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

UNIVERSITY OF PUNE

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B. E. (Civil) Examination - 2013

Advanced Transportation Engineering. (2003 Course)

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

Instruction

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 *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.*
6 *Neat diagrams must be drawn wherever necessary.*

SECTION -I

Q.1	A	Explain in brief the following projects i) Delhi Metro ii) PMGSY	6
	B	What is regression analysis? Why is it useful in traffic and transportation planning? Explain with an example	6
	C	Explain the travel demand forecasting process with a flow diagram	6

OR

Q.2	A	Explain in brief the following projects i) NHDP ii) Banglore Metro	6
	B	Explain how O-D surveys are carried out and how the data is documented and used in transportation planning	6
	C	Discuss the various factors affecting the trip generation	6
Q. 3	A	Classify the various urban transportation innovations and explain any 2 of them in detail.	(10)
	B	Discuss problems of BRT adopted in Pune city	6

OR

Q. 4	A	Explain concept of ITS and elaborate the various technologies used in it with examples.	(2+8)
	B	Discuss solutions to the problems of BRT adopted in Pune City	6

Q. 5 A The client associated with Infrastructure development has decided to evaluate two highway proposals with the following cash flows. 16

	Option I			Option II	
Year	Cash Inflow (Rs.)	Cash Outflow (Rs.)	Year	Cash Inflow (Rs.)	Cash Outflow (Rs.)
1	-	10,00,000	1	-	35,00,000
2	-	35,00,000	2	10,00,000	2,00,000
3	-	20,00,000	3	12,00,000	3,00,000
4	15,00,000	2,00,000	4	15,00,000	50,000
5	20,00,000	3,00,000	5	11,00,000	50,000
6	25,00,000	2,00,000	6	9,00,000	1,50,000
7	30,00,000	3,00,000	7	3,00,000	2,50,000

The decision criteria is based on NPV at 12%. Work out the values and suggest.

i) Whether both proposals are worth investing, and
ii) The better alternative, stating reason.

OR

Q. 6 A Explain merits and demerits of 16

a) ARR and IRR.
b) BOT and BOOS.
c) NPV and B/C
d) BT and BOO.

SECTION I

Q. 7 A Explain the following methods of traffic counting with examples (6+6+6)

i) Manual classified Counts method
ii) Moving vehicle method
iii) Licenced plate survey method

OR

Q. 8 A What are household surveys? How are they conducted? What are the advantages? Explain the standard household survey format and how data is collected using it with an example (2+2+4+10)

Q. 9 A Design a flexible pavement for the following data, as per IRC-37 (10+2)

i) 4 lane single carriageway
ii) Expected year of completion-2014
iii) CVPD in one direction in year 2010-2000
iv) Design life – 12 years
v) Traffic growth rate – 6%
vi) Terrain – hilly
vii) C.B.R. for subgrade – 5%

Also draw a typical cross-section showing all the basic layers

B Discuss advantages of flexible pavements over rigid pavements 4

OR

Q. 10 A Design a flexble pavement by using IRC-37 and the data given in problem 9 a, except for the change that the road is a 2 lane dual carriageway instead of the 4 lane single carriageway. Also draw the typical cross-section (10+2)

B Explain how pavement riding quality is measured, with an example 4

Q. 11 A Explain various types of over lays and compare/contrast amongst them 8

B Explain the design procedure for any types of overlay based on the provisions made in IRC-81. Before designing an overlay what needs to be assessed and why? Explain (6+2)

OR

Q. 12 Design a rigid pavement as per IRC-58 and draw the plan and cross-section showing correctly all relevant details with the correct nomenclature, based n the following data. 16

i) 2 way CVPD=2500
ii) Flexural strength of concrete = 48 kg/cm^2
iii) Effective modulus of subgrade reaction= kg/cm^3
iv) Elastic modulus of concrete = $3.3x10^5$ kg/cm^2
v) Poissons ratio = 0.18
vi) Coefficient of thermal expansion of concrete = $10x10^6$per°C.
vii) Tyre pressure = 8.2 kg/cm^2
viii) Traffic growth rate = 7%
ix) Design life = 15 years
x) Spacing of contraction joints = 4.5m
xi) Slab width 4.0 m.
xii) Load safety factor = 1.05
xiii) Maximum temperature difference between the top and bottom of the slab = 23°C
xiv) Centre to centre distance between tyres = 32cm.

xv) Axle load spectrum is as follows

Single Axle Loads		Tandem Axle Loads	
Load in Tons	%	Load in Tons	%
20	0.5	36	0.3
18	1.4	32	4.0
16	3.8	28	3.0
14	12.0	24	2.0
12	20.0	20	4.0
10	22.0	16	1.0
less	25.0	Less than 16	1.0

xvi) Trial Thickness = 30cms

xvii) Use following table if required

L/l or B/l	C	L/l or B/l	c
1	0.000	7	1.035
2	0.042	8	1.075
3	0.178	9	1.085
4	0.445	10	1.080
5	0.725	11	1.060
6	0.925	12	1.000

Check whether the pavement is safe for

i) Critical condition with dowel bars and

ii) Critical condition without dowel bars.

If the pavement fails, design a suitable pavement thickness so as to withstand all the critical conditions

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B. E. (Civil) Examination-2013

HYDROLOGY AND IRRIGATION

(2008 Pattern)

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

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

Instructions:

(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 answer-books**.*

(3) Neat diagram must be drawn wherever necessary.

(4) Figures to the right indicate full marks.

(5) Use of electronic calculator is allowed.

(6) Assume suitable data, if necessary.

SECTION-I

Q1.

a) State the various methods of determination of the mean precipitation over a given catchment area. Explain giving neat sketches any two methods. **[12]**

b) For a catchment area of 500 sqkm. Following data are available. Estimate the average precipitation over the catchment area. **[6]**

Isohyet in mm	900-1000	800-900	700-800	600-700	500-600
Area between successive isohyets in sqkm	90	100	125	40	45

OR

Q2.

a) Explain the following with case **[10]**

   1) Mass rainfall curve

   2) Double mass curve

b) A catchment area is in the form of a quadrilateral with its vertical at A(30,20), B(-40,30),C(-60,-20),D(30,-70). Four rain gauge station are located at P(10,10), Q(-30,40),R(-30,-20),S(40,-20)

   If the rainfall recorded at these stations during a particular storm are P(100mm), Q(80mm), R(92mm) and S(106mm), estimate the average rainfall for this catchment area by Thiessen polygon method. **[8]**

Q3.

a) Explain the various methods of reducing evaporation from lakes or reservoirs. **[8]**

b) Runoff from a catchment area 150 sqkm. was 9.0 /Mm^3 Rainfall in the area was observed as below. Determine the rate of infiltration.

Time (hour)	0	1	2	3	4	5	6
Rainfall(mm)	0	16	19	26	41	21	11

OR

Q4.

a) Explain the following methods of measurement of evaporation **[8]**

   1) By evaporimeters

   2) By analytical methods

b) Calculate the value of ø index from the following data of storm of 10cm precipitation that resulted in a direct runoff 4.6cm **[8]**

Time in hours	1	2	3	4	5	6
Incremental rainfall per hour in cms	0.55	0.60	1.25	3.00	1.50	1.20

Q5.

a) Discuss the points that are to be considered in deriving a unit hydrograph for a given catchment. **[8]**

b) Ordinates of a one day hydrograph from a catchment area of 500 sqkm. Are given below. Derive a one day unit hydrograph. **[8]**

Time(days)	0	1	2	3	4	5	6	7	8
Discharge(cumecs)	0	10	35	70	120	65	35	10	0

OR

Q6.

a) Explain in brief the importance of stream gauging. Describe any one method of stream gauging. **[8]**

b) A catchment area of 100 sqkm. receives maximum precipitation of 5cm/hr. Find maximum flood discharge by using **[10]**

1) Dicken's formula (take C=19)
2) Inglis formula
3) Ali Nawaz Jung Bahadur formula (take C=45)
4) Ryve's formula (take C=10)
5) Fuller's formula (take C=0.45)

SECTION - II

Q7.

a) Explain how various five year plan have helped in development of irrigation in India. **[8]**

b) It is proposed to irrigate 50,000 hectares in western area of Nasik district where the crop pattern is as follows

Sr.No	Crop	% area under crop	Duty (ha/cumecs)
1	Sugarcane	8	730
2	Other perennial crops	7	1000
3	Paddy	18	750
4	Cotton	12	900
5	Jowar	35	1500
6	Wheat	15	1800
7	Hot weather crop	5	2000

Assume time factor=0.7 and capacity factor=0.8

Find the discharge of canal and capacity of reservoir. **[10]**

OR

Q8.

a) State salient features of national water policy. **[8]**

b) Describe the following- **[10]**

1) Duty of water
2) Base period
3) Consumption use of water
4) Crop rotation
5) Delta of crop

Q9.

a) What is meant by reservoir sedimentation? State the factors affecting reservoir sedimentation. What is the effect of reservoir sedimentation? How will you reduce it? **[8]**

b) State Darcy's law and assumptions made in it. Also, state procedure of pumping test with the help of neat sketch **[8]**

OR

Q10.

a) State Dupuit's assumptions and derive the equation for discharge from unconfined acquifer under steady state conditions. **[8]**

b) Explain the procedure of planning a multipurpose reservoir. **[8]**

Q11.

a) Compare lift irrigation system with canal irrigation system. **[8]**

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

1) Participatory irrigation management
2) Warabandi

OR

Q12.

a) What do you mean by water logging? What are the causes of water logging? Give the preventative and curative measures of water logging. **[8]**

b) What are the different irrigation acts? State the main features of Maharashtra Water Resources Controlling Authority Act 2005. **[8]**

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B. E. (Civil) Examination - 2013

GEOINFORMATICS

(2003 Course)(ElectiveI)

Total No. Of Questions: 12 **[Total No. Of Printed Pages: 3]**

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

Instructions:

*(1) Answer any **three questions** from each section.*

*(2) Answers to the **two sections** should be written in **separate answer-books**.*

(3) Figures to the right indicate full marks.

(4) Neat diagrams must be drawn wherever necessary.

(5) Assume suitable data, if necessary.

SECTION-I

Q. 1. A) Explain the typical EMS. State the characteristics of different frequencies. (12)

B) Define resolution and explain any 2 types. (6)

OR

Q. 2. A) What are the elements of Visual Image Interpretation? Explain their Significance and factors influencing them. (12)

B) Explain interaction of EMR with Earth's Surface. (6)

Q. 3. A) What is image enhancement? Explain its various techniques. (12)

B) Write a note on (4)

i. Image Rectification.

ii. Geo referencing.

