urban transportation planning process. List out various surveys associated.**[4+2]**

c) Explain multiple linear regression analysis and estimate the total number of trips using Modesto model based on the following data.

i) No. of dwelling units = 2000.

ii) No. of cars owned perdwelling unit = 3.

iii) Average number of persons per house = 3.

iv) Social rank index = 2.5.

v) Urbanization index = 4.0. **[2+4]**

Q3) a) With the help of statistical figures, explain the 4 stages of the traffic study conducted to arrive at the net ADT and hence the peak hourly traffic for the easterly bypass from Theur Phata to Hadapsar - Saswad road, a MSRDC project. **[8]**

b) Discuss the various issues related to the urban transportation planning in India, given suitable examples. **[8]**

OR

Q4) a) What is BRT? Explain the various problems associated with the implementation of BRT in Pune. **[2+6]**

b) With examples, evaluate the validity of DMRC statements as regards the performance of the Delhi Metro. **[4]**

c) Explain how the toll rates were arrived at, on the Bandra - Worli sea link. **[4]**

Q5) a) With examples explain the following:

i) BOT ii) BOO iii) PBP iv) NPV **[8]**

b) On the 4 Sion fly over in Mumbai, explain in detail the method of working out the various costs. Explain the difference between the economic and financial costs and also explain, which one of the two was used and why? **[8]**

OR

Q6) a) Explain the advantages of BOT projects. **[4]**

b) List the various traditional and discounted cash flow methods used for financial analysis? How is IRR calculated. **[6]**

c) Differentiate between BOT, BOO, BOOS, BTO with an example. **[6]**

SECTION - II

Q7) a) Explain in brief the "volume count surveys". **[4]**

b) Explain traffic management measures such as-

i) Location of Signals. ii) Bus lane. **[4]**

c) While carrying out a manual count survey for a period of 12 hours on typical day of the week, for the base year, the following count were recorded in total, in one direction. **[10]**

i)	Auto rickshaws, cars	– 3500
ii)	Buses	– 1500
iii)	Motorcycles, Scooters	– 4500
iv)	Cycle rickshaws	150
v)	Horse driven vehicles	40
vi)	Bullock carts	20
vii)	Hand carts	50
viii)	6-seater rickshaw	800
ix)	Heavy matadoors	400
x)	Other Heavy vehicles	3000

Determine:

1) % Composition of each classified count.
2) PCU factors based on % and as per IS code.
3) Total hourly volume of traffic in base year.
4) Total traffic count in horizon year after 15 years at a growth rate of 10%.
5) Number of lanes required and total road width in base year.
6) CVPD.
7) Strategies to flow out the traffic during horizon year.

OR

Q8) a) While using the moving vehicle method, the following data was recorded in the North bound as well as sound bound trips: **[10]**

Run Number	Travel time in minutes	Vehicles met by test car from opposing direction	Vehicles over taking test car	Vehicles passed by the test car
North bound trips	T_n	M_n	O_n	P_n
1N	2.70	88	1	0
2N	2.85	80	3	1
3N	2.15	77	0	3
4N	3.00	85	2	1
5N	2.45	87	1	1
6N	2.55	81	2	0
South bound trips	T_s	M_s	O_s	P_s
1S	2.40	110	0	0
2S	2.35	108	1	2
3S	2.70	105	2	0
4S	2.15	115	0	1
5S	2.55	107	1	2
6S	2.45	100	1	1

Determine hourly volume and average travel time in each of the directions:

b) Explain in detail: **[8]**

i) Spot, Speed delay studies.

ii) Parking Surveys.

Q9) a) What is an overlay? What are the types of overlay explain. **[6]**

b) As per IRC - 37 Design a flexible pavement for construction of new by pass with the following data:- **[10]**

i) Type of Road - two lane single carriage way.

ii) Initial traffic made during counts before the start of construction = 1500 CVPD in one direction.

iii) Traffic growth rate per annum = 7.5%.

iv) Construction period = 03 years.

v) Design life = 15 years.

vi) Terrain = Rolling.

vii) C.B.R of subgrade = 5%.

OR

Q10)a) Compare and contrast between flexible and rigid pavement. **[8]**

b) As per IRC - 81 Design overlay for the existing flexible pavement. **[8]**

Design data

i) Type of road - four lane carriageway.

ii) Initial traffic at the end of construction in both direction 3000 CVPD.

iii) Traffic growth rate - 7.5%.

iv) Design life - 15 years.

v) Characteristic deflection of existing pavement regarded by Benkelman beam method = 0.850 mm.

vi) Average annual Rainfall = 1350 mm.

vii) Average temperature = 32^{o}C.

viii) Subgrade soil - Clayey of P.I < 15 and corresponding moisture content = 18%.

ix) Use following table if required.

Ratio L/l or B/l	C
1	0.00
2	0.04
3	0.175
4	0.440
5	0.725
6	0.920

Q11)a) A cement concrete pavement is to be designed for a two lane two way national highway. The data necessary for the design is as follows: **[12]**

i) 2 way CVPD = 3200

ii) Flexuval strength of concrete = 45 kg/cm^2.

iii) Effective modulus of subgrade reaction = 8kg / cm^3.

iv) Elastic modulus of concrete = 3.2 x 10^5 kg /cm^2.

v) Poissons ratio = 0.18.

vi) Coefficient of thermal expansion of concrete = 10.5 x 10^{-6}/ºC.

vii) Tyre pressure = 8 kg/cm^2.

viii) Traffic growth rate = 8.0%.

ix) Design life = 20 years.

x) Spacing of contraction joints = 4.5 m.

xi) Width of slab = 4.0 m.

xii) Load safety factor = 1.2.

xiii) Maximum temperature difference between top and bottom of slab = 22°C.

xiv) Centre to centre distance between two tyres = 32 cm.

Assume only single axle load spectrum as follows:

Axle loads (tonnes)	% of axle load
20	1.4
18	7.0
16	25.0
14	36.0
12	12.0
10	8.0
<10	0.6

Perform design as per IRC - 58 and check whether the Pavement thickness of 34 cm is safe or not.

b) Explain the process of tie bar design. **[4]**

OR

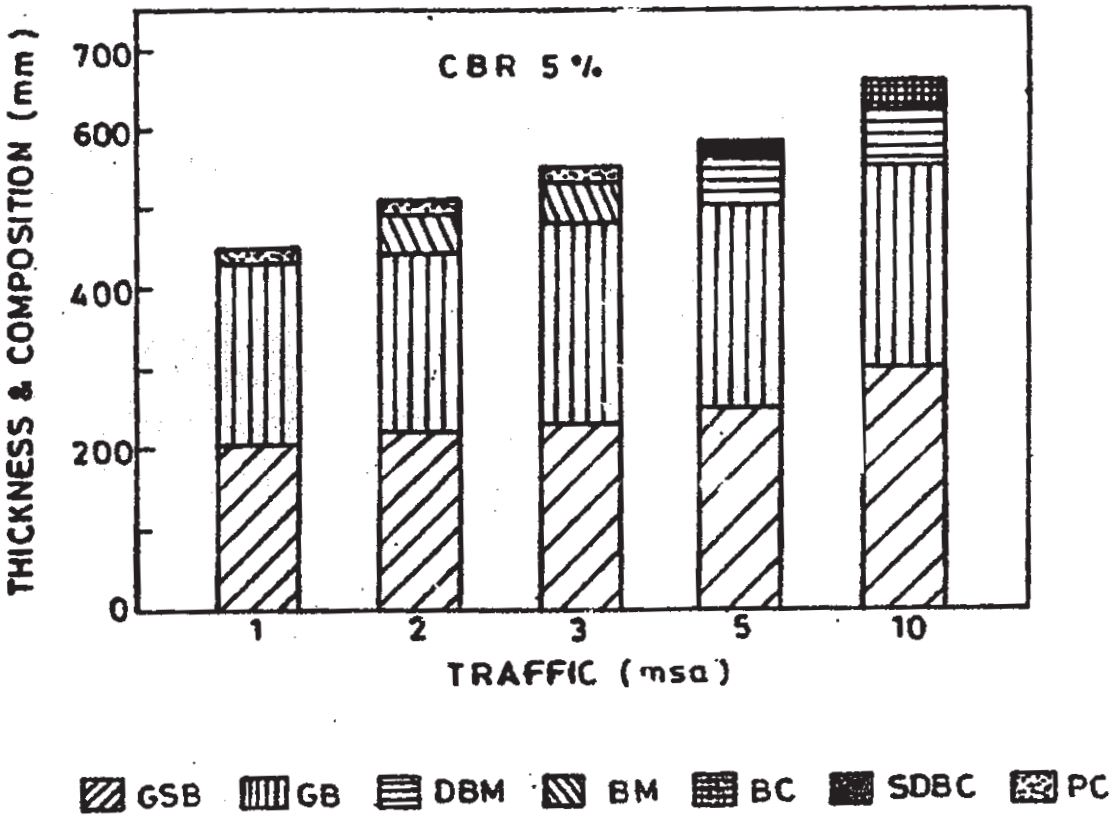
Q12)a) For the above data check whether 30 cm slab is safe, when modulus of subgrade reaction is 15 kg / cm^3. **[12]**

b) What is PCR? How is it used? Plot PCR scale. **[4]**

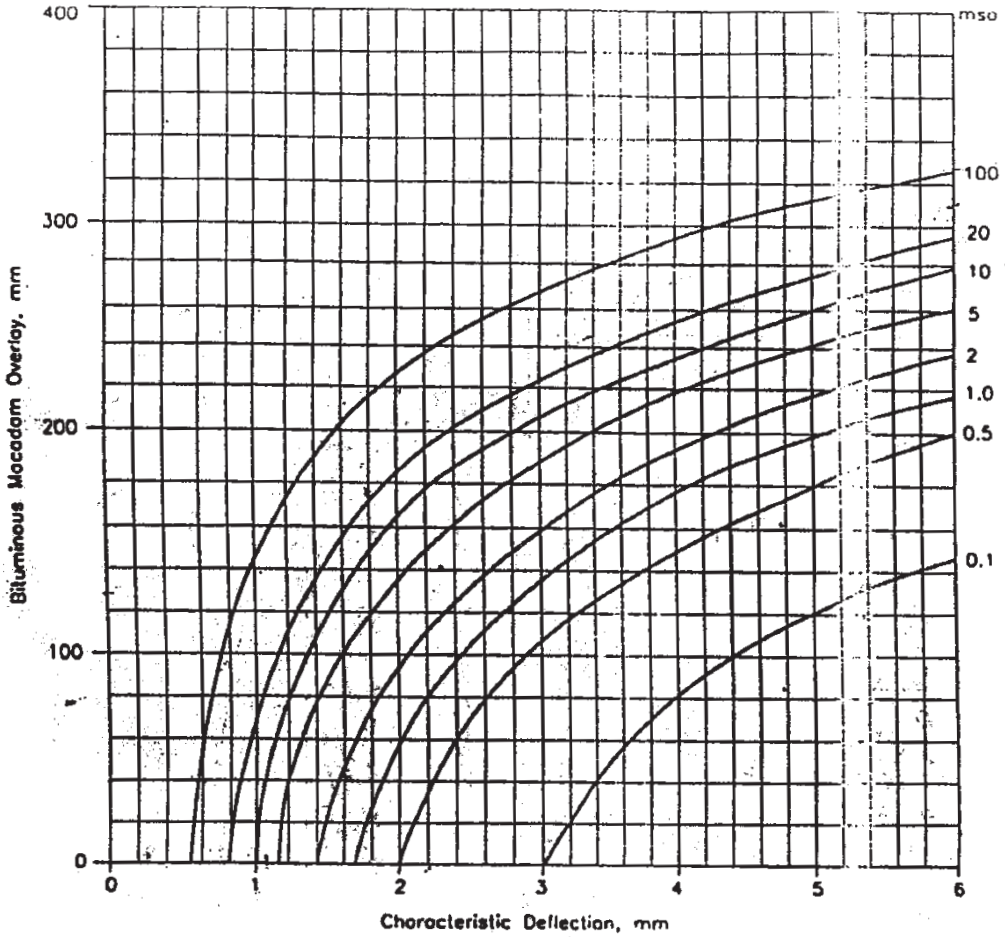
PAVEMENT DESIGN CATALOGUE

PLATE 1 – RECOMMENDED DESIGNS FOR TRAFFIC RANGE 1-10 msa

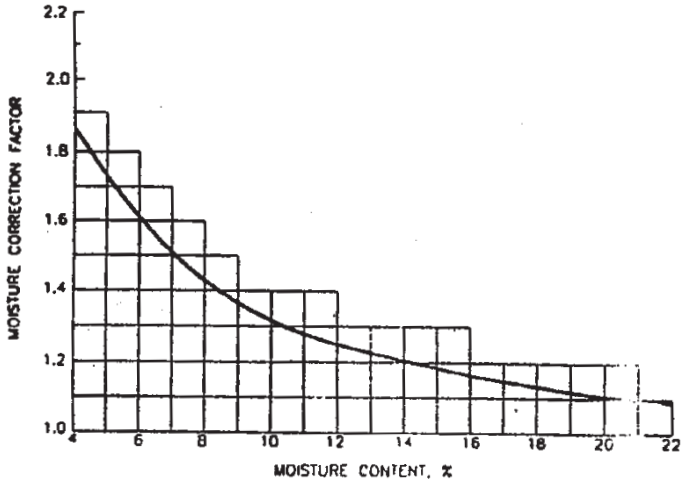
CBR 5%					
Cumulative Traffic (msa)	Total Pavement Thickness (mm)	PAVEMENT COMPOSITION			
		Bituminous Surfacing		Granular Base (mm)	Granular Sub-base (mm)
		Wearing Course (mm)	Binder Course (mm)		
1	430	20 PC		225	205
2	490	20 PC	50 BM	225	215
3	530	20 PC	50 BM	250	230
5	580	25 SDBC	55 DBM	250	250
10	660	40 BC	70 DBM	250	300



Contd.



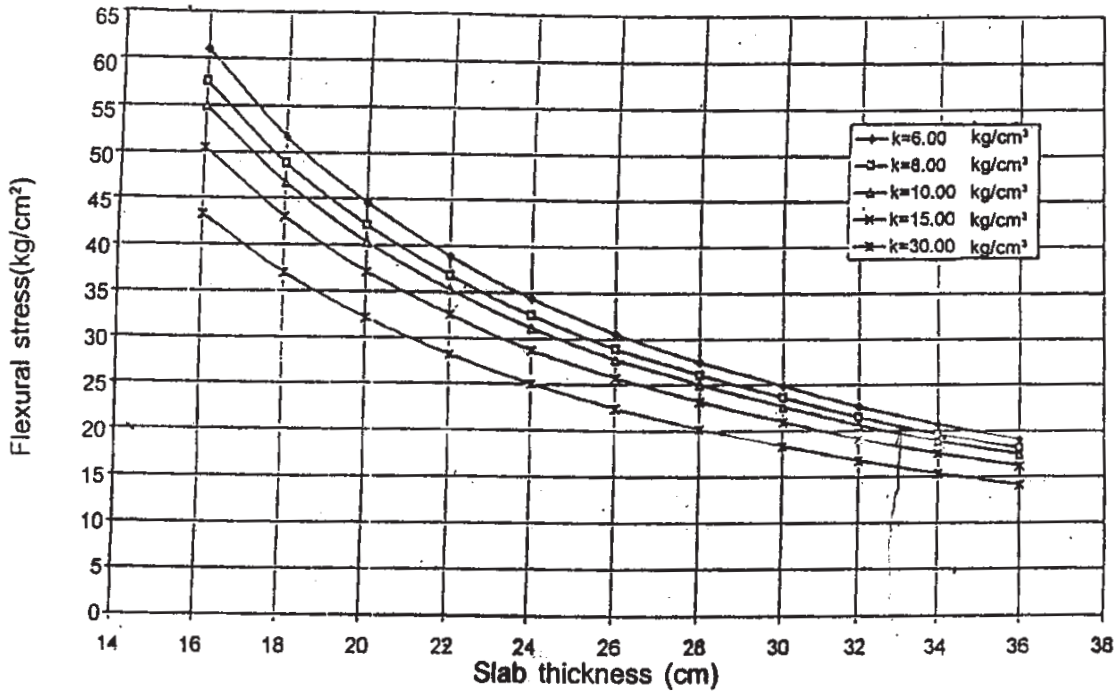
Overlay Thickness Design Curves



Moisture correction factor for clayey subgrade with low plasticity (PI < 15) for high rainfall areas (Annual rainfall > 1300 mm)

Appendix-1 (Contd.)

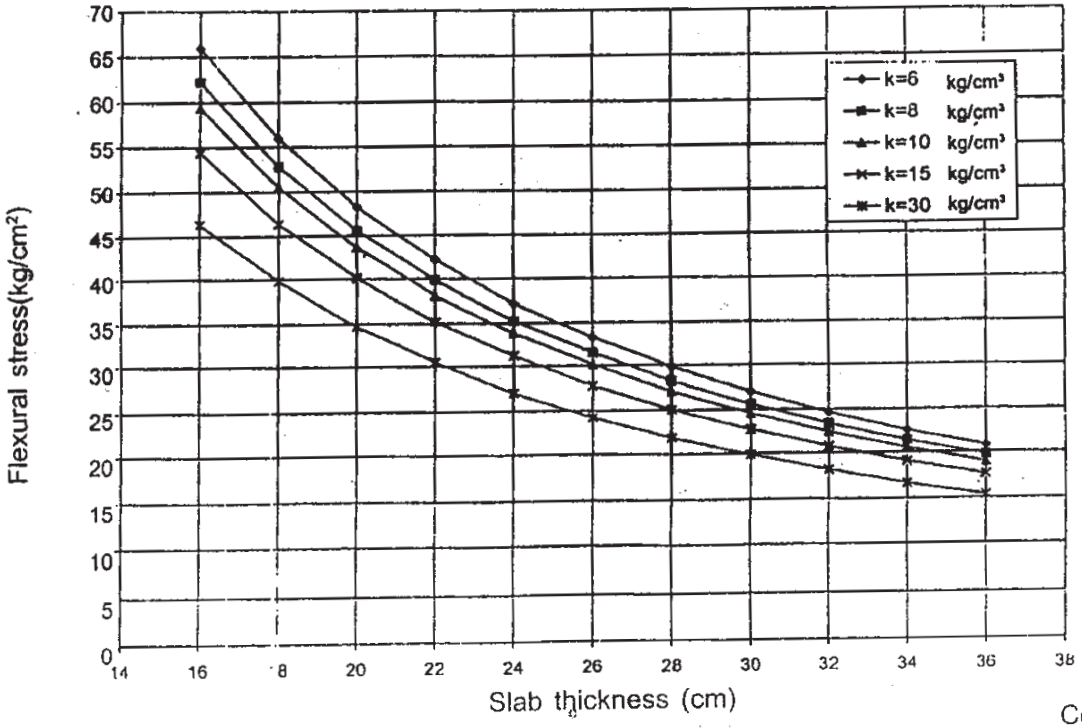
Stresses in Rigid Pavement (Single Axle Load = 20 tons)



Contd..

Appendix-1 (Contd.)

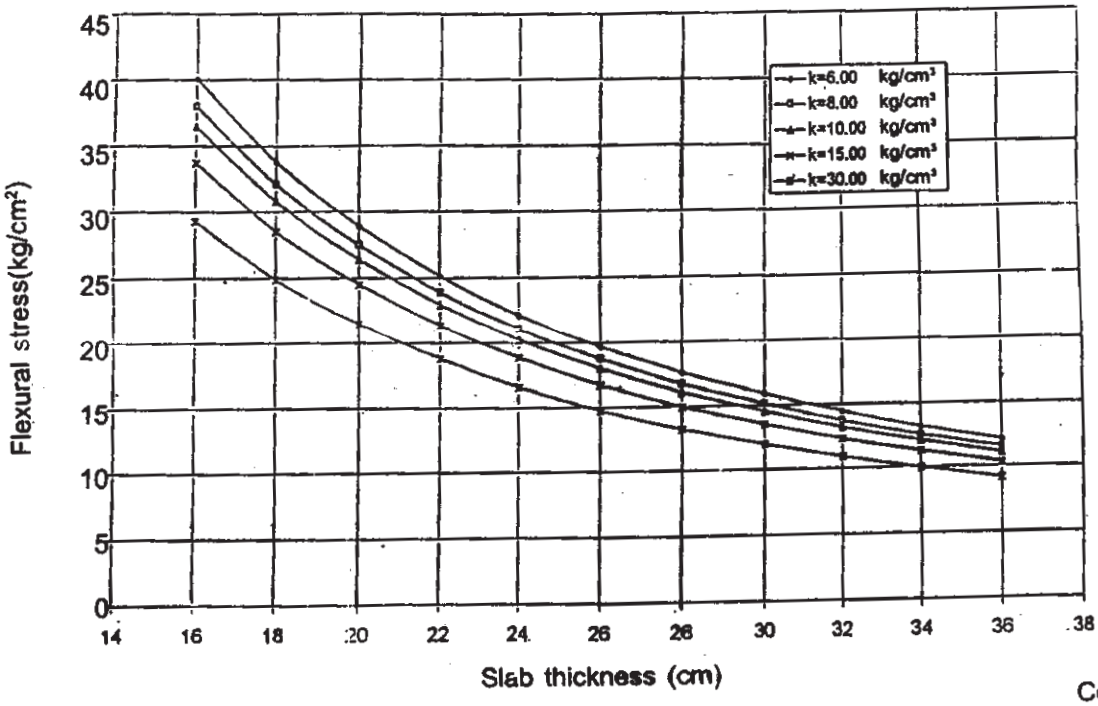
Stresses in Rigid Pavement (Single Axle Load = 22 tons)



Contd..