OR

Q. 4. A) Explain the term "Histogram Equalization". Elaborate the Linear and (12)
Non Linear contrast stretch enhancement.

B) Explain supervised classification. (4)

OR

Q. 5. A) Explain with neat sketches the working of GPS in association with: (12)

i. GPS Space Segments.

ii. GPS Control Segments and

iii. User Segments.

B) What are application of GPS in Civil Engineering? (4)

OR

Q. 6. A) What are the different types of errors in GPS observations and explain (12)
How to minimize it?

B) Write a note on codes used in GPS. (4)

SECTION-II

Q. 7. A) Describe briefly with necessary sketches the different spatial Analysis (12)
that can be performed with help of GIS.

B) What are the different types of Map Projections systems and describe (6)
Any two systems in detail.

OR

Q. 8. A) What is GIS? What are the objectives of GIS and explain in detail (12)
the components of GIS.

B) State the Differences between; (6)

i. Spatial and Non-Spatial Data

ii. Vector and Raster Model

Q. 9. A) Elaborate the concept of Relational Database, The Hybrid and (12)
Integrated GIS Data Model.

B) What are the components of DBMS? (4)

OR

Q. 10. A) Explain with neat sketches the object oriented GIS model. (12)

B) State the difference between primary Key and Foreign Key. (4)

Q. 11 Explain application of GeoInformatics with working flow charts in the following areas (16)

i. Disaster planning and management using Geoinformetics

ii. Rainwater harvesting using Geoinformatics

Q.12 Explain application of GeoInformatics with working flow charts in the following areas (16)

i. Land use/Land cover classification mapping and analysis

ii. Crime mapping and Analysis Geoinformatics

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B. E. Civil Examination - 2013

Structural Design III

(2003 Pattern)

Total No. Of Questions: 8 **[Total No. Of Printed Pages: 4]**

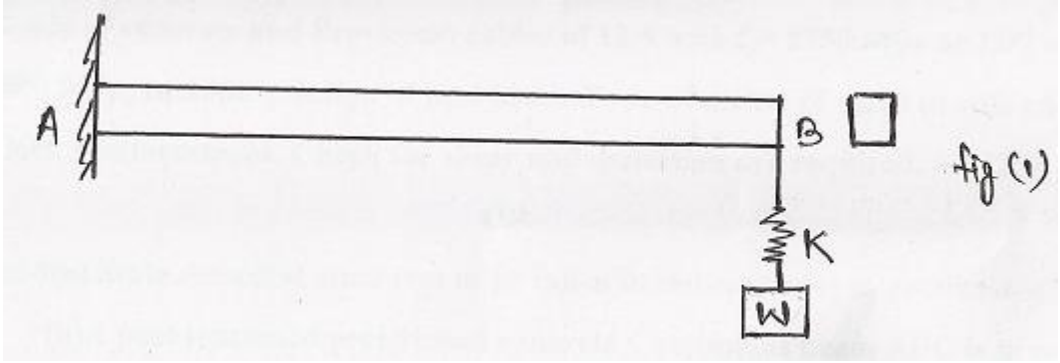
[Time: 3 Hours] **[Max. Marks: 100]**

Instructions:

(1) Answer Q1 or Q2 and Q2 or Q4 from Section-I
(2) Answers Q5 or Q6 and Q7 or Q8 from Section-II.
(3) Answer to the two section should be written separately
(4) Figure to the right indicate full marks.
(5) IS 1343, IS456, IS3370 are allowed
(6) If necessary assume suitable data and mention it clearly

SECTION-I

Q. 1. A) A mild steel Plate of size 15mm×80mm of length 1.3 m is supporting a load of 200 N through a spring having stiffness K=90N/mm as shown in fig (1) Calculate natural frequency of the system if E=200Gpa (8)



Figure

B) A Post tensioned pre stressed concrete beam has top flange 400×200mm, web 150×600mm and bottom flange 300×150mm, is Simply supported over a span of 15 m and carries a super imposed load Of KN/m over entire span. Calculate extreme fiber stress in concrete at Initial and final stage. The 4 nos of 12/7 Freyssinet cables having zero Eccentricity at support and C.G of area of steel at 100 mm from soffit (17)

Of section and are stressed to initial prestress of 1500 Mpa. Take loss Ratio as 0.85 and unit weight of concrete as 25KN/m^2 .

OR

Q. 2. A) Explain in brief (8)

i. Single degree of freedom system

ii. Multiple degree of freedom system

B) A post tensioned prestressed concrete beam having simply supported Span of 18m and cross section details as top flange 450×150mm, web 125×500mm, and bottom flange 300×350mm. the beam is prestressed With 3 Nos of 12/5 Freyssinet Parabolic cables with their C.G at 100 mm from extreme bottom fiber stressed one at a time from only one End to 1250 Mpa calculate total loss of prestress and Jacking force At the age of 100 days, if the coeff. of friction =0.3, Coeff. Of Curvature and wave effect=0.0026/m length of cable, slip of anchorage At Jacking=1.5mm, Creep Coeff.=2.2, Es=2×10^5 Mpa, Creep and Relaxation of steel=1.1% of Initial prertress. Assume M40 Concrete. (17)

OR

Q. 3. Design a post tensioned prestressed concrete I-section beam for flexure Of carry a live load of 16KN/m over entire simply supported span of 17m With M40 Grade of concrete and Freyssinet cables of 12/5 with f_y=1750 Mpa or 12/7 with f_y=1500 Mpa, Including design of End block. Draw Sketches of cables profile and end block reinforcement. Check for shear And deflection are required. (25)

OR

Q. 4. A) State remedial measures to be taken to reduce losses in prestress (5)

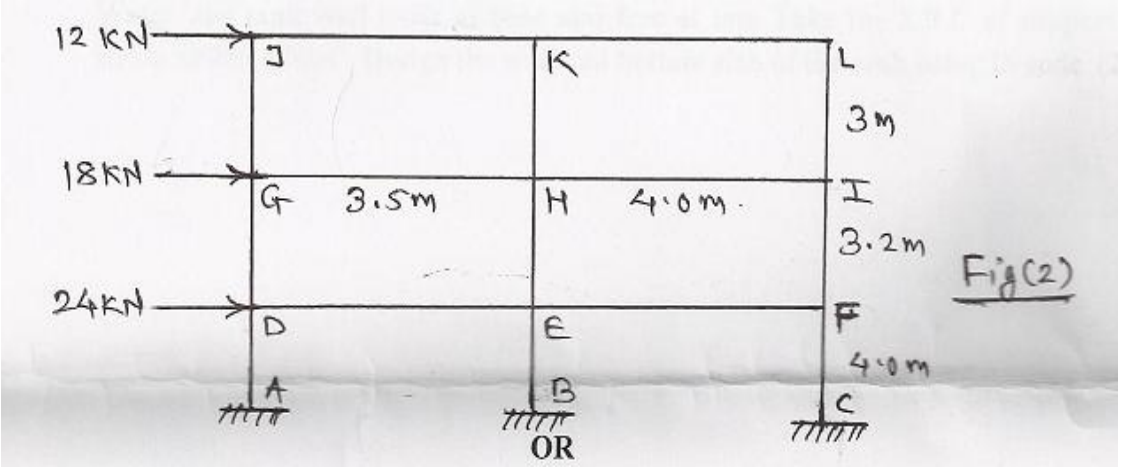
B) A post tensioned prestressed concrete continuous beam ABC is Prestress with initial pre stressing force of 1250 KN. The cross Section of beam is 300×800mm. it carries external ULD of 14 KN/m On span AB and a point load of 100 KN at 8m from support B. the Loads are exclusive of dead load. Locate centre line of thrust under DL also make it concordant stating the shift of cable at silent points Find stress at extreme fiber in concrete at intermediate support take Loss ratio=0.82, Span AB=20m, BC=20m. the eccentricity at support A and C=0 At center of AB=230mm downward, At support B= 160mm Upward and at E (Under the point load) 280mm down ward, the cable Profile is parabolic in span AB and triangular in Span BC. (20)

SECTION-II

Q. 5. A) Write detail note on Substitute frame method of analysis. (8)

B) Analyze the rigid jointed frame as shown in fig (2) by portal for Lateral loads. Flexural rigidity for all members is same. Analyze beam (17)

GHI using proper substitute frame, if it is subjected to vertical ultimate Live & Dead load including its self weight of intensities 12 KN/m and 10 KN/m on Span GH and 15 KN/m and 12 KN/m on HI respectively . The horizontal forces are as show in fig. calculate maximum span Moment for HI and support moment at H Design section for combined Effect of vertical and horizontal lads. Adopt 20% redistribution of Moments. Use M20 and Fe 500



Fig(2)

Q. 6. A) Explain in detail method of calculation of earthquake forces on building (8)

B) Analyze the rigid jointed frame as 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 & dead load including its self weight of Of intensities. 15KN/m and 12KN/m on span GH and 20 KN/m And 15 KN/m on HI respectively. The horizontal forces are as shown in Fig. calculate maximum span moment for HI and support moment at H. Design section for combined effect of vertical and horizontal loads. Adopt moment at H. design section for combined effect of vertical And horizontal loads. Adopt 15 % redistribution of moments for Vertical load moments. Use M20 and Fe500(17)

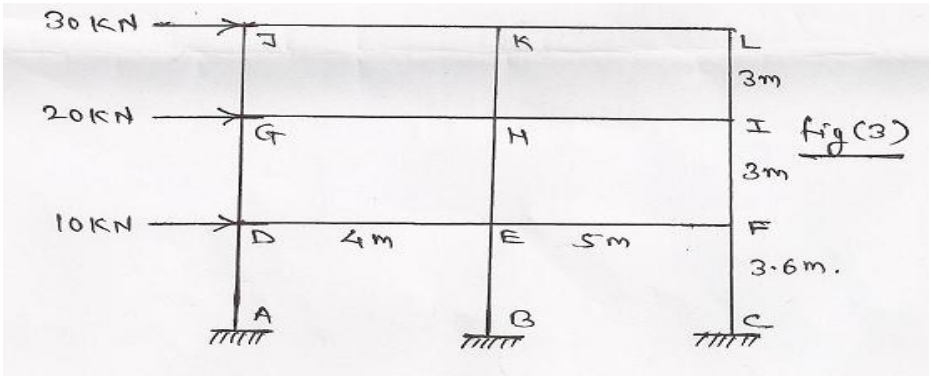


Fig (3)

Q. 7. Design a Slab and Beam type rectangular combined footing for two Columns A and B carrying working loads 700 KN respectively column A is 230mm×375 mm and column B is 230mm×450mm. center to center Distance between the columns is 3.2 m and SBC of soil is 180KN/m^2 Use M20 and Fe500. Draw details of reinforcement in slab and central beam. (25)

OR

Q. 8. A) Explain with neat sketch Behavior of cantilever retaining wall (5)

B) Design a circular reinforced tank resting on ground to store 3.5 lakh liters of water. The tank wall is fix at base free at top. Take the S.B.C. of supporting strata as 200KN/m2, Design the wall and bottom slab of the tank using IS code. (20)

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

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B.E. (Civil), Examination - 2013

(2003 Pattern)

Finite Element Method (Elective-I)

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

Instructions:

(1) Use of non programmable calculator is allowed.
(2) Answers to the 02 section should be written in separate answer books.
(3) Figures to the right indicate full marks.
(4)Neat diagrams must be drawn whenever necessary.
(5) Assume suitable data, if necessary.