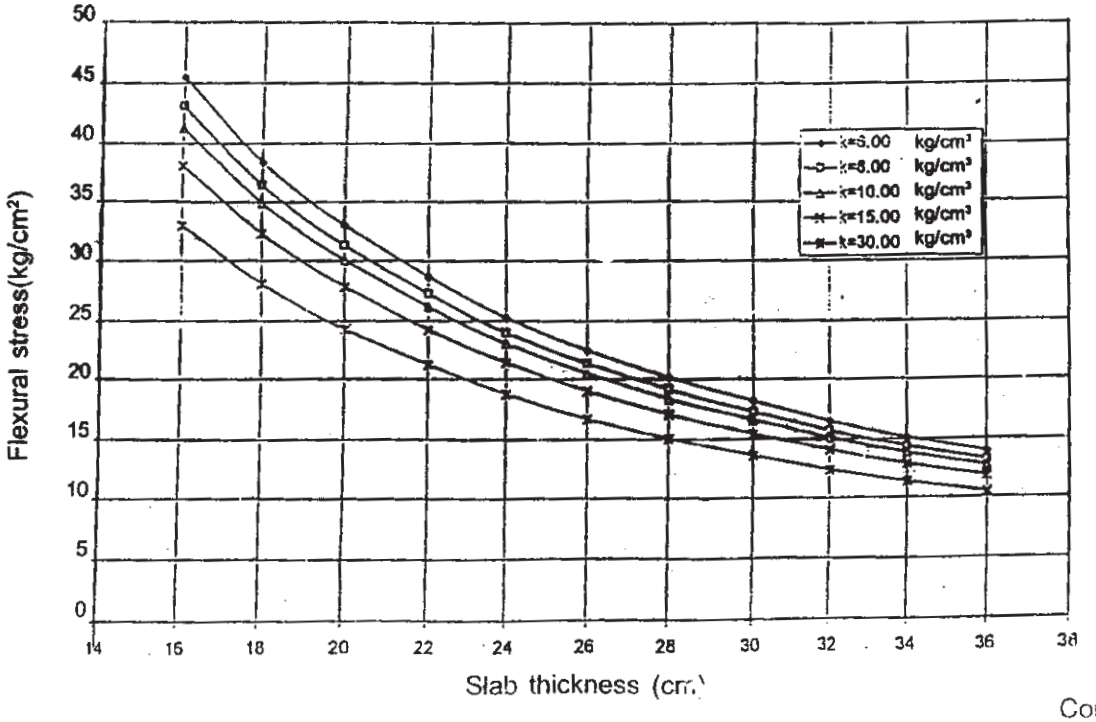
IRC:58-2002

Stresses in Rigid Pavement (Single Axle Load = 12 tons)



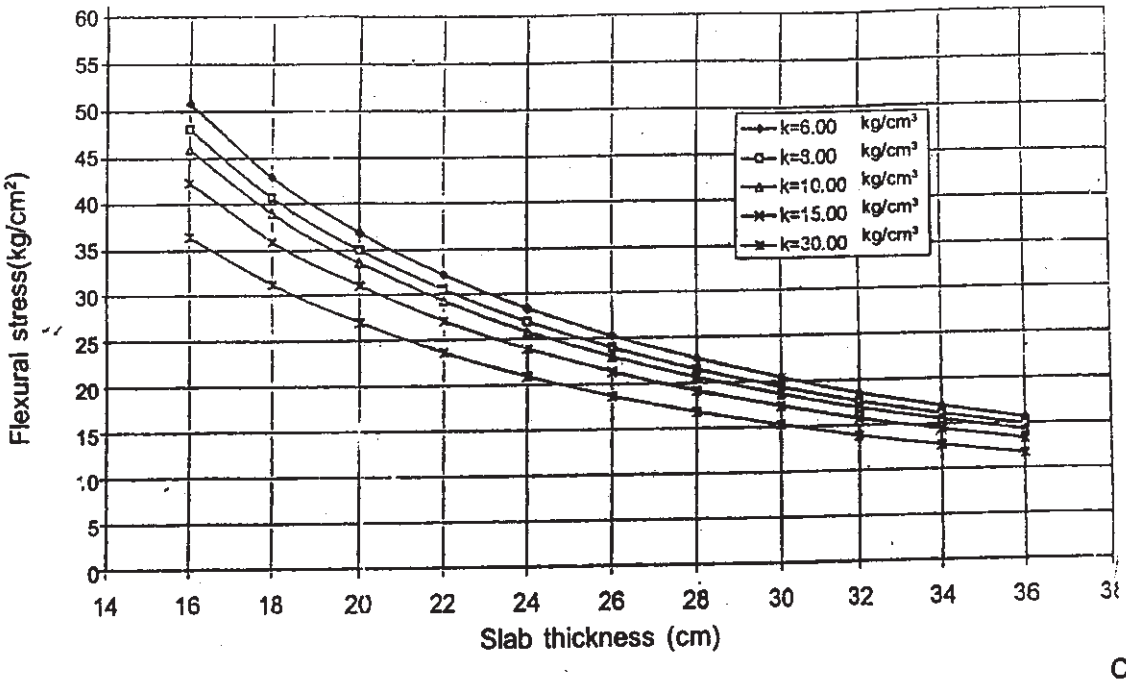
Contd..

Stresses in Rigid Pavement (Single Axle Load = 14 tons)



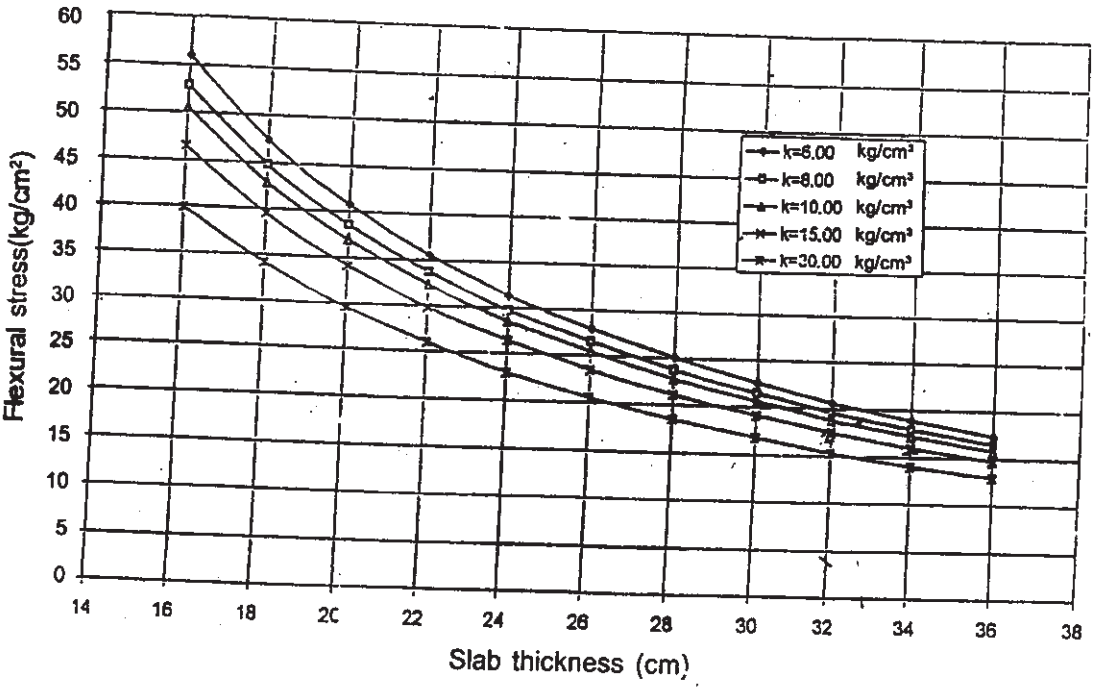
Contd..

Stresses in Rigid Pavement (Single Axle Load = 16 tons)



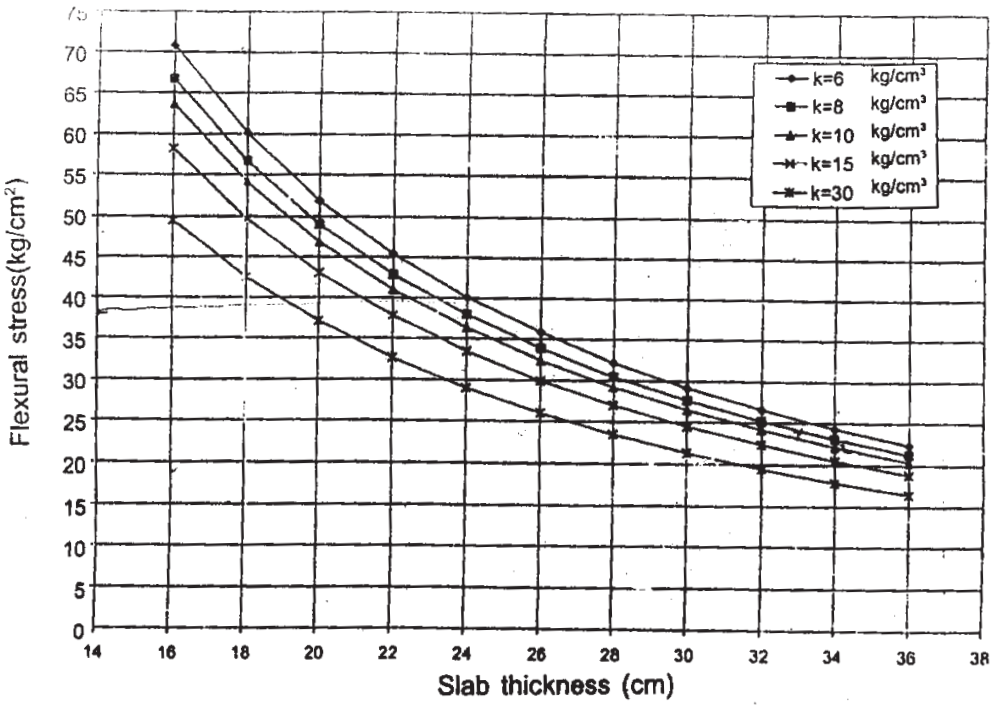
Contd..

Stresses in Rigid Pavement (Single Axle Load = 18 tons)



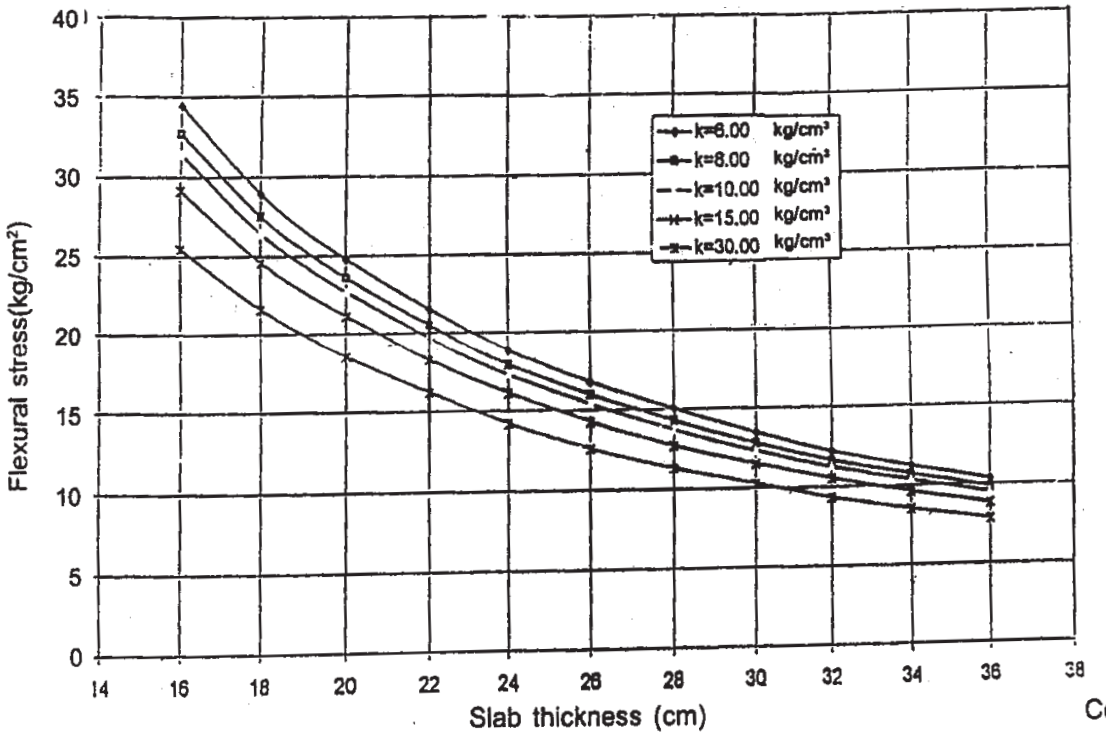
Contd..

Stresses in Rigid Pavement (Single Axle Load = 24 tons)



Contd..

Stresses in Rigid Pavement (Single Axle Load = 10 tons)



Contd..

Total No. of Questions : 12] **[Total No. of Pages : 3**

P1254

[3564]-112
B.E. (Civil)
ADVANCED CONCRETE TECHNOLOGY
(2003 Course) (Elective - II)

Time : 3 Hours] ***[Max. Marks : 100***

Instructions :

1) ***Solve Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6 from Section-I. Q.7 or Q.8, Q.9 or Q.10, Q.11 or Q.12 from Section-II.***
2) ***Answers to the two sections should be written in separate answer books.***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Compare the Portland silica flume cement with Portland Pozolana Cement. **[6]**

b) Explain the different grading curves for aggregate. **[6]**

c) Explain with charts, the relation between bond strength of concrete and fineness of cement. **[6]**

OR

Q2) a) Determine the volume of water required to test ordinary Portland cement weighing 1 kg. for consistency test, soundness test, initial and final setting time and compressive strength. **[6]**

b) Explain the importance of gradding curve of aggregates in Civil engineering. **[6]**

c) Explain the different properties of fresh concrete. **[6]**

Q3) a) Differentiate the light weight concrete and ultra light weight concrete. **[6]**

b) Differentiate shotcreting and guniting. **[6]**

c) Explain how to produce and use the self compaction concrete. **[4]**

OR

Q4) a) Differentiate the sulphur concrete and sulphur infiltrated concrete. **[6]**

b) What is carbonation of concrete? Explain rate of carbonation and factors affecting it. **[6]**

c) Explain how to obtain vacuum concrete and mass concrete. **[4]**

P.T.O.

Q5) a) Design fly ash cement concrete mix, M25 by IS 10262-1982 for following data. **[12]**

Maximum size of aggregate = 20 mm, Fine aggregates confirm to Zone-II, Compaction factor = 0.9, Quality control = good, Type of exposure = mild, Water absorption for both aggregate = 1%, Free moisture content = 2%, Specific gravity of OPC = 3.15 and that of both aggregates = 2.7, Slump = 10-30 mm.

b) Explain the percentage and role of different ingredients or/material used to replace the cement quantity for the production of huge volume of concrete. **[4]**

OR

Q6) a) Describe design process of high density concrete mix. **[6]**

b) Enlist the different methods of non destructive testing of RCC elements and explain any one in detail. **[6]**

c) Explain the accelerated curing of concrete in laboratory. **[4]**

SECTION - II

Q7) a) Explain the historical development of fiber reinforced concrete. **[6]**

b) What are the naturally occurring fibers? Explain their properties in detail. **[6]**

c) Explain the major parameter affecting fiber interaction with homogeneous uncracked matrix with axial stress and shear stress. **[6]**

OR

Q8) a) Explain the major parameter affecting fiber interaction with homogeneous cracked matrix with axial stress and shear stress. **[6]**

b) Explain procedure how to find the fracture resistance of concrete. Also explain how to improve it. **[6]**

c) Explain the rate fiber orientation and aspect ratio in FRC. **[6]**

Q9) a) Describe the tensile behavior of FRC with steel fiber and polypropylene fibers. **[8]**

b) Compare the GFRC and SFRC property-wise. **[6]**

c) Enlist the different light weight material used for civil construction and state the physical properties of any one in detail. **[4]**

OR

Q10)a) Explain the fracture resistance curve formulation with cement based composites. **[8]**

b) Explain the different reasons and principles underlying in use of strong fibers in a brittle matrix. **[6]**

c) Write a note on SIFCON development. **[4]**

Q11)a) Explain the details of any one industrial Precast concrete element you ever seen with reference to the Material required. Analysis and design principles, manufacturing method with flow chart, testing methodology and quality control. **[10]**

b) Explain and draw a schematic diagram of construction any one structural element by slip form construction technique. **[4]**

OR

Q12)a) Explain the construction of G + 2 building using the techniques of Precast concrete construction. Draw the sketches of connection at important joints. **[10]**

b) Explain the different techniques for rehabilitation of damaged G + 2, RCC building. **[4]**

❐❐❐

Total No. of Questions : 12] **[Total No. of Pages : 3**

P1091

[3564]-111

B.E. (Civil)

GEOINFORMATICS

(401005) (2003 Course) (Elective - I)

Time : 3 Hours*]** **[*Max. Marks : 100

Instructions to the candidates:

1) ***Answer any 3 questions from each section.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Explain Scattering, Absorption and Refraction with reference to interaction of EMR with the Earth's surface. **[12]**

b) Describe briefly the following types of Resolution with necessary sketches: **[6]**

i) Spatial Resolution

ii) Spectral Resolution

iii) Radiometric Resolution

OR

Q2) a) What are the elements of Interpretation of Aerial Photographs & Satellite Imageries? Explain their significance and factors influencing them. **[12]**

b) Describe briefly with necessary sketches the concept of Electromagnetic Spectrum? **[6]**

Q3) a) What are the different Digital Image Processing Techniques? Explain any two methods in detail. **[12]**

b) Differentiate Low Pass Filters and High Pass Filters. **[4]**

P.T.O.

OR

Q4) a) What is the need of Image Classification? Explain in detail Supervised and Unsupervised method of Image Classification. **[12]**

b) Enumerate the different types of Vegetation Indices. Explain any one in detail. **[4]**

Q5) a) What are the different types of errors in GPS observations and explain how to minimize it? **[12]**

b) Differentiate Single point GPS and Differential GPS. **[4]**

OR

Q6) a) Explain with neat sketches the working of GPS in association with

i) GPS space segments,

ii) GPS control segments &

iii) User segments

[12]

b) What are the Applications of GPS? **[4]**

SECTION - II

Q7) a) Describe briefly with necessary sketches the different spatial Analysis that can be performed with help of GIS. **[12]**

b) What are the different types of Map Projections system and describe any two systems in detail? **[6]**

OR

Q8) a) What is GIS? What are the objectives of GIS and explain in detail the components of GIS? **[12]**

b) State the Differences between: **[6]**

i) Spatial and Non-Spatial Data

ii) Vector and Raster Model

Q9) a) Elaborate the concept of Relational Database, The Hybrid and Integrated GIS Data Model. **[12]**

b) What are the components of DBMS? **[4]**

OR

Q10) a) Explain with neat sketches the object oriented GIS model. **[12]**

b) State the difference between Primary Key and Foreign Key. **[4]**

Q11) Explain application of GeoInformatics with working Flow Charts in following areas; **[16]**

i) Urban Infrastructure Planning and Development.

ii) Resources Mapping and Planning for Rural areas.

OR

Q12) Explain application of GeoInformatics with working Flow Charts in following areas; **[16]**

i) Land use/Land cover classification mapping and analysis.

ii) Watershed Management and planning.

❐❐❐

Total No. of Questions : 12] **[Total No. of Pages : 3**

P1090

[3564]-110
B.E. (Civil)
ADVANCED ENVIRONMENTAL MANAGEMENT
(2003 Course) (Elective - I)

Time : 3 Hours*]** **[*Max. Marks : 100

Instructions to the candidates:

1) ***Answer any 3 questions from each section.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Your answers will be valued as a whole.***
6) ***Use of logarithmic tables, slide rule, electronic pocket calculator and steam table is allowed.***
7) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Explain following terms with respect to Environmental Management System requirements. **[12]**

i) Planning.

ii) Implementation.

iii) Checking & correction.

iv) Management Review.

b) What are key elements of ISO 14001 EMS? **[6]**

OR

Q2) a) What events lead to development of ISO 14000 series? **[6]**

b) Define EMS. What are benefits of EMS? **[6]**

c) Write importance of environmental policy for smooth working of environmental management system. **[6]**

Q3) a) Briefly discuss the salient features of Environment Protection Act, 1986. **[4]**

b) Briefly discuss the salient features of Water (Prevention and control of Pollution) Act, 1974. **[6]**

P.T.O.

c) Briefly discuss the salient features of Air (Prevention and control of Pollution) Act, 1981. **[6]**

OR

Q4) a) Briefly discuss Municipal Solid Waste Rules 2000. **[6]**

b) Write short notes on: **[10]**

i) Constitution of central board.

ii) Constitution of state boards.

Q5) a) Write a procedure for controlling the emission of SO_x by dilution using tall stacks. **[6]**

b) Write National Ambient Air Quality (NAAQ) Standards for SPM, SO_x, NO_x & CO. **[6]**

c) Explain any one method of NO_x control by treatment. **[4]**

OR

Q6) a) Explain with examples or chemical formulae the following physical process to control emission of SO_2 from thermal power plant. **[12]**

i) Adsorption.

ii) Absorption.

iii) Catalytic conversion.

b) Write emission factor in tabular form. **[4]**

SECTION - II

Q7) a) Explain estimation of solid waste. **[6]**

b) Write the classification of hazardous solid waste. **[6]**

c) Discuss the suitable methods of collection & disposal of Municipal Solid Waste. **[6]**

OR

Q8) Write short notes on: **[18]**

a) Sanitary landfilling.

b) Incineration.

c) Compositing.

Q9) a) Explain method of removal of nitrogen. **[4]**

b) Explain method of removal of phosphorous. **[6]**

c) Enlist various methods of removing dissolved inorganic solids and explain with chemical equations Ion Exchange process. **[6]**

OR

Q10) Explain the following land treatment system. **[16]**

a) Irrigation.

b) Rapid infiltration.

c) Overland flow system.

d) Wetland flow system.

Q11) a) Write procedure of environmental impact assessment. **[6]**

b) Discuss 'Effectiveness of public participation in India'. **[6]**

c) Explain procedure for public hearing in India. **[4]**

OR

Q12) a) Write positive and negative environmental impacts of following projects. **[10]**

i) Water resources project (Dam).

ii) Nuclear power plant.

b) Explain the Category- I, Category- II and Category- III projects subject to EIA. **[6]**

❐❐❐

Total No. of Questions : 12] **[Total No. of Pages : 2**

P1089

[3564]-109
B.E. (Civil)
ARCHITECTURE AND TOWN PLANNING
(2003 Course)

Time : 3 Hours] ***[Max. Marks : 100***

Instructions :

1) ***Solve Q1 or Q2, Q3 or Q4, Q5 or Q6 from Section-I and Q7 or Q8, Q9 or Q10, Q11 or Q12 from Section-II.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) Write short note on: **[18]**

a) Doric order.

b) Architectural design aids and

c) Factors in architecture.

OR

Q2) a) Explain with sketches the importance of Aesthetical and architectural aspects in building planning. **[9]**

b) Explain the basic concept of Vastushastra in relation to functional planning of a building. **[9]**

Q3) a) Explain the concept of Garden City. **[8]**

b) What is the concept of neighbourhood planning? What are the standards followed in it? **[8]**

OR

Q4) Write short note on: **[16]**

a) Neighborhood concept.

b) Town planning scheme.

c) Chandigarh and

d) Shading devices.

P.T.O.

Q5) a) What are the objectives and contents of Urban Land Ceiling act? **[8]**

b) Describe the aims, objectives and contents of M.R.T.P. act. **[8]**

OR

Q6) a) Explain planning standard and guideline of UDPFI. **[8]**

b) Define Development Plan. What are its contents explain? **[8]**

SECTION - II

Q7) a) What is landscape? How does it enhance the aesthetical appeal of a building? **[9]**

b) What is the concept of soft and hard landscape? **[8]**

OR

Q8) a) Describe in details the different landscaping elements. **[9]**

b) Write short note on: **[8]**

i) Soft landscape and

ii) Hard landscape.