Section I

Q1. Write 4x4 stiffness matrix of truss element. Hence, obtain the global stiffness matrix of truss as shown in Fig.1. Also, by imposing the boundary conditions, write reduced stiffness matrix. Take EI constant. [16]

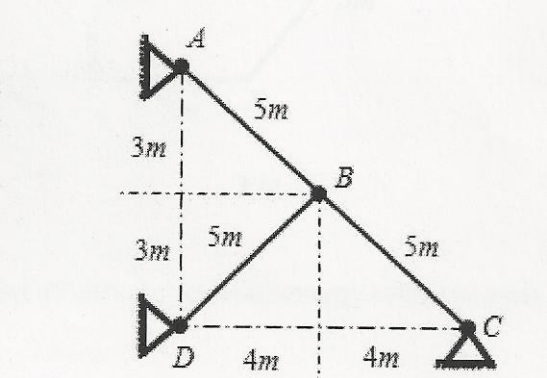

Fig. 1

OR

Q2 Analyze the prismatic beam ABC loaded and supported as shown in Fig. 2 using finite element approach. Support B is sink by 25mm. Draw SFD and BMD. Take EI constant. [16]

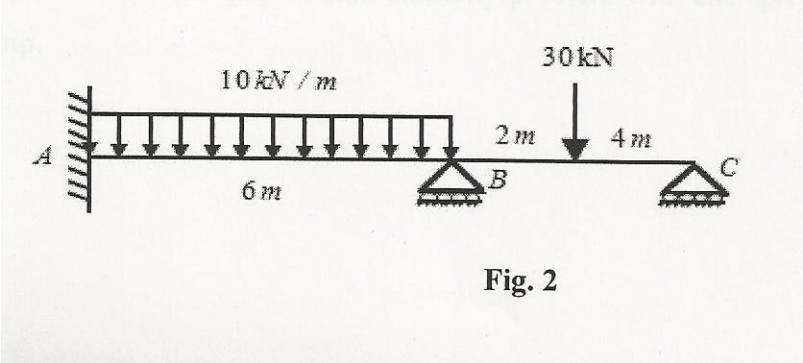

Fig. 2

Q3. Derive stiffness matrix of plane frame element considering axial force, shear force and bending moment. When do you need transformation matrix? Write transformation matrix frame element. [18]

OR

Q4. Analyse and draw bending moment diagram of grid structure as shown in Fig.3 using finite element method. Take GJ=0.4 EI. [18]

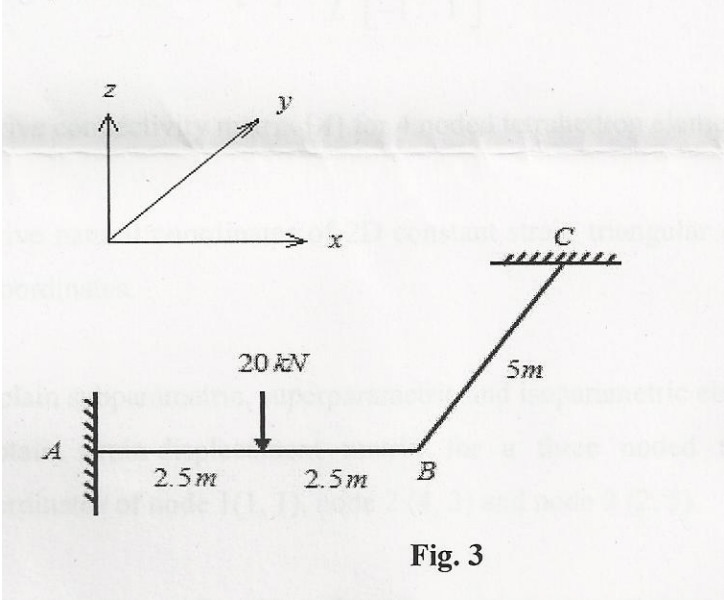

Fig. 3

Q5a) Explain principle of minimum potential energy with example. [8]
b) Explain two dimensional and three dimensional Pascal's triangle. [8]

OR

Q6a) Explain with suitable examples compatible and completeness requirements of displacement function. [6]
b) Explain plane stress and plane strain elasticity problem with example. Write stress-strain relationship. [10]

Section II

Q7.a) Determine the shape functions for 4 noded rectangular elements used in plane stress problems. [8]
b) Using finite element approach, show that , stiffness matrix for one-dimensional axially loaded bar element is $[K] = \frac{AE}{L}\begin{bmatrix} 1 & -1 \\ -1 & 1 \end{bmatrix}$ [10]

OR

Q8.a) Drive connectivity matrix [A] for 4 noded tetrahedron element [8]
b) Drive natural coordinates of 2D constant strain triangular element in-terms of area coordinates. [10]

Q9a) Explain subparametric, superparametric and isoparametric elements. [8]
b) Obtain strain-displacement matrix for a three noded triangular element with coordinates of node 1(1,1), node 2(4,3) and node 3(2,5). [8]

OR

Q10 a) Derive shape functions for nine noded rectangle element using Lagrange Polynomials. Use natural coordinate system (ξ, n). [8]
b) State and explain three basic laws on which isoparametric concept is developed. [8]

Q11a) To analyze axisymmetric problem toroidal element of triangular cross section I used. Assuming displacement function in polar coordinates, derive necessary matrices to formulate [K] of element. [16]

OR

Q12a) Explain step by step procedure of finite element analysis. [6]
b) Explain Jacobian matrix in case of four noded isoparametric quadrilateral element. Obtain strain displacement matrix. [10]

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B. E. (CIVIL) Examination – 2013
ADVANCED ENVIRONMENTAL MANAGEMENT
(2003 Pattern)(Elective I)

[Time : 3 Hours] **[Max. Marks : 100]**
[Total No. of Questions : 12] **[Total No. of Printed Pages :3]**

Instructions :

*(1) Answer **any three** questions from each section.*
*(2) Answers to the **two sections** should be written in **separate answer-books**.*
(3) Black figures to the right indicate full marks.
(4) Neat diagrams must be drawn wherever necessary.
(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) Enlist ISO 14000 series. [06]

b) Explain environmental management system requirements. [06]

c) What events lead to development of ISO 14000 series? [06]

OR

Q2) a) Explain following terms with respect to Environmental Management System requirements: [12]

1) Planning 2) Implementation 3) Checking & correction

4) Management Rewiew.

b) Write about links between ISO 14001 and ISO 9000 in tabular form. [06]

Q3) a) Briefly discuss Hazardous Waste Management Handling Act 1989. [08]

b) Briefly discuss Municipal Solid Waste Rules 2000. [08]

OR

Q4) a) Briefly discuss the salient features of Environment Protection Act, 1986. [08]

b) What is the purpose of Air (Prevention & control) Act 1981; Explain in brief how the act helped the state pollution control board to control air pollution. [08]

Q5) a) Explain with examples or chemical formulae the following physical process to control emission of SO_2 from thermal power plant. [12]

1) Adsorption 2) Absorption 3) Catalytic conversion.

b) Explain any one method of NOX control by treatment. [04]

OR

Q6) a) Explain the limestone injection process used to remove oxides of sulphur from flue gases. [04]

b) Write National Ambient Air Quality (NAAQ) Standards for SPM, $SO_{x,}$ $NO_{x,}$ and CO [06]

c) Write a procedure for controlling the emission of SO_x by dilution using tall stacks. [06]

SECTION II

Q7) a) Write the classification of hazardous solid waste. [06]

b) Discuss the suitable methods of collection & disposal of Municipal Solid Waste. [06]

c) Explain with reference to hazardous waste: [06]

i) Reactivity

ii) Corrosivity

iii) Toxicity

OR

Q8) a) Explain on-site handling, storage and processing of solid wastes. [08]

b) Enlist different methods available for treatment of medical waste and discuss any one in detail. [06]

c) Write the classification of hazardous solid waste. [04]

Q9) a) Write short notes on : [16]

i) Carbon adsorption

ii) Ion exchange

iii) Electrodialysis

OR

Q10) a) Enlist various methods of phosphorous removal from effluent and explain any one method. [08]

b) Enlist various methods of removing dissolved inorganic solids and explain with chemical equations Ion Exchange process. [08]

Q11) a) Explain constructions 'Leopold Matrix' with reference to EIA [04]

b) Explain procedure for public hearing in India. [06]

c) What are advantages and disadvantages of EIA? [06]

OR

Q12) a) Explain constructions 'Leopold Matrix' with reference to EIA. [04]

b) Write positive and negative environmental impacts of following projects of any one: [06]

i) Thermal power plant.

ii) Express highway.

c) Discuss the role of general public in Environment Clearance. [06]

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

UNIVERSITY OF PUNE

[4364]-12

B.E. Civil Examination-2013

SUBJECT:-ADVANCED CONCRETE TECHNILOGY

(401007) [Elective II]

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

Instructions:

1. Answer 03 questions from SECTION I (Que. 1 or 2, Que. 3 or 4, Que. 5 or 6) and Answer 03 questions from SECTION II (Que. 7 or 8, Que. 9 or 10, Que. 11 or 12.)
2. Answer to the two sections should be written in separate answer books.
3. Neat diagrams must be drawn wherever necessary.
4. Black figure to the right indicate full marks.
5. Your answer will be valued as whole.
6. Assume suitable data if necessary.
7. Use of electronic pocket calculator is allowed.

SECTION I

Q.1 a. Write a note on following. [18]

1. Heat of hydration of cement.
2. Alkali aggregate reaction.
3. Gel space ratio for concrete.
4. Maturity concept for concrete.
5. Bond strength.