Q9) a) Explain in details the contents of Development Plan. **[8]**

b) Explain in detail how will you carry out a traffic and transportation survey for D.P. **[9]**

OR

Q10) a) Write a note on Demographic survey. **[8]**

b) Explain different surveys to be carried out for preparation of Development Plan. **[9]**

Q11) What is GIS, GPS and Remote sensing? Describe the role of GIS, GPS and Remote sensing in Town planning. **[16]**

OR

Q12) Write short note on: **[16]**

a) Application of GIS in Town planning.

b) GPS segments.

c) Use of GPS in transportation and

d) Remote sensing.

❐❐❐

Total No. of Questions : 8] **[Total No. of Pages : 4**

P1350

[3564] - 108

B.E. (Civil)

STRUCTURAL DESIGN OF BRIDGES

(2003 Course) (Elective - I)

Time : 3 Hours] ***[Max. Marks : 100***

Instructions to the candidates:

1) ***Answer Q.1 or Q.2 and Q.3 or Q.4 from Section - I. Answer Q.5 or Q.6 and Q.7 or Q.8 from Section - II.***
2) ***Answers to the two sections should be written in separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicates full marks.***
5) ***Assume suitable data, if necessary and clearly state them.***
6) ***Use of cell phone is prohibited in the examination hall.***
7) ***Use of electronic pocket calculator is allowed, IS : 800, IS : 875, IS : 1343 and steel table is allowed.***

SECTION - I

Q1) a) Explain I.R.C. loading standards for highway bridges. **[9]**

b) Explain role of impact factor in the design of highway bridges. **[8]**

c) Explain pigeaud,s method of analysis for deck slab. **[8]**

OR

Q2) Design the cantilever slab of the R C T - beam deck slab bridge and sketch the details of reinforcement with the following data. **[25]**

a) Clear width of roadway : 7.5 m

b) Span of bridge : 30 m

c) Footpath on either side : 1.2 m

d) Three longitudinal girders are provided at 3.3 m c/c.

e) Average thickness of wearing coat : 80 mm.

f) Cross girder are provided at every 3.0 m c/c.

g) Live load as per IRC class AA tracked vehicle.

h) Materials : M 30 grade of concrete and Fe 415 grade of steel.

Q3) The following data refer to a proposed highway bridge :

Span of the bridge : 30 m

Width of the carriage way : 7.5 m.

Width of footpath on either side : 1.5 m.

Three main girders are to be provided at 3 m c/c.

Cross girder to be provided at 4 m c/c.

Using M 45 grade of concrete and high tensile steel strands with a loss ratio of 0.85, design an intermediate post tensioned prestressed main girder. **[25]**

OR

Q4) a) Explain the various types of bridge bearing with sketches. **[13]**

b) Explain the design procedure for elastomeric bearing. **[12]**

SECTION - II

Q5) a) State and explain with sketches truss girder, plate girder and arch steel railway bridges. **[8]**

b) Explain in brief the different type of forces acting on the railway steel bridges. **[9]**

c) Classify railway steel bridges according to cross section and span length with suitable example. **[8]**

OR

Q6) Atruss girder through type steel bridge consists of two Pratt truss as shown in Fig. 6. The span of the truss is 50 m c/c to of bearing. The bridge supports an equivalent uniformly distributed load of a 88kN per meter run. The dead load transmitted to each truss inclusive of self weight is 25 kN/m. Impact factor is 0.3. Determine the forces and design U_4U_5, L_4L_5 and U_5L_5 members of bridge.**[25]**

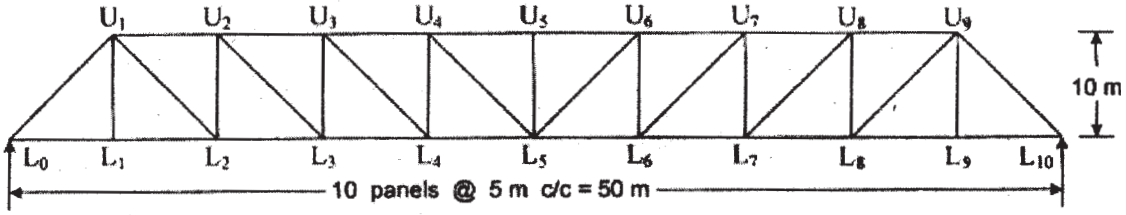


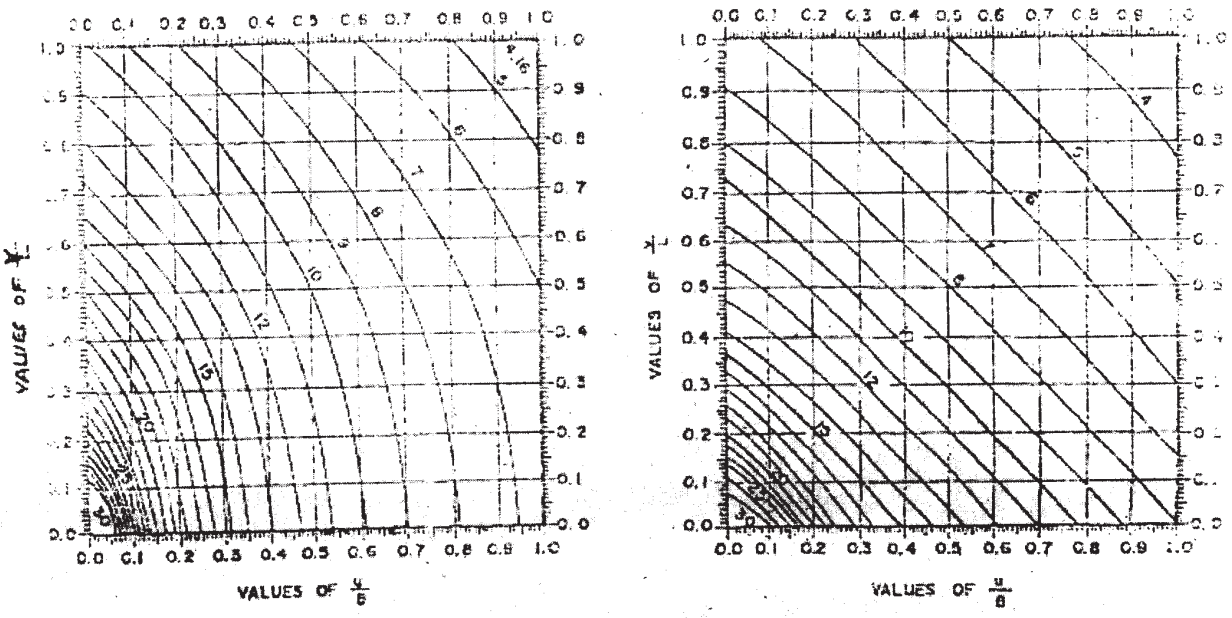
Fig. 6

Q7) Design the top lateral bracing for the through type truss girder railway steel bridge for a single broad gauge track as shown in Fig. 6, with the following details. The height of girder between c.g. to c.g. of chord member is 6 m. The spacing between the main trusses is 7 m. The rail is 800 mm above the c.g. of bottom chord. The chord members are 600 mm deep and 650 mm wide. The end posts are 600 mm deep and 660 mm wide. The inner web members are 600 mm deep and 600 mm wide. **[25]**

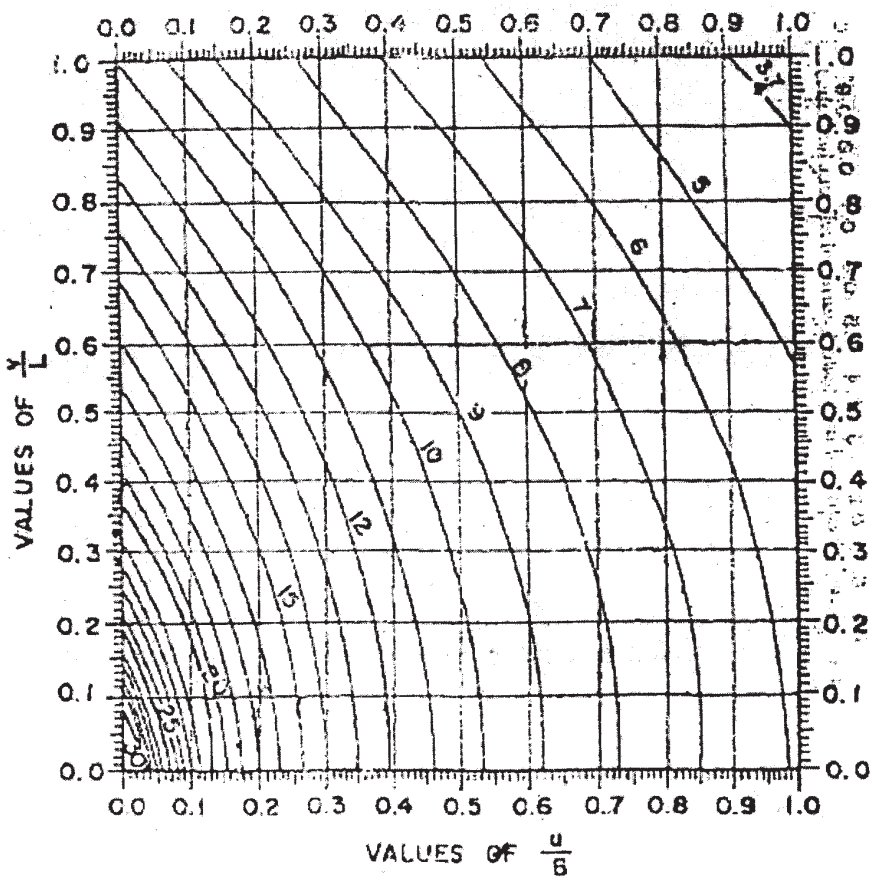
OR

Q8) a) Explain in brief portal bracing with suitable sketches for deck and through type truss girder bridge. **[9]**

b) For the truss girder bridge of span 30 m, dead, live and impact load reaction is 1500 kN. The vertical reaction due to overturning effect of wind at each end of the girder is 120 kN. The lateral load due to wind at each bearing is 60 kN. The tractive force is 476 kN and the breaking force is 457 kN. Design a rocker bearing. **[16]**



a. COEFFICIENT $m_1 \times 100$ Moment Coefficients m_1 and m_2 for $K = 0.9$. b.COEFFICIENT $m_2 \times 100$



Moment Coefficients m_1 (or m_2) × 100 for Partially Load Slabs with $K = 1.0$.

Total No. of Questions : 12] **[Total No. of Pages : 4**

P1088

[3564]-106
B.E. (Civil)
SYSTEMS APPROACH IN CIVIL ENGINEERING
(2003 Course & 1997 Course) (Elective - I)

Time : 3 Hours] ***[Max. Marks : 100***

Instructions :

1) ***Answer 3 questions from Section-I and 3 questions from Section-II.***
2) ***Answer Q1 or Q2, Q3 or Q4, Q5 or Q6 from Section-I and Q7 or Q8, Q9 or Q10, Q11 or Q12 from Section-II.***
3) ***Answers to the two sections should be written in separate books.***
4) ***Neat diagrams must be drawn wherever necessary.***
5) ***Figures to the right indicate full marks.***
6) ***Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.***
7) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Solve using Big M method or Two-phase method, **[12]**

$\min Z = 20x_1 + 10x_2$

Subject to

$x_1 + x_2 \geq 10$

$3x_1 + 2x_2 \geq 24$

$x_1, x_2 \geq 0$

b) Explain Unbounded solution in L.P. **[4]**

OR

Q2) a) Solve the problem in Q1(a) above by graphical method. **[6]**

b) Explain convex and concave functions. **[6]**

c) What are slack variables and artificial variables? **[4]**

Q3) a) Cement is to be transported from 4 warehouses to 3 sites. The quantity available at each warehouse and that required at each site and the unit cost of transport are given below. Determine the transportation policy which will minimize the total cost of transportation. Use the solution obtained by least cost method as the initial basic feasible solution, to find the optimal solution. **[14]**

P.T.O.

Ware house	Sites			Quantity Available
	1	2	3	
1	2	7	4	5
2	3	3	1	8
3	5	4	7	7
4	1	6	2	14
Quantity Required	7	9	18	

b) Explain degeneracy in a Transportation problem. How is it resolved? **[4]**

OR

Q4) a) Write the dual of the problem in Q.1(a). **[4]**

b) Explain shadow prices in LP. **[4]**

c) Four jobs are to be assigned to 4 employees. The time taken in hours, by each employee to perform each job is given below. How should the jobs be allotted, one per employee, so as to minimize the total time taken. **[10]**

Employees	Jobs			
	1	2	3	4
A	8	26	17	11
B	13	28	4	26
C	38	19	18	15
D	19	26	24	10

Q5) a) Use golden section or Fibonacci method to minimize $f = 3x^3 - 36x$ in the range 0 to 10, to an accuracy of 1%, carry out first 4 iterations only. **[10]**

b) What is a Hessian matrix? Explain its significance. **[6]**

OR

Q6) a) Using Newton's method maximize $f = 3x_1 - x_1^2 + 6x_2 - 3x_2^2$ taking starting point as (0, 0). **[10]**

b) Give the algorithm for steepest Gradient method. What are the advantages of Newton's method over steepest Gradient method? **[6]**

SECTION - II

Q7) a) Use Lagrange Multiplier Technique to minimize $Z = 2x_1^2 - 3x_2^2 + 18x_2$ Subject to $2x_1 + x_2 = 8$. **[10]**

b) Explain the recursive equation in Dynamic Programming. What is the difference between a state and a stage in D.P.? **[4]**

c) What are the applications of D.P. in Civil Engineering? **[4]**

OR

Q8) Construction equipment is to be transported from place 1 to place 11. The equipment can be transported along different routes. The travel distances along different routes from place *i* to place *j* are given below.

Place $i - j$	Distance in Km	Place $i - j$	Distance in Km
1 – 2	30	5 – 8	21
1 – 3	34	5 – 9	33
1 – 4	36	5 – 10	33
2 – 5	29	6 – 8	22
2 – 6	27	6 – 9	24
2 – 7	30	6 – 10	29
3 – 5	31	7 – 8	33
3 – 6	25	7 – 9	32
3 – 7	23	7 – 10	34
4 – 5	28	8 – 11	37
4 – 6	27	9 – 11	28
4 – 7	26	10 – 11	36

a) Use dynamic programming to determine the shortest route between place 1 and place 11. **[16]**

b) Write the recursive equation for each stage. **[2]**

Q9) a) Five jobs are to be processed on 3 machines A, B and C in the sequence A–B–C. The processing times of these jobs are given below. **[10]**

Job	Processing Times in minutes		
	A	B	C
1	20	14	12
2	24	16	22
3	16	8	20
4	18	10	16
5	26	12	14

i) Determine the sequence of processing, for the 5 jobs so as to minimize the total elapsed time.
ii) Find the total elapsed time and idle times of machines B and C.

b) Explain the Monte Carlo method of simulation. Give any two applications of it from the field of Civil Engineering. **[6]**

OR

Q10) a) Arrivals at a telephone booth follow Poisson distribution with an interarrival time of 10 minutes. The length of the phone call is assumed to be distributed exponentially with a mean of 3 minutes. **[10]**

Find: i) The probability that an arrival will have to wait before the phone is free.
ii) The average queue length.
iii) The average number of customers in the system.
iv) Average waiting time of customer in the queue.
v) Average waiting time of customers in the system.

b) Explain the characteristics of queueing models. **[6]**

Q11) a) Explain the assumptions made in a two-person-zero sum Game. **[4]**

b) Explain the theory of Dominance in solving a game. **[4]**

c) Use dominance property to solve the game between A and B where the payoff to A is given in the following payoff matrix. Determine the strategies of each player and the resulting payoff. **[8]**

	B_1	B_2	B_3	B_4	B_5
A_1	3	5	4	9	6
A_2	5	6	3	7	8
A_3	8	7	9	8	7
A_4	4	2	8	5	3

OR

Q12) a) What are direct costs and indirect costs in a construction project? **[4]**

b) Explain the significance of benefit cost analysis for any project. **[4]**

c) Explain: **[8]**
i) Discount rate.
ii) Internal rate of return.
iii) Amortization.
iv) Salvage value.

❐❐❐

Total No. of Questions : 8] **[Total No. of Pages : 4**

P1087

[3564]-104
B.E. (Civil)
STRUCTURAL DESIGN - III
(2003 Course)

Time : 4 Hours] ***[Max. Marks : 100***

Instructions :

1) ***Answer Q1 or Q2, Q3 or Q4 in Section-I.***
2) ***Answer Q5 or Q6, Q7 or Q8 in Section-II.***
3) ***Answers to the two sections should be written in separate books.***
4) ***Figures to the right indicate full marks.***
5) ***Use of IS 1343, IS 456, IS 3370 and non programmable calculator is allowed.***
6) ***Neat diagrams must be drawn wherever necessary.***
7) ***Assume any other data if necessary and mention it at the starting of the answer.***
8) ***Mere reproduction from IS Code as answer, will not be given full credit.***
9) ***Assume any other data, if required.***

SECTION - I

Q1) a) Explain in brief **[8]**

i) Damping.

ii) Multi degree freedom.

b) A post tensioned prestressed concrete beam section has top flange 650 × 150, web 150 × 650 and bottom flange 350 × 250 mm, is simply supported over a effective span of 17 m and carries a super imposed load of 11 kN/m over entire span. Calculate extreme fiber stresses in concrete at midspan at initial and final stage. Initial prestressing force is 1125 kN at eccentricity 480 mm at midspan and zero at support. Take loss ratio as 0.85 and unit weight concrete as 25 kN/m^3. **[17]**

OR

Q2) a) A mild steel plate of cross section 12 mm × 50 mm of length 1 m is supporting a load of 160 N through a spring having stiffness K=110 N/mm as shown in fig (1). Calculate the natural frequency of the system if modulus of elasticity of mild steel is 200 Gpa. **[8]**

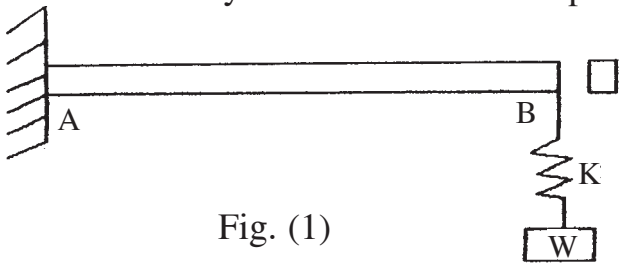


Fig. (1)

P.T.O.

b) A post tensioned prestressed concrete beam section has top flange 450 × 150, web 120 × 600 and bottom flange 360 × 200 mm, is simply supported over a effective span of 15 m. The beam is prestressed with 4 No. of 12/5 Freyssinet parabolic cables with their c.g. at 120 mm from extreme bottom fiber, stressed one at a time from only one end to 900 Mpa. Calculate total loss of prestress at the age of 120 days, if k = 0.0026/m length of cable, slip of anchorage = 2 mm, Cc = 2.0, $\mu = 0.3$, Es = 2×10^5 Mpa, concrete grade = M40, Creep and relaxation of steel = 2% of initial prestress. **[17]**

Q3) Design a post tensioned prestressed concrete rectangular or 'I' section beam for flexure to carry a live load of 13kN/m over entire simply supported span of 12 m with M45 grade of concrete and Freyssinet cables of 12/5 (fy = 1750 Mpa) or 12/7 (fy = 1500Mpa), including the design of end block. Draw sketches showing cable profiles and end block reinforcement details. Check fiber stresses in concrete and deflection. **[25]**

OR

Q4) a) State remedial measures to be taken to reduce losses in continuous PSC beams. **[8]**

b) A post tensioned prestressed concrete continuous beam ABC as shown in Fig. (2) is prestressed with initial prestressing force of 1500 kN. The loads shown are exclusive of dead load. Locate centerline of thrust under prestress plus dead load also and make it concordant stating the shift of cable at salient points find the stresses in concrete at extreme fibers at intermediate support. Take loss ratio of 0.85, AD = DB = BE = EC = 9 m. The eccentricities at A & C = 0, at D & E = 230 mm (downwards), at B = 160 mm (upwards). **[17]**

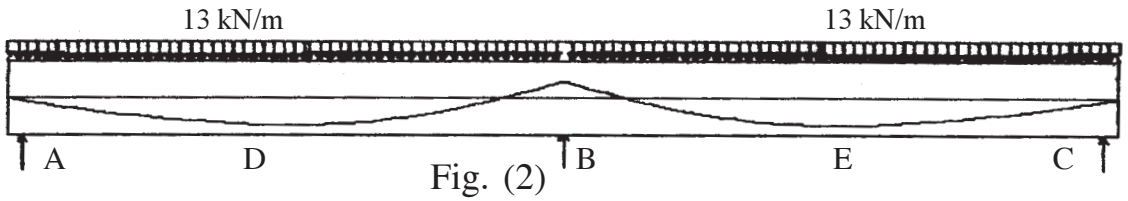


Fig. (2)

SECTION - II

Q5) a) Write detailed note on cantilever method. **[8]**

b) Analyze a rigid jointed frame shown in Fig. (3) by cantilever method for lateral loads. Flexural rigidity for all members is same. Analyze beam GHI using proper substitute frame, if it is subjected to vertical ultimate live and dead load incl. of its self wt. intensities of 13 kN/m and 15 kN/m on GH and 17 kN/m and 18 kN/m on HI respectively. Calculate max. span moment for span HI and support moment at H. Design section for combined effect of vertical and horizontal Loads. Adopt 15% redistribution of moments for vertical load moments Use M20, Fe415. **[17]**

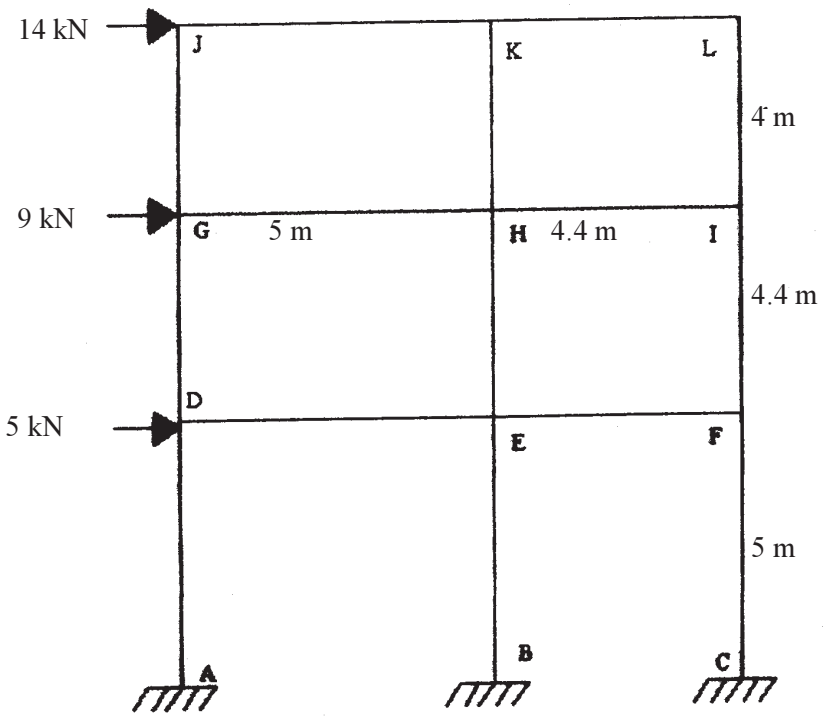


Fig. (3)