OR

Q.2 a. Determine the volume of hydrated cement for following data. [6]
Weight of cement=100gms. Ratio of non-evaporable water to mass of cement = 23%

b. Write a note on gap graded aggregates. [6]

c. Explain any two properties of fresh concrete. [6]

Q.3 a. Compare the following. [16]

1. Light weight concrete with ultra light weight concrete.
2. High performance concrete and high strength concrete.
3. Conventional concrete with green concrete.
4. Sulphur concrete with Sulphur infiltrated concrete.

OR

Q.4 a. Write a note on following. [16]

1. Vacuum concrete,
2. Mass concrete
3. Jet cement concrete
4. No fine concrete

Q.5 a. Write a note on following. [16]

a. Design of light weight aggregate concrete mixes
b. Addition of fly ash in concrete
c. Non destructive testing of concrete by pull out test
d. Non destructive testing of concrete by Ground penetration Radar

OR

Q.6 a. Design a high strength concrete Mix by any method for following data. [8]
f_{ck}=50MPa, Slump =40mm, size of CA=20mm, FA confirm to Zone-II, Specific gravity of OPC is 3.15 and that of aggregate (CA & FA)=2.8, compaction factor=0.9, degree of control =good, type of exposure = moderate, water absorption in CA and FA=0.5%, FM of CA=6 and FM of FA=2.2, K=1.65 and S=6.2 , Max. W/C ratio=0.6. Assume additional suitable data if required

b. Explain the accelerated curing with conventional curing of concrete. [4]

c. Explain concrete with Ground Granulated Blast Furnace slag. [4]

SECTION II

Q.7 a. Explain the importance of fiber addition in concrete. [6]

b. Give the classification of natural fibers and artificial fibers. [6]

c. Write a note on orientation of fibers in concrete. [6]

OR

Q.8 a. Explain the interaction between fibers and homogeneous cracked matrix. [6]

b. Describe the prediction of composite strength based on empirical approaches. [6]

c. Explain mechanical properties of glass fiber in tension and bending. [6]

Q.9 a. State values of the following properties of steel fiber [6]
Specific gravity, Tensile strength, Modulus of elasticity, stain at break.

b. Explain the behavior of FRC under compression, tension and flexure. [6]

c. What is SIFCON material? Write about its physical properties [4]

OR

Q.10 a. Explain the test procedure to evaluate the contribution of steel fiber to drying shrinkage and crack reduction. [6]

b. Explain the techniques for toughness measurement for FRC. [6]

c. Explain the different quality control tests a civil engineer should conduct at concrete site. [4]

Q.11 a. Explain the details of industrial Precast concrete monoblock railway [12]

sleeper with reference to following

1. Material required with specification,
2. Analysis & design principles involved.
3. Manufacturing technology,
4. Testing method employed.
5. Quality control

b. Write a detailed note on use of fibrocement in civil engineering. [4]

OR

Q.12 a. Prepare a technical visit report which you had visited to industrial precast production unit with respect to following. [12]

1. Material required with specification,
2. Analysis & design principles involved.
3. Manufacturing technology,
4. Testing method employed.
5. Quality control

b. Explain the errection and assembly techniques involved in the construction of fly over bridge. [4]

4364-13

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

B.E. (Civil)

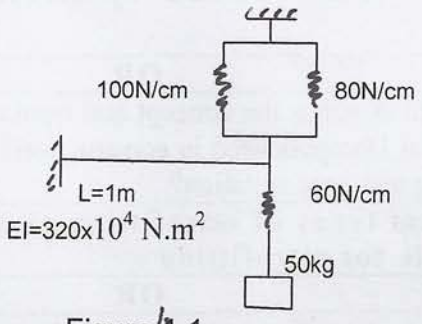
EARTHQUAKE ENGINEERING (ELECTIVE-II)

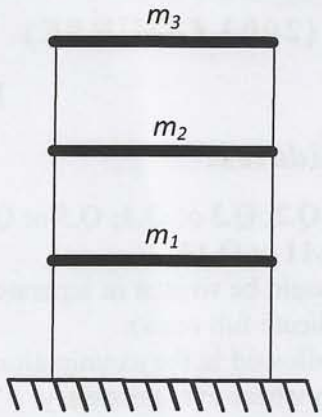
(2003 COURSE)

Time: Three Hours **Maximum Marks: 100**

Instructions to the candidates:

1) From **Section I** answer **Q.1** or **Q.2**; **Q.3** or **Q.4**; **Q.5** or **Q.6** and from **Section II** answer **Q.7** or **Q.8**; **Q.9** or **Q.10**; **Q.11** or **Q.12**
2) Answers to the two sections should be written in separate answer books
3) Figures in bold to the right, indicate full marks
4) IS 456, IS 1893, IS 13920 are allowed in the examination
5) Neat diagrams should be drawn where ever necessary
6) If necessary, assume suitable data and indicate clearly
7) Use of electronic pocket calculator is allowed

		SECTION I	
Q.1	**a)**	Explain elastic rebound theory	**(08)**
	b)	Explain the various types of earthquakes	**(08)**
		OR	
Q.2	**a)**	What is the difference between Intensity and Magnitude of an earthquake? Explain MMS measurement of earthquake in brief.	**(10)**
	b)	How are Tsunamis produced, explain in brief	**(06)**
Q.3	**a)**	Obtain the response for a SDOF system subjected to forced vibration.	**(10)**
	b)	Explain dynamic magnification factor	**(06)**
Q.4	**a)**	Determine the natural frequency for the system shown in Fig. 4.1  Figure 4.1	**(08)**
	b)	Derive the expression for an under damped SDOF system	**(08)**
Q.5	**a)**	Explain the various factors used in seismic coefficient method	**(09)**
	b)	What is modal analysis, explain in brief	**(09)**
		OR	
Q.6		Perform modal analysis for the G+3 building modeled as shown in Fig. 6.1 is located in seismic zone IV. The floor-to-floor height is	**(18)**

	3.5 m. The building is supported on medium stiff soil. The R.C. frames are in-filled with masonry walls. The lumped weight due to dead loads is 12 kN / m^2 on floors and 8 kN / m^2 on the roof. The floor slabs are designed for a live load of3 kN / m^2 and the roof is designed 2 kN / m^2.  Fig. 6.1	

SECTION II

Q.7		A (230 X 500) mm column is reinforced with 8-16#. It is supported on an isolated footing. The load coming on the footing is 1500 kN and a moment of 21 kNm. The SBC of the soil is 174 kN / m^2. Use M20 grade of concrete and steel of grade Fe 415 and design the footing.	**(16)**
		OR	
Q.8	**a)**	List the parameters influencing the liquefaction potential of soil at site? Explain the general methods of evaluating liquefaction and suggested measures to reduce the same?	**(08)**
	b)	Briefly explain the codel provisions for static and dynamic analysis of structures	**(08)**
Q.9		How are lateral loads resisted by structures. Explain with neat sketches	
		OR	
Q.10		Explain with suitable sketches the concept and need of Base Isolation. Also describe the types of structural Dampers used in construction? What is the difference between behavior of damping and base isolation?	**(16)**
Q.11		What are different types of retrofitting of RC buildings? Explain the methods available for retrofitting	**(16)**
		OR	
Q.12		Explain the behavior of masonry structures and their strengthening and retrofitting techniques with neat sketches	**(16)**

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

UNIVERSITY OF PUNE
[4364]-15
B.E. (CIVIL) Examination May - 2013
Advanced Structural Design (ELECTIVE II)
(401007) (2003 Course)

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

Instructions:

1 *Answer Q1 or Q2, Q3 or Q4 from Section I and, Q5 or Q6,Q7 or Q8, 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.*
6 *Use of cell phone is prohibited in the examination hall.*
7 *Use of electronic pocket calculator, steel table and relevant IS code is allowed.*

SECTION-I

Q.1 Two channel sections without bent lips 200 mm x 50 mm and 2.5 mm thick are connected with webs to act as beam. The effective span of a simple supported beam is 5m. The beam is laterally supported throughout is length. Determine the maximum uniformly distributed load exclusive of self weight which can be supported by the beam. Assume f_y= 30 M/mm^2 and I_x = 2 x 390.307 x 104^4 mm^4. (25)

OR

Q.2 Select suitable configuration of the truss and determine the maximum compressive and tensile force in the leg at the base for a 60m microwave antenna tower is to be built near Pune. The terrain at the location is a level ground. It has to carry a 2.5 m diameter hemispherical antenna disc at the top. 25

a) Width at the top of tower=3.4 m
b) Width of tower at bottom=6.8 m
c) Weight of platform at top=0.85 k N/ m^2
d) Weight of trailing at top=0.50 k N/ m.
e) Weight of ladder and cage=0.75 k N /m
f) Weight of antenna disc an fixture=12 kN
g) Self weight of truss=6 kN/m
h) Terrain category II and class of building B.

Q.3 Design and open web (castellated beam) for a span of 12m. The dead load coming on roofing is 0.75 kN/m^2. Calculate the spacing of the beam and check for shear and deflection. Adopt suitable pattern of castellation and adjust the section such that overall depth of section (25)

should not exceed 900 mm. Assume f_y=250 Mpa.

OR

Q.4 Design a hoarding board of size 4 m x 8 m, with minimum height from ground=4.0 m. Take basic wind velocity in the area as 39 m/s. Try alternative support system design the anchor block. (25)

SECTION II

Q.5 Explain Rankine Grashoff theory for analysis of grid slab and design a grid slab using approximate method of analysis for following data: (25)
Size of hall: 13.5 m x 9.0 m
Spacing of beams: 1.5 m along both directions
Live load: 3.5 kN/m^2
Materials: M_{25} grade if concrete and Fe_{415} grade of steel. Draw the detail reinforcement in beams and slab.

OR

Q.6 Design simply supported circular slab of 5 m diameter, subjected to service live load of 4.0 kN/m^2 and floor finish of 1 kN/m^2. Use M_{25} grade of concrete and Fe_{415} grade of steel. Draw the reinforcement details. (25)

Q.7 Design a counterfort retaining wall for the following data (25)
Height of wall above ground level = 6.2 m
Safe bearing capacity of soil = 165 kN/m^2
Angle of repose = 30^o
Unit weight of soil=16000 N/ m^3
Spacing of counter fort = 3 m
Coefficient of friction between soil and concrete = 0.5
Use M_{25} grade of concrete and Fe_{415} grade of steel. Draw the reinforcement details.