OR

Q6) a) Write detailed note on substitute frame method. **[8]**

b) Analyze a rigid jointed frame shown in Fig. (4) by portal method for lateral loads. Flexural rigidity for all members is same. Analyze beam GHI using proper substitute frame, if it is subjected to vertical ultimate live and dead load incl. of its self wt. intensities of 15 kN/m & 16 kN/m on GH and 19 kN/m & 20 kN/m on HI respectively. Calculate max span moment for span HI and support moment at H Design section for combined effect of vertical and horizontal Loads. Adopt 10% redistribution of moments for vertical load moments Use M20, Fe500. **[17]**

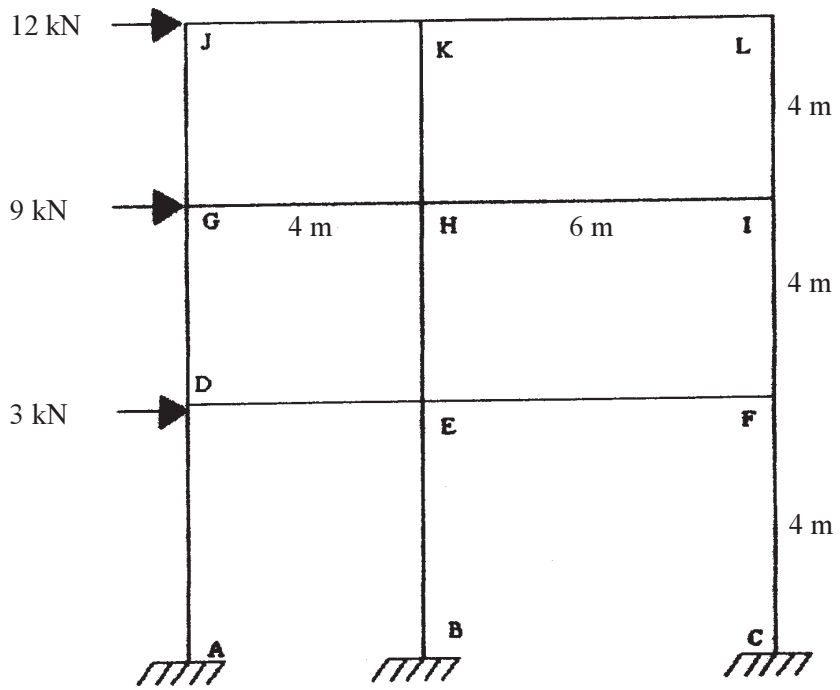


Fig. (4)

Q7) a) Compare rectangular combined footings with strap beam to that without it. **[5]**

b) Design circular reinforced concrete tank resting on ground to store 2 lakh liters of water the top of tank is open Take the safe bearing capacity of the supporting strata as 200 kN/m^2 Design the wall and bottom slab of the tank using IS code. Draw all details of reinforcements. **[20]**

OR

Q8) Design a 'L' shaped retaining wall for two layered leveled backfill for the following data.

Upper layer, height = 3m, $\varphi = 30^o$, $\gamma = 18$ kN/m^3.

Lower layer, height = 3m, $\varphi = 32^o$, $\gamma = 20$ kN/m^3.

Safe bearing capacity of the underlying strata = 160 kN/m^2. The coefficient friction between the base slab and the underlying strata = 0.52. Draw lateral pressure diagram and details of reinforcement of stem and base showing curtailment if any. **[25]**

❐❐❐

Total No. of Questions : 12] **[Total No. of Pages : 5**

P1086

[3564]-103
B.E. (Civil)
QUANTITY SURVEY, CONTRACTS AND TENDERS
(2003 Course)

Time : 4 Hours] ***[Max. Marks : 100***

Instructions :

1) ***Answer Q1 or Q2, Q3 or Q4, Q5 or Q6 from Section-I and Q7 or Q8, Q9 or Q10, Q11 or Q12 from Section-II.***
2) ***Answers to the two sections should be written in separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) Figure No.1 shows detailed plan and section of a residential building. Workout the quantities of following items describing them fully in a format of measurement sheet.

a) Excavation for foundation. **[4]**

b) UCR masonary in foundation and plinth. **[5]**

c) Two coat internal plastering 12 mm thick in cm (1 : 6) with neeru finish. **[5]**

d) RCC in lintels, Chajjas and slab. **[4]**

OR

Q2) a) Again refer Fig. No.1. Workout the quantities of following items describing them fully in a format of measurement sheet.

i) Brick masonary in cm 1 : 6 in superstructure. **[4]**

ii) External plastering on brick surfaces in cm 1 : 6 with sand finish. **[4]**

iii) Pointing to external surface of UCR masonary above ground levels. **[4]**

b) Explain the method of preparing approximate estimate for irrigation project. **[6]**

P.T.O.

Q3) a) Briefly explain the importance of approximate estimate and state various purposes of approximate estimates. **[4]**

b) Explain the terms: **[6]**

i) Work charged establishment.

ii) Contingencies.

iii) Prime cost items.

c) Explain the principles of deciding unit of measurement. Also state the data required for preparing a detailed estimate. **[6]**

OR

Q4) a) State and explain the mode of measurement for plastering of doors and windows between areas 0.5 m^2 to 3.0 m^2. **[6]**

b) Explain the terms 'Lead' and 'Lift' in estimating. How will you consider it in estimate of an excavation work? **[6]**

c) Explain the difference between supplementary estimate and revised estimate. **[4]**

Q5) a) Analyse and workout the rate for following items of construction. **[10]**

i) UCR masonary in cement morter (1 : 6) in foundation and plinth.

ii) 12 mm thickness plastering to internal wall surface with two coats in cm (1 : 4).

b) Explain the terms overheads and sundries. **[4]**

c) What is task work? State the taskwork for following items. **[2]**

i) Taskwork of blacksmith for reinforcement work in residential building.

ii) Taskwork of whitewasher for two coat white washing.

OR

Q6) a) How do we workout rate per unit item of any construction item? Explain in detail. **[6]**

b) Workout rate analysis for PCC in 1 : 4 : 8 in foundation. **[6]**

c) Explain significance of transportation cost of material in analysis of rates of construction item. **[4]**

SECTION - II

Q7) a) What is depreciation? State and explain the method for calculating depreciation of a building. **[8]**

b) Distinguish clearly between the following: **[6]**

i) Occupation lease and building lease.

ii) Scrap value and salvage value.

iii) Sentimental value and distress value.

c) Explain sinking fund and year's purchase. **[4]**

OR

Q8) a) Discuss the reproduction cost method of valuation in detail with an example. **[6]**

b) Explain with suitable example (any two): **[6]**

i) Revertionary value of land.

ii) Capitalised value.

iii) Potentiality of land.

c) State the procedure of 'fixation of rent' for a residential building. **[6]**

Q9) a) Explain the purposes and legal aspect of specifications. **[6]**

b) Draft a detail specification for an item of providing and casting PCC in foundation trenches by assuming suitable details. **[6]**

c) Explain the terms 'Administrative approval' and 'Technical sanction' for any PWD work. **[4]**

OR

Q10) a) State and explain the prequalifications for tenders. **[4]**

b) Explain with suitable example the term 'Unbalanced Tender'. **[6]**

c) State true or false with justification : "A lowest tender can be rejected". **[6]**

Q11) a) Explain 'Item rate contract' with respect to following points. **[12]**

i) Nature of agreement.

ii) List of documents required.

iii) Mode of payment to contractor.

iv) Suitability.

v) Advantages.

vi) Disadvantages.

b) State the different methods of execution of work in PWD. Explain the term 'deposit work'. **[4]**

OR

Q12) Write short notes on: **[16]**

a) Secured advance.

b) Liquidated damages.

c) Extra items.

d) Arbitration.

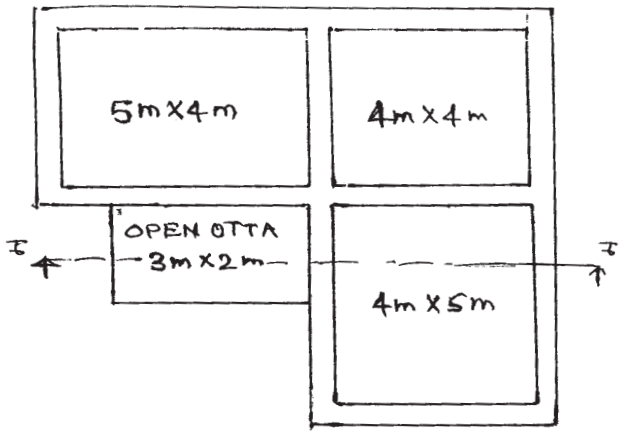
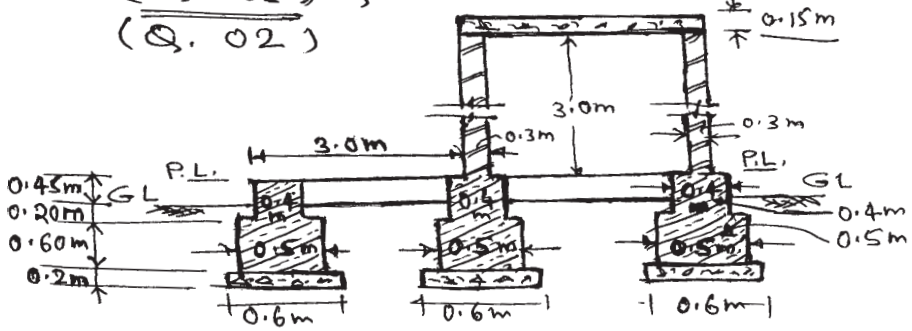


FIG 01 PLAN

(Q. 01) & (Q. 02)

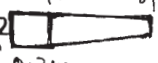


SECTION - I-I

Schedule for opening

SR NO.	Type	Size	Nos	Remark
01	Door (D_1)	1.2 X 2.1 (m)	01	In external wall
02	Door (D_2)	1.0 X 2.1	03	In internal walls
03	Window	1.5 X 1.2	06	In external walls

Notes : 1. Lintel of size 0.3 X 0.2 (m) with bearing of 0.15m on either end.

2. chajja c/s 

for clear opening of windows (For all windows)

3. Figure not to the scale.

□□□

Total No. of Questions : 12] **[Total No. of Pages : 4**

P1085

[3564]-102
B.E. (Civil)
ENVIRONMENTAL ENGINEERING - II
(2003 Course)

Time : 3 Hours] ***[Max. Marks : 100***

Instructions to the candidates :

1) ***Solve three questions from Section-I and three questions from Section-II.***
2) ***Answers to the two sections should be written in separate answer books.***
3) ***Neat diagrams must be written wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Your answer will be evaluated as a whole.***
6) ***Use of non-programmable calculators is allowed.***
7) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Explain the use of various equipments used in the experiments of BOD, COD and solids in one sentence. **[4]**

b) State the indicator used in COD test and the color of end point of titration. **[4]**

c) Explain the necessity of DO fixation while determining DO in water and state their importance. **[4]**

d) State the formulae for sodium thiosulphate, ferrous ammonium sulphate and potassium dichromate. **[4]**

OR

Q2) a) Determine the size of a circular sewer for a discharge of 600 lps running half full. Assume i = 0.001 and n = 0.015. **[6]**

Proportionate Depth (d/D)	Proportionate Area (a/A)	Proportionate Wetted perimeter (p/P)	Proportionate HMD (r/R)	Proportionate Velocity (v/V)	Proportionate Discharge (q/Q)
0.50	0.500	0.500	1.000	1.000	0.500
0.40	0.373	0.444	0.857	0.902	0.337
0.30	0.252	0.369	0.684	0.776	0.196

P.T.O.

b) Describe briefly and explain the functions of the following **[4]**
i) Street inlet, ii) Leaping weir, iii) Drop manhole.

c) What are the units of measurements for the following? **[6]**
i) Solids, ii) Color, iii) Test & odour, iv) Turbidity.