OR

Q.8 Design an exterior panel of size 5 m x 5 m of a flat slab with suitable drop to support a live load of size 450 mm x 450mm. Floor to floor distance is 4 m. Use M_{25} grade of concrete and Fe_{415} grade of steel. Draw the reinforcement details. (25)

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

UNIVERSITY OF PUNE
[4364]-16
B.E. (Civil) May Examination-2013
Construction Management
(2003 Course) (Elective II)

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

Instructions:

1. *Question No. 1 and 6 are compulsory. Out of the remaining attempt 2 questions from section I and 2 question 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. *Assume suitable data, if necessary.*
5. *Black figures to the right indicate full marks.*

SECTION I

Q.1 a. What is the importance of Construction Management in the success of a project? Discuss the same w.r.t. construction of a flyover at a very busy chowk. [10]

b. What are the qualities required for a successful construction manager? Out of these qualities, list any four most important stating the reasons. [8]

Q.2 a. Derive the expression for Economic Order Quantity (EOQ). [8]

b. State salient features of the site you have visited w.r.t following points [8]
1. Site layout
2. Material Management
3. Quality Control

OR

Q.3 a. Discuss the common reasons for delay in work and disputes on sites. [8]

b. Explain advantages and limitations of ABC analysis [8]

Q.4 a. Describe any six objectives depicting the need of finance to any [8]

		business	
	b.	What is annuity? What are different types of annuity? Give applications of each.	[8]
		OR	
Q.5	a.	Give the rating method as suggested by ICRA for a construction company.	[8]
	b.	Explain the break even analysis in detail. How you will apply it to schedule sales of your product?	[8]
		SECTION II	
Q.6	a.	Suggest suitable rehabilitation plan for a city struck very badly by drought.	[8]
	b.	Describe following terms as used in connection with disaster 1. Mitigation of disaster 2. Disaster Management 3. Response 4. Preparedness 5. Recovery	[10]
Q.7	a.	Give the points covered under the training programme of a safety engineer.	[8]
	b.	What is the definition of child labour? What are the establishments where child labour is banned?	[8]
		OR	
Q.8	a.	Explain the procedure for calculating the compensation in case of permanent disablement? Explain with example	[8]
	b.	Give the points covered in Minimum Wages act.	[8]
Q.9	a.	Define Risk. What is the role of Risk manager?	[8]
	b.	What are the advantages of using computer as MIS tool?	[8]
		OR	
Q.10	a.	Describe various methods of Construction risk mitigation	[8]
	b.	Write a detailed note on RAMP book	[8]

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

UNIVERSITY OF PUNE

[4364]-17

B.E. (Civil) (2003 Course)

Interpreted Water Resource Planning and Management

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

Instructions:

1 *Answer any three question from each section*
2 *Answer any three questions from Section I and any three questions from Section II.*
3 *Answers to the two sections should be written in separate answer-books.*
4 *Neat diagrams must be drawn wherever necessary*
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

Q.1 a) What are the challenges in water sector? Discuss with respect to meeting basic needs, sharing of water resources, dealing with hazards, and protection of ecosystems. [12]

b) What is the present institutional framework for water management? [6]

OR

Q.2 a) Explain the scope of privatization in water resources sector in India. [4]

b) An amount of Rs 1000 is invested each in projects A and B. Project "A" returns Rs 200 at the end of year for 10 years while Project "B" returns Rs 130 at the end of the year for 20 years. Rank the projects using BC ratio method if the discount rate is 4%. Also rank them if the discount rate is 11% [8]

c) State the salient features of National water policy. [6]

Q. 3 a) Explain the following with the help of sketches. [8]

i) Mean
ii) Standard deviation
iii) Skewness and
iv) Kurtosis

b) Explain the need of optimization techniques in water resources engineering. [8]

OR

Q. 4 a) Discuss any four common probabilistic distributions occurring in water resources engineering [8]

b) What are the different soft computing techniques available for water resources planning and management? [8]

Q. 5 a) Explain some salient features of drought mitigation plan. [8]

b) Explain the concept of geo-informatics? Discuss its use in flood [8]

management.

OR

Q. 6	a)	What is severity index? What are the methods of drought forecasting?	[8]
	b)	Explain the assessment of flood damage in detail.	[8]

SECTION II

Q. 7	a)	Explain significance and feasibility of inter-basin water-transfer in India.	[8]
	b)	Discuss in brief the estimation of water demand in irrigation sector.	[8]

OR

Q. 8	a)	What is an artificial recharge of ground water? Discuss different methods of artificial recharge.	[8]
	b)	What are the forecasting methods of water demands of domestic and industrial sector?	[8]
Q. 9	a)	Explain rehabilitation and resettlement of any water resources project in India.	[8]
	b)	Explain in brief the management in water quality of river flows for its various uses.	[8]

OR

Q. 10	a)	What is the social impact due to construction of a storage type of a dam.	[8]
	b)	Discuss some principle measures to control the inflow sediment into an impounding reservoir.	[8]
Q. 11	a)	Explain the soft computing tool of artificial neural networks with the help of a sketch. Also discuss the various networks in use for forecasting models in water resources planning and management	[8]
	b)	Discuss the decision support system for a river basin for integrated water resources management with the help of an example.	[10]

OR

Q. 12	a)	Write a note on various applications of artificial neural networks in water resources engineering	[10]
	b)	Discuss the use of geo-informatics in water resource planning, development and management.	[8]

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

UNIVERSITY OF PUNE
[4364]-18
B.E. (Civil Engineering) (Semester II) Examination-2013
ADVANCED ENGINEERING GEOLOGY WITH ROCK MECHANICS
(Elective - II)(2003 Course)

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

Instructions:

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

SECTION-I

Q.1	A	Pinching and Bulging of Dykes.	[4]
	B	Explain field characters of Fractures in Deccan trap area.	[5]
	C	Explain the engineering significance Older metamorphic rocks in Maharashtra state.	[9]

OR

Q.1	A	Flow Groups.	[4]
	B	Criteria for demarcation of Deccan Trap Basaltic flows.	[5]
	C	Explain Engineering significance of Kaldagis and Vindhyan rocks in Maharashtra state.	[9]
Q.2	A	Discuss in detail case histories of Varsgaon and Mula dam sites where economy has been achieved.	[9]
	B	Discuss in detail any two case histories of dams in Maharashtra state where tail channel erosion is occurring.	[7]

OR

Q.2	A	Treatment to be given to a fracture crossing dam alignment. Give case histories.	[9]
	B	Discuss in detail the old and recent theories about the origin of Tachylytic basalts.	[7]
Q.3	A	Explain Barton's system of classification of rock masses? in detail.	[12]
	B	Define Rock Mechanics. Explain any 2 physical properties of rocks in detail.	[4]

OR

Q.3	A	What is RMR system of classification of rock masses? Explain in detail.	[12]

	B	Explain Wennre's configuration of Electrical Resistivity method.	[4]

SECTION II

Q.4	A	Discuss with suitable examples , suitability of Compact Basalts, Volcanic breccias and Amygdaloidal Basalts from tunneling point of view.	[18]

OR

Q.4	A	Can we locate a pier of the bridge partly on weathered rock and partly on dyke?	[6]
	B	Location and depth of drill holes for bridge foundation.	[6]
	C	Deere's method of calculation of RQD.	[6]
Q.5	A	Excavation of COT through alluvium in deccan traps area Give case histories.	[8]
	B	Influence of climate on soil formation.	[4]
	C	Availability of natural sand in Deccan trap area	[4]

OR

Q.5	A	Give detailed account of water bearing characters of Deccan trap rocks	[16]
Q.6		Write note on	
	A	Problems with made grounds in cities	[6]
	B	RIS in Deccan Trap area	[10]

OR

Q.6	A	Objections and facts for using Amygdaloidal basalt as rubble for masonry. Give examples	[8]
	B	Active faults	[4]
	C	Foundations of monumental Buildings	[4]

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

UNIVERSITY OF PUNE

[4364]-19

B. E. (*Civil*) Examination - 2013

Dams & Hydraulic Structs.

(2003 Course)

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

Instructions:

1 ***Answer 3 from each Section.***

2 *Answers three questions from Section I and three questions from Section ii.*

3 *Black figures to the right indicate full marks.*

4 *Neat diagrams must be drawn wherever necessary.*

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

Q.1	A	Discuss the various elements of watershed management.	08
	B	Answer any two of the following: i. Strengthening of dams ii. IS guidelines for dam safety iii. Silting of reservoirs	08

OR

Q.2	A	Discuss various applications of geographical information systems to watershed management.	06
	B	Write short notes on any two of the following: i. Submergence and rehabilitation of dams ii. Instrumentation in dams iii. Colgrout masonry in dams.	10
Q. 3	A	Define the following: i. Mass curve and demand curve ii. Various zones of storage reservoir	08

iii. Useful life of a reservoir
iv. Benefit cost ratio in planning of water resource project

B Discuss the analytical procedure adopted for stability analysis of gravity dam. 10

OR

Q. 4 A Discuss physical, economic and environment considerations which influence the planning of a water resource project. 06

B Determine the stability analysis of a gravity dam with the help of following data: 12

i. Top width of the dam is 2 m for a height of 2m and then splays on the downstream side so as to have a base width of 12m.
ii. Upstream face vertical
iii. Downstream slope is 0.5H:1V
iv. Internal friction for silt=30%
v. RL of top of dam=562m
vi. RL at the bottom =540 m
vii. RL of Sediment level= 546m
viii. Unit weight of silt =15kN/m^3
ix. Unit weight of concrete =24kN/m^3
x. Unit shear stress = 550kN/m^2
xi. Angle of internal friction =36º

Determine the stability of the dam against a) Overturning and b) Sliding.