Q3) a) Discuss the following zones of a stream which is undergoing self Purification **[6]**

i) Zone of degradation, ii) Zone of active decomposition,
iii) Zone of recovery, iv) Zone of clear water.

b) What are the natural forces acts for the purification of streams? **[6]**

c) Explain different treatment units in preliminary treatment of waste water. **[4]**

OR

Q4) a) Design a bar screen for a peak flow of 50 million liters per day. **[6]**

b) Design a grit chamber for the following data. **[6]**

i) Flow = 15000 m^3 per day,
ii) Settling velocity of particle 0.016 to 0.022 m/sec
iii) Flow through velocity 0.3 m/sec.

c) Write a note on skimming tank with figure. **[4]**

Q5) a) What is meant by activated sludge process? What are the advantages and disadvantages? **[6]**

b) Explain the following terms with respect to Activated Sludge Process. **[6]**
i) HRT, ii) SRT, iii) MCRT, iv) F/M ratio.

c) Given the following data of operating Activated Sludge Process (ASP). **[6]**

1)	Waste water flow, Q	=	35000 m^3/day.
2)	Influent total solids	=	600 mg/lit.
3)	Influent suspended solids	=	120 mg/lit.
4)	Influent BOD, S_0	=	175 mg/lit.
5)	Effluent total solids	=	495 mg/lit.
6)	Effluent suspended solids	=	22 mg/lit.
7)	Effluent BOD, S_0	=	20 mg/lit.
8)	MLVSS concentration, X	=	2500 mg/lit.
9)	Return sludge solid concentration, Xr	=	9800 mg/lit.
10)	Volume of aeration basins	=	10000 m^3.

Determine (a) aeration period, (b) BOD loading in kg/m^3/day, (c) F/M ratio, (d) Total solids, suspended solids and BOD removal efficiencies, (e) Recirculation ratio.

OR

Q6) a) What do you understand by "Trickling Filter"? Explain with the help of neat sketch in detailed. Explain regarding biological process involved in the working of trickling filter. **[6]**

b) Compare the conventional trickling filter and high rate trickling filter. **[6]**

c) A single stage filter is to treat a flow of 3.79 M.l.d. of raw sewage with BOD of 240 mg/l. It is to be designed for a loading of 11086 kg of BOD in raw sewage per hectare meter and the recirculation ratio is to be l What will be the strength of the effluent, according to the recombination of NRC? **[6]**

SECTION - II

Q7) a) Explain diagrammatically the Algae-Bacteria symbiotic relations. **[4]**

b) Write the design steps required for oxidation pond. **[6]**

c) What are the advantages and disadvantages of oxidation ponds? **[6]**

OR

Q8) a) What are the different methods of aeration in the treatment of aerated lagoon? **[4]**

b) What are the advantages and disadvantages of aerated lagoons? **[6]**

c) What is the principle involved in the design of oxidation ditch. **[6]**

Q9) a) Discuss the design criteria of a septic tank. **[8]**

b) i) Design a septic tank for the following data:

No. of people = 100

Sewage/capita/day = 120 liters

De-sludging period = 1 year

Length : width = 4:1.

ii) What should be the size of its soak well if the effluent from this septic tank is to be discharged in it. Assume percolation rate through the soak well to be 1250 l/m^3/d. **[8]**

OR

Q10)a) What are the different stages of digestion in case of anaerobic digesters?**[4]**

b) What are the various gases generated in anaerobic digesters and their percentage. **[6]**

c) Write the various design parameters of anaerobic digesters. **[6]**

Q11)a) Write a flow chart for treating a typical waste of pulp and paper mill. **[6]**

b) What are the characteristics of distillery spent wash? **[6]**

c) Draw a flow chart for treating sugar mill waste water. **[6]**

OR

Q12)a) Explain any one method of hazardous waste treatment. **[6]**

b) Explain the benefits of waste minimization. **[6]**

c) Explain in detail reactivity and toxicity in hazardous waste water. **[6]**

❐❐❐

Total No. of Questions : 12] **[Total No. of Pages : 4**

P1084

[3564]-101
B.E. (Civil)
HYDROLOGY AND IRRIGATION
(2003 Course)

Time : 3 Hours] ***[Max. Marks : 100***

Instructions :

1) ***Answer any three questions from each section.***
2) ***Answer three questions from Section-I and three questions from Section-II.***
3) ***Answers to the two sections should be written in separate books.***
4) ***Neat diagrams must be drawn wherever necessary.***
5) ***Figures to the right indicate full marks.***
6) ***Use of logarithmic tables, slid rule, Mollier charts, electronic pocket calculator and steam tables is allowed.***
7) ***Assume suitable data, if necessary.***
8) ***Answer Q1 or Q2, Q3 or Q4, Q5 or Q6 from Section-I and Q7 or Q8, Q9 or Q10, Q11 or Q12 from Section-II.***

SECTION - I

Q1) a) State the various practical applications of hydrology. **[6]**

b) State the factors governing site selection for rain gauge station. **[6]**

c) Explain the different methods of determining the mean depth of precipitation over a catchment area. What are their advantages and limitations? **[6]**

OR

Q2) a) The hourly precipitation data during a storm is as follows. **[8]**

Time (hr.)	0	2	4	6	8	10	12	14	16
Precipitation (mm)	0	25	5	10	25	15	10	5	0

Plot (i) Hyetograph (ii) Mass Curve

b) In a catchment area covering 100 km^2, the average annual precipitation observed at 5 raingauge stations is as follows. **[10]**

Station	1	2	3	4	5
Precipitation (mm)	700	995	925	675	480

Find the number of additional rain gauge stations and also the rain gauge density of the permissible error is 8%.

P.T.O.

Q3) a) Explain the dilution technique of stream flow gauging. **[5]**

b) Briefly discuss the factors affecting the evaporation. What are the methods used to control evaporation from reservoirs? **[7]**

c) What are 'W' and 'ϕ' Indices? Explain their importance. **[4]**

OR

Q4) a) Explain: **[8]**

i) ISI Standard Pan Evaporimeter.

ii) Field capacity and permanent Wilting point.

b) The storm over a catchment of 50 km^2 was having the following intensity

35 mm/hr for 1 hr

75 mm/hr for 2 hr

32 mm/hr for 1 hr

The infiltration rate of the catchment area is as follows.

25% area ϕ = 10 mm/hr

50% area ϕ = 12 mm/hr

Remaining area is impervious

Find the runoff. **[8]**

Q5) a) Give the definition of unit hydrograph. State the assumptions made in the unit hydrograph theory. What are the limitations of unit hydrograph theory. **[8]**

b) The unit hydrograph of 1 hr – 1 cm precipitation is as follows. **[8]**

Time (hr)	0	1	2	3	4	5	6	7	8	9	10
Discharge (m^3/s)	0	6	12	20	24	21	17	15	10	5	0

Derive & plot 2 hr – 1 cm unit hydrograph.

OR

Q6) a) What is a synthetic unit hydrograph? Why is it necessary? **[8]**

b) Briefly explain – Causes of flood

– Factors affecting flood

– Design flood

– Maximum probable flood. **[8]**

SECTION - II

Q7) a) For an irrigation district, the data pertaining to cropping pattern is as follows. **[12]**

Sr. No.	Name of the crop	Crop Period (days)	Area to be irrigated (hectares)	Duty at the head of the canal (ha / cumec)
1	a) Sugarcane	280	420	630
	b) Over lap for Sugarcane in hot weather	100	90	630
2	Wheat (Rabi)	120	6700	1500
3	Rice (Kharif)	120	2600	650
4	Vegetables hot weather	120	420	700

Find: The discharge required at the head of main canal.

Time factor = 0.7, Capacity factor = 0.8.

b) Explain – Drip Irrigation

– Sprinkler irrigation. **[6]**

OR

Q8) a) What is irrigation? Why is it necessary? What are the various aspects of an irrigation project? **[7]**

b) Explain – 'Warabandi' method of irrigation. **[5]**

c) Explain – Factors to be considered in determination of crop water requirement. **[6]**

Q9) a) State the causes of water logging and its bad effects. Explain curative method to reclaim the water logged lands. **[8]**

b) Explain – National Water Policy. **[8]**

OR

Q10) a) Explain lift irrigation scheme - investigations required, various components, their design. **[10]**

b) Explain – Global Water Partnership. **[6]**

Q11) a) Explain with neat sketches Artesian well, free flowing well, confined and unconfined aquifer, perched aquifer. **[6]**

b) Derive an expression for steady state discharge through a tube well fully penetrating a confined aquifer. State the assumption made in the design. **[10]**

OR

Q12) Write short notes on: **[16]**

a) Crop area assessment methods.

b) Reservoir Sedimentation.

c) Method of drilling of a tube well.

d) Darcy's law and assumptions made in it.

e) Specific yield and specific retention.

f) Permeability and transmissibility.

❐❐❐

Total No. of Questions : 8] **[Total No. of Pages : 2**

P1324

[3564]-8

B.E. (Civil)

ADVANCED ENGINEERING GEOLOGY WITH ROCK MECHANICS

(1997 Course) (Elective - II)

Time : 3 Hours*]** **[*Max. Marks : 100

Instructions to the candidates:

1) ***Answer any three questions from each section.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

SECTION - I

Q1) a) Discuss in detail to what extent, the concept of R.I.S. - Reservoir Induced Seismicity is correct in Deccan trap area with suitable examples. **[10]**

b) Treatment to be given to a fracture occurring below the pier of a bridge. **[4]**

c) Tunnelling through quartzite. **[3]**

Q2) Write notes on the following:

a) Tunnelling through Amygdaloidal basalts. **[4]**

b) Bieniawski's Geomechanics classification. **[8]**

c) Tunnelling through compact basalts. **[4]**

Q3) Discuss any four case histories in detail, of dams where economy has been achieved by interpreting correctly the local geological conditions in Deccan trap area. **[17]**

P.T.O.

Q4) a) Discuss in detail the origin of Tachylytic basalts and their engineering properties. **[10]**

b) The parameters deciding Safe Bearing Capacity (S.B.C.) for bridge foundation. **[6]**

SECTION - II

Q5) Write notes on the following:

a) Engineering significance of Pre-Cambrian secondary rocks. **[9]**

b) Region 2. **[4]**

c) Lateral extent of dykes. **[3]**

Q6) Discuss how location of spillway is decided on geological grounds. Only state geological conditions leading to tail channel erosion in Deccan Trap area. Discuss case histories of tail channel erosion due to columnar basalt and volcanic breccia. **[17]**

Q7) Write notes on the following:

a) Significance of dykes from dam foundation point of view. Give case histories. **[9]**

b) Availability of natural sand in Deccan Trap area. **[4]**

c) Foundations of monumental buildings. **[3]**

Q8) Write notes on the following:

a) Giant phenocryst basalts as construction material. **[4]**

b) Multiaquifer system. **[3]**

c) Fault zone treatment. Give examples. **[3]**

d) Flow groups. **[4]**

e) Characters of fractures occurring in Deccan Trap area. **[3]**

❐❐❐