Q. 5 A Explain the design principles of an earthen dam. 08

B Estimate the discharge per m length of the earthen dam with the help of following data: 02

i. Height of dam = 30m
ii. Free board = 2.5m
iii. Total number of flow channels = 5
iv. Total number of potential drops =12
v. Coefficient of permeability of dam material =5×10^{-4}cm/s

C Enlist the different types of spillway and describe briefly any two types of spillways. 06

OR

Q. 6 A Explain how cracking of an embankment result in 06

		failure. What are the measures against piping and sloughing?	
	B	Explain the need for dissipating energy below an overflow spillway and explain Tail water and Jump height curve. Enlist the various combinations of these curves and their implication on deciding types of energy dissipater and explain any one combination in detail giving the choice of energy dissipater.	10

SECTION II

Q. 7	A	What are discharge measuring structures? Discuss standing wave flume in detail.	06
	B	Draw a neat sketch of a typical layout of a diversion head works and explain the function of its component parts.	08
	C	State the fundamental difference between Khosla's theory and Bligh's creepy theory for seepage flow below weir.	04
		OR	
Q. 8	A	What are the different types of weirs? Explain with neat sketches circumstances under which each type is adopted.	06
	B	Briefly outline Khosla's theory on the design of weirs on permeable foundation.	08
	C	Explain lake tapping in Koyna dam project.	04
Q. 9	A	What is a cross regulator? What are the functions of a cross regulator	04
	B	Design a regime channel for a discharge of 40 cumecs with silt factor = 0.9 by Lacey's theory. The trapezoidal channel has a side slope of 0.5H: 1V.	06
	C	Write short notes on the following: a. Aqueduct b. Canal siphon and c. Super passage	06
		OR	
Q. 10	A	What are the different types of cross-drainage works that are necessary on a canal alignment? State briefly the conditions under which each one is used.	08

	B	What are the advantages of canal lining? How will you justify economically the necessity of lining of an existing canal?	08
Q. 11	A	Name the important types of river training methods indicating the purpose for which each type is adopted.	08
	B	The hydraulic turbine at a hydel plant has an installed capacity of 15000kW when working under a net head of 30m and an overall efficiency of 80%. It operates at 28% load factor when it serves as a peak load station. Find the minimum capacity of reservoir to satisfy the uniform demand of water.	08
		OR	
Q. 12	A	State and explain the objectives of river training.	04
	B	What are the principal objectives of a hydro-electric scheme? Discuss the utility of each component.	08
	C	how the hydro power potential of a stream is assessed?	04

UNIVERSITY OF PUNE

[4364]-2

B. E. (CIVIL) Examination 2013

ENVIRONMENTAL ENGINEERING-II

(2003 Course)

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

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

Instructions

(1) *Solve Q.1, or Q.2, Q.3 or Q.4,Q.5or Q.6,from SECTION- I and Q.7 or Q.8, Q.9 or Q.10,Q.11or Q.12 from SECTION-II*

(2) *Answers to the two Sections should be written in separate answer-books*

(3) *Neat diagram must be drawn wherever necessary.*

(4) Figures to the right indicate full marks.

(5) Use of logarithmic tables slide rule, Mollier charts, ectronic pocket calculator and steam tables is allowed.

(6) Assume suitable data, if necessary.

SECTION-I

Q1 a) The BOD_5 of waste has been measured as 450 mg/l. If rate is constant is 0.12, find out ultimate BOD and 3 day BOD at 27^0 C. [6]

b) Explain procedure of B.O.D. test [6]

c) Differentiate Dry Weather Flow and Wet Weather Flow. [4]

OR

Q2 a) What is a treatability index? Explain the significance of treatability index. [6]

b) What are physical, chemical and biological characteristics of wastewater? [6]

c) Differentiate between sanitary sewage and storm water runoff. [4]

Q3 a) What are the physical changes observed at zone of degradation, zone of decomposition and zone of recovery at a polluted stream? [6]

b) Give a list of methods available for treatment of sewage both for rural and urban conditions. [6]

c) What are the natural forces acts for the purification for streams? [4]

OR

Q4 a) Draw a neat sketch of grit chamber. What are the design considerations for a grit chamber. [6]

b) Draw a neat sketch of skimming tank and explain its working. [6]

c) What is the difference between preliminary and primary treatment of wastewater? [4]

Q5 a) What is meant by activated sludge? Describe with sketch the treatment of the sewage by activated sludge process(ASP). [6]

b) Describe the advantages and disadvantages of ASP. [6]

c) Explain the following terms with respect to ASP. [6]

i) Organic loading ii) F/M ratio iii) Volumetric loading

iv) HRT v) MCRT

OR

Q6 a) Explain with sketch the biological process in trickling filter. [6]

b) What do you understand by secondary treatment of waste water? [6]

Enumerate the various treatment techniques used for biological treatment.

c) What is the difference between high rate and low rate trickling filters? [6]

SECTION-II

Q7 a) Explain the mechanism of purification in facultative oxidation pond. [8]

b) Explain diagrammatically the algae-bacteria symbiotic relations. [8]

OR

Q8 a) Distinguish clearly between the working of an oxidation ditch and oxidation pond. [8]

b) Write in detail design parameters of aerated lagoons and mention the advantages and disadvantages of the same. [8]

Q9 a) What are the suitable conditions and situations to propose septic tank unit for the sewage treatment. [6]

b) How the septic tank effluent is disposed? Explain with a neat sketch. [6]

c) Discuss the criteria for design of a septic tank. [4]

OR

Q10 a) What are the different stages of digestion in case of anaerobic digesters? [6]

b) What are the advantages of anaerobic treatment of waste water? [6]

c) Write the various design parameters of anaerobic digesters. [4]

Q11 a) Draw a flowchart for treating Sugar industry waste water. [6]

b) Discuss in brief various treatment processes adopted for treating industrial waste water. [6]

c) What is the difference between grab and composite sample? Explain. [6]

OR

Q12 a) Explain in detail corrosivity and toxicity in hazardous waste. [6]

b) Explain the characteristics of pulp and paper mill waste. [6]

c) Draw a neat sketch showing the points where spentwash is generated in the distillery. [6]

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

UNIVERSITY OF PUNE

[4364]-20

B. E. (Civil) Examination - 2013

Transportation Engineering II (2003 Course)

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

SECTION –I

Q.1	A	Explain in brief classification of roads as per 3rd Road development plan.	06
	B	State the various Highway planning surveys. Explain any one in brief.	06
	C	Write a short note on Spot speed studies.	04

OR

Q.2	A	Explain in brief the various recommendations of Jaykar Committee.	06
	B	Write a short note on types of Traffic Signs.	04
	C	State comparison between Nagpur road plan and Bombay road plan.	06
Q. 3	A	Define width of formation. Draw a neat cross section of a road in embankment.	04
	B	What is sight distance? Derive an expression for calculating stopping sight Distance considering level road.	06
	C	What factors are to be considered for an ideal alignment? Discuss in brief.	06

OR

Q. 4	A	Explain in brief the following: 1. PIEV Theory 2. Grade Compensation	04
	B	Calculate the stopping sight distance for a level road at design speed of 80kmph. Assume any other suitable data as per IRC recommendations.	06
	C	What is Transition curve? What are its types and Why it is necessary in highway alignment?	06
Q. 5	A	Draw a neat labeled sketch of cross section of flexible pavement	06

		and rigid pavement.	
	B	State the stepwise procedure of carrying out an Impact Test on Road Aggrepate, in Laboratory.	06
	C	Explain in brief the concept of Equivalent Single wheel load in design of pavement	06

OR

Q. 6	A	Draw a neat labeled sketch of Expansion joint in concrete pavement.	06
	B	State the comparison between rigid pavement and Flexible pavement.	06
	C	State the various bituminous materials used in construction of flexible pavement. How are they classified?	06

SECTION II

Q. 7	A	What do you mean by basic runway length? State clearly the corrections that are applied for determining basic runway length.	06
	B	What is wind Rose diagram? Explain any one in brief.	04
	C	Explain the following terms: 1. Minimum Turning Radius 2. Terminal Building 3. Taxiway.	06

OR

Q. 8	A	Explain the following terms: 1. Hangers and Apron 2. Airport and Aerodrome 3. Runway and Taxiway	06
	B	Explain with the help of a neat sketch, three controls for rolling, pitching and yawing movements of an aero-plane.	06
	C	Give detail classification of airports.	04

Q. 9 A The following are the costs of one pler and one superstructure of a multiple span bridge for various span lengths. The cost of superstructure span excludes the cost of railing and flooring system. Calculate the economic span: 10

Span (m)	04	08	12	15
Cost of superstructure in ((Rs)	1700	7000	16000	24000
Cost of one pier (Rs)	22200	23200	2300	23600

B Explain in brief the importance of following: 06
1. Afflux
2. Scour Depth

OR

Q. 10 A State the various requirements of an Ideal Bridge site. 06

B A bridge has a linear waterway of 150meters constructed across a stream whose natural linear waterway is 220meters. If the average flood discharge is 1200m^3/sec and average flood depth is 3meters. Calculate the afflux under the bridge. Use mole worth formula. 10

Q. 11 A Explain in brief the necessity of providing bearings in bridges. 06

B How will you account for the following in the design of a highway bridge: 06
1. Impact
2. Wind load
3. Force due to water current

OR

Q. 12 A Draw a neat sketches of the following : 06
1. Box culvert
2. Pipe culvert

B Explain in brief the loads and forces to be considered for designing of bridge pier. 06

C Explain in brief any one method of erection of bridge superstructure. 06

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

UNIVERSITY OF PUNE
[4364]-21
B. E. (*Civil*) Examination - 2013
Foundation Engineering
(2003 Course)(401010)

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

Instructions:

1 *Answers to the **two sections** should be written in **separate answer-books**.*
2 *Neat diagrams must be drawn wherever necessary.*
3 *electronics pocket calculator is allowed*

SECTION -I

Q.1	A	Explain the purpose subsurface exploration for foundations	[5]
	B	Explain with a neat sketch electrical resistivity method to get subsoil stratification condition	[6]
	C	Distinguish between disturbed and undisturbed soil sampling how the degree of disturbance of a sampler is measured.	[6]
		OR	
Q.2	A	Explain seismic refraction method to get subsoil stratification condition	[6]
	B	Explain standard penetration test with a neat sketch enlisting the utility of test results.	[6]
	C	With a neat sketch explain pressure meter test.	[5]
Q.3	A	What is pressure bulb and explain it significance	[5]
	B	Draw contact pressure diagram for rigid and flexible footing on cohesive and non cohesive soil	[6]
	C	Explain what is tolerable settlement and the factors which influence its value	[6]
		OR	
Q. 4	A	Explain consolidation test with a neat diagram	[6]
	B	Explain the terms normal consolidation and over consolidation.	[6]
	C	Enlist the assumptions made in Terzaghi's consolidation theory.	[5]
Q. 5	A	With neat diagrams explain different modes of shear failure	[6]
	B	Give Hensen bearing capacity equation and name all the terms in it	[5]
	C	Explain effect of water table and depth of foundation on bearing capacity.	[5]
		OR	

Q. 6	A	What is Housel's perimeter shear concept? How it is used to estimate the load carrying capacity of an actual footing	[6]
	B	Explain concept of floating foundation	[5]
	C	Clearly explain how allowable bearing pressure is estimated for a shallow foundation.	[5]

SECTION II

Q. 7	A	With a neat diagram explain the difference between friction & end bearing piles.	[6]
	B	With necessary diagram explain construction of bored cast -iusitu concrete pile	[6]
	C	State & explain Engineering New Formula	[5]

OR

Q. 8	A	Explain negative skin friction in case of pile foundations	[5]
	B	Draw a neat sketch of well foundation showing all its component parts.	[6]
	C	Explain sand island method for sinking of a caisson	[6]
Q. 9	A	Draw pressure distribution diagram for a cantilever sheet pile.	[5]
	B	Explain the use of sheet piles with two examples	[6]
	C	Explain construction of under reamed pile foundation with necessary diagrams	[6]

OR

Q. 10	A	Enlist the design principle for design foundations on black cotton soils	[6]
	B	Explain why the black cotton soils are considered as problematic soils by civil engineers	[5]
	C	With a neat sketch explain preloading technique for ground improvement	[6]
Q. 11	A	What is liquefaction and its effect on built environment	[5]
	B	Explain in brief types of earthquakes	[5]
	C	Explain liquefaction hazard mitigation	[6]

OR

Q. 12	A	Explain various functions performed by geosynthetics	[6]
	B	What is rein forced earth? Give any three of its applications in Civil Engg	[5]
	C	Draw a neat sketch of vertical RE wall.	[5]

UNIVERSITY OF PUNE
[4364]-3
B. E.(Civil)Examination - 2013
QUANTITY SURVEYING CONTRACTS AND TENDERS
(2003 Pattern)

[Total No. of Questions:12] **[Total No. of Printed Pages :5]**
[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) Black figures to the right indicate full marks.
(4) Neat diagrams must be drawn wherever necessary.
(5) Use of logarithmic tables, slide rule, Mollier charts, electronics pocket calculator is allowed.
(6) Assume suitable data, if necessary.
(7) Your answers will be valued as a whole.

SECTION-I

Q1 a) Enlist different types of estimate and explain any one. [4]

b) Describe various factors to be considered while preparing estimate for a project. [4]

c) An elevated storage reservoir (ESR) of capability 100000 Litres is to be constructed. Determine the estimated cost of this work using following data. [8]

i) Cost of construction for ESR of capacity 40000 Litres and of similar specification was Rs. 2000000

ii) Assume work charged establishment=2% and contingencies=5% of construction cost. Also describe the method used in this case.

OR

Q2 a) Differentiate between prime cost items and provisional sum items. [6]

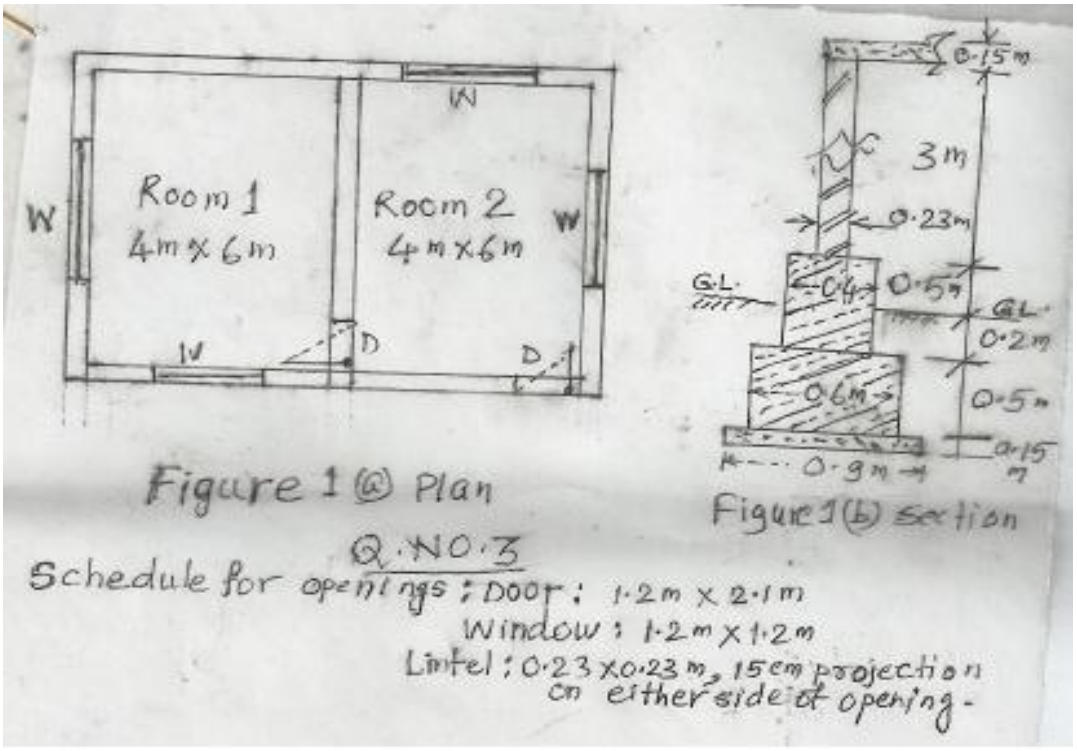
b) Explain in brief the data required for preparation of detailed estimate [4]

c) A primary health centre of 50 beds consisting O.P.D; operation theater, medical store, store, administrative section, Laboratory and other units was recently constructed. The cost of this project was found to be Rs 80 lakhs. [6]

i) Determine the rate of construction per service unit
ii) Considering 10% rise over the rate per service unit for above mentioned project, determine the estimated cost for proposed hospital campus of 65 beds with similar units.

Q3 Figure no.1 shows plan and section for a residential building. Determine, the quantities of following items,

i) Excavation for foundation, [3]
ii) P.C.C.(1:2:4) for plinth and foundation bed [3]
iii) Brick Masonry (1:6) in superstructure [3]
iv) 20 mm thick cement plaster in C.M.(1:3) [3]
v) 12 mm thick cement plaster in C.M. (1:3) [3]
vi) Cement Concrete M20 for slab and, Lintel [3]



OR

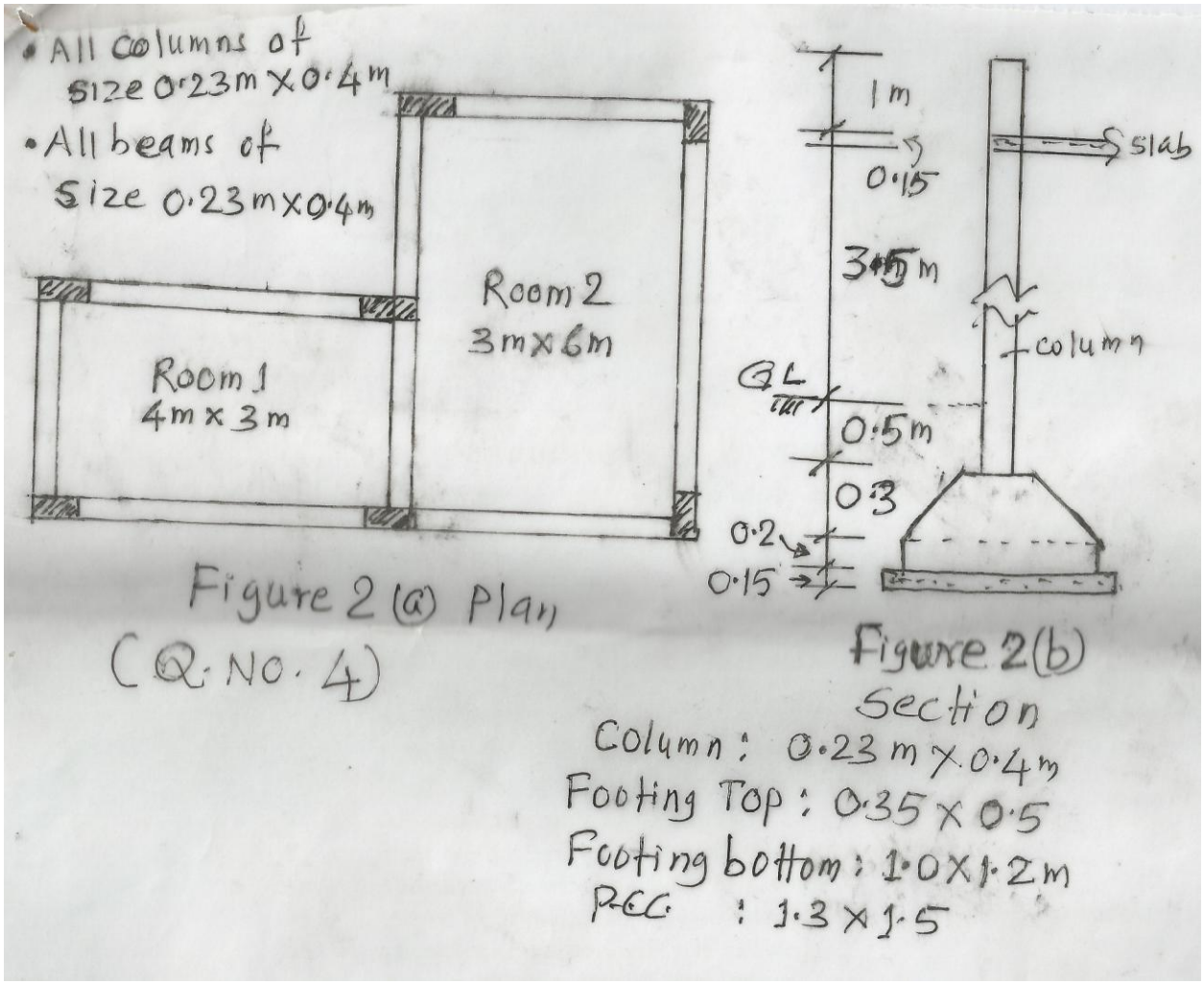
Q4 Figure no.2 shows plan and section of a R.C.C recidential building. Determine the quantities of following items,

i) Excavation for footing [3]
ii) R.C.C. in footing [3]
iii) R.C.C. in column [3]

iv) R.C.C. in beam [3]

v) R.C.C. in slab [3]

vi) Steel reinforcement in kg if the percentage of steel in all R.C.C. members is 1.5% [3]



Q5 a) Draft a detailed specification for providing and laying cement concrete for providing and laying cement concrete for R.C.C. works with reference to following points. [6]

i) Materials, quality of materials

ii) Method of execution, quality, properties etc

iii) Method of measurement and mode of payment.

b) State the different formulae used for computation of earth work in road construction and explain any one in detail. [4]

c) The quantity of brick masonry provided for a building is $140m^3$. [6]

determine the basic materials required for the work. The brick masonry is constructed in cement mortar (1:6)

OR

Q6 a) Determine the rate per unit of measurement for the item 'providing and laying U.C.R. masonry in C.M.(1:6) in superstructure. Assume following rates for materials and labour. [8]

Rubble: Rs 600/m^3, Cement: Rs 280/bag. Sand: Rs 1800/m^3, Headmason : Rs 800/day mason: Rs 600/day, mazdoor and bhisti: Rs 300/day.

b) Draft detailed specification for providing and laying brick masonry in superstructure with reference to following points, [8]

i) Materials, quality requirement etc.

ii) Method of execution and workmanship.

iii) Method of measurement and payment.

Also state the importance of detailed specifications in Civil engineering Projects.

SECTION-II

Q7 a) A recidential building consisting 10 flats is constructed recently on a Plot of land costing Rs. 30 lakhs. The cost of construction of the building is Rs 150 lakhs. Calculate standard monthly rent per flat using following data: [8]

i) Expected return on investment done on building and land is 10% and 8% respectively.

ii) Future life of building is 80 years.

iii) Rate of interest for sinking fund is 6%

iv) Annual repairs of 1% on cost of construction

v) Municipal taxes equal to 25% of gross rent

b) What is depreciation? State various methods of used for calculation of depreciation and explain any one. [6]

c) Explain the factors that affect value of a property. [4]

OR

Q8 a) Explain following terms used in valuation. [8]

i) Reversionary value of land

ii) Capitalised value

iii) Scrap value

iv) Book value

b) A concrete mixer was purchased at Rs 140000/- assuming the scrap [10]

value of 14000/- after 10 year by constant percentage method and value after each year.

Q9 a) Describe lump sum contract with reference to following parameters. [10]
i) Nature of aggrement ii) Contract document iii) Mode of payment
iv) Suitability and vi) Advantages and disadvantages
b) Explain in brief [6]
i) Conditions of valid contract
ii) Unbalanced Tender

OR

Q10 a) Write short note on [12]
i) Security Deposit ii) Earnest Money iii) Pre-tender conference
iv) Administrative approval
b) Explain the importance of specification in leagal aspect of contract [4]

Q11 a) List out the circumstances where lowest tender can be rejected. [4]
b) Explain the 3-bid system of tender submission [4]
c) Explain the PWD procedure for execution of minor works [4]
d) Explain in brief 'Technical Sanction' [4]

OR

Q12 Write short note on following. [16]

1. Rate List method of execution of works
2. Global tendering
3. B.O.T. method of execution of works
4. Free hold and Lease hold property

UNIVERSITY OF PUNE

[4364]-5

B. E. (CIVIL) Examination - 2013

Advance Geotechnical Engineering

(2003 Pattern)

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

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

Instructions :

*(1) Answers three questions from **Sections 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 drawn wherever necessary

(4) Assume suitable data, if necessary.

SECTION I

Q1) a) Explain 'HRB' &'USCS' classification. [08]

b) Discuss different 'Clay Minerals'. [08]

OR

Q2) a) Explain – 'Comparison of two foundation sites' based upon 'LL, RZ & IE' [08]

b) Why BC soil swells? Explain the role of 'Montmorillonite'. [08]

Q3) a) Explain 'Culmann's graphical Method'. [09]

b) Derive expression for 'K_o'. [08]

OR

Q4) a) Design a gravity retaining wall, 4m high withvert. bach to retail a dry sand with [09]
r=18 kN/m^3 & $\emptyset$ =30^0. Find also the FOS against sliding assuming μ =28^0.
The wall is made up of bricks with r= 22 kN/m^3 & top with of 1m. Use
Rankine's theory.

b) Explain the steps for 'Anchored Sheet pile design' with 'free earth support' [08]

Q5) a) Discuss the following: [12]

i) Geosynthetics & their functions.

ii) Geogrid – properties & functional requirements.

b) Explain the role of geoyntherics for geoenvironment . [05]

OR

Q6) a) Discuss – i) 'Prinquet & Lee' Theory. [12]

ii) 'Reinforced earth wall.

b) Explain – 'Soil nailing' & its applications. [05]

SECTION II

Q7) Explain the following: [16]

a) Forced vibrations b) Panne's Analysis

c) Barken's method d) Elastic half space method.

OR

Q8) a) Resonance occurred at a frequency of 22 cycles/sec in a vertical bloch [08]
vibration test on a block of 1m x 1m x 1m. Determine Cu if the weight of
oscillator is 650 N & the force produced by it at 12 cycle/sec is 1000N.

B) Discuss the design criteria for impact type machines as per IS-2974 [08]
(Pt-II)-1996.

Q9) Explain the following: [17]

a) Vibro-floatation b) Compaction piles.

c) Grouting d) Sand drains

OR

Q10) a) Explain the design steps for sand drains in following cases. [08]

i) Kr = Kz ii) Kr = 5 Kz

b) Explain the stages of inserting reinforcement in vibro-expanded pile. [09]

Q11) a) Explain- 'Rheological Models'. [09]

b) Discuss – 'Utility of Rheological models' [08]

OR

Q12) a) Explain- 'Rheology' & Basic Rheological models. [07]

b) Explain the following with the help of Rheological Models. [10]

i) Secondary consolidation

ii) Creep

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

UNIVERSITY OF PUNE

[4364]-6

B. E. (*Civil Engg*) Examination - 2013

System Approach In Civil Engg.

(2008 Course)(401005)

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

Instructions:

1. ***Answer*** *three questions from section I and three 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 answer-books***.
4. *Neat diagrams must be drawn wherever necessary.*
5. *Assume suitable data, if necessary.*
6. *Use of logarithmic tables, slide rule, Mollier charts, electronics pocket calculator is allowed*
7. *Black figures to the right indicate full marks.*

SECTION -I

Q.1 A Minimize $Z= 12x_1+20x_2$ [12]

S.t. $6x_1+8x_2 \geq 100$

$7x_1+12x_2 \geq 120$

$x_1, x_2 \geq 0$ Use Big-M method

B Explain the following terms used in simplex method [4]

i) Key Columm ii)Key Row

iii) Degeneracy iv) Infeasibility

OR

Q.2 A Solve the problem in Q.1 above by Two-Phase Method [12]

B What are the applications of linear programming in civil engineering. [4]

Q.3 A Water is to be transported from 3 reservoirs to 5 different distribution centres. The unit cost of transportation from the various reservoirs to each of the distribution centres and [18]

the quantities available at the reservoirs and those required at the distribution centres are given in the following table,

Reservoir	Distribution Centres					Quantity Available
	1	2	3	4	5	
A	15	10	7	9	12	50
B	14	17	11	6	18	70
C	22	23	21	13	20	80
Quantity Required	20	30	40	50	50	200

i) Find initial feasible solution by VAM
ii) Find the optimal solution which will minimize the distribution policy.

OR

Q. 4 A Five skilled workers are available to to 5 skilled jobs on the site. Each worker is to be assigned one job. The time taken in hours by each worker to execute the different jobs is given below. Find the optimal assignment that will minimize the total time. [12]

Workers	Jobs				
	1	2	3	4	5
1	3	9	2	3	7
2	6	1	5	6	6
3	9	4	7	10	9
4	2	5	4	2	1
5	9	6	2	4	6

B How will you formulate a Transportation problem as an L.P. model? Explain how you will solve an assignment problem where a particular assignment is restricted? [6]

Q. 5 A Maximize $f(X) = 2X_1X_2 - 2X_1^2 - 2X_2^2 + 6X_2$ with initial value (1,1) using gradient method. [8]

B Use Lagrange Multiplier Technique to Maximize [8]
$Z = X_1^2 + 3X_2^2 + 2X_1X_2 + 2X_1 + 6X_2$
Subject to $2X_2 - X_1 = 4$,
And $X_1, X_2 \geq 0$

OR

Q. 6 A Minimize $f(X) = 2(X_1 - 1)^2 + (X_2 - X_1)^2$ with initial value(-1,2) using gradient method. [8]

B Use Fibonacci method to maximize $Z = 16X - 0.2X^2$ in the range of (0,100) with 0.1% accuracy. Carry out five stages. [8]

SECTION II

Q. 7 A A salesman located in city A decided to travel to city B. he knew the distances of alternative routes from city A to city B, the city of origin A, is city1and the destination city B is city 10. Other cities through which the salesman will have to pass are numbered 2to 9. Then ,fine the shortest route. 16

Node	Distances	Node	Distances
1-2	4	4-6	10
1-3	6	4-7	5
1-4	3	5-8	4
2-5	7	5-9	8
2-6	10	6-8	3
2-7	5	6-9	7
3-5	3	7-8	8
3-6	8	7-9	4
3-7	4	8-10	7
4-5	6	9-10	9

OR

Q. 8 A A promoter builder intends to invest Rs. 60million in real estate business in 3 housing sites A,B and C. the returns depending upon the level of investment are given in the following table. Determine the amount which can be invested in each of the housing sites. So that the total returns are maximum. Write the recursive equation at each stage. [18]

Investment Rs (million)	Returns from housing site		
	A	B	C
0	0	0	0
10	18	26	23
20	28	27	29
30	43	33	41
40	47	44	46
50	53	55	52
60	63	62	61

Q. 9 A Solve the following sequencing problem involving 3-machines, n-jobs and no passing. To obtain the sequence of jobs to be processed so as to minimize the total time elapsed. Determine the total elapsed time and idle hours of the machines, if any, Tabulate the results indicating the schedule of processing of all the jobs. 12

Jobs	Time in hours		
	Mach.A	Mach.B	Mach.C

1	6	5	9
2	7	7	11
3	3	8	8
4	4	5	9
5	5	6	12
6	10	4	9
7	16	7	10
8	12	3	14

B What is sequencing? What are the assumptions in sequencing problem? [4]

OR

Q. 10 A A sample of 100 arrivals of automobiles at toll both is found to be according to the following distribution; 12

Time between arrivals in Min.	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
Frequency	2	6	10	24	20	15	10	7	4	2

The time taken for service follows the distribution.

Service Time in Min.	0.5	1.0	1.5	2.0	2.5
Frequency	13	22	37	20	8

Estimate the average% waiting time and idle time of a customer by simulation for next 10 arrivals. Use the following random numbers.

Arrivals:	16	77	23	02	77	28	06	24	25	93
Service:	56	65	05	61	86	90	92	10	79	80

B State advantages and limitations of simulation technique. [4]

Q. 11 A Distinguish between pure strategy and mixed strategy. [6]

B Reduce the following game by dominance and fine the game value. [12

Strategies	I	II	II	IV
I	3	2	4	0
II	3	4	2	4
III	4	2	4	0
IV	0	4	0	8

OR

Q. 12 A Explain the i) Sinking Fund Factor ii) Present Worth Factor [6]

B Following data pertains to two projects. 12

P-articulars	**Project A**	**Project B**
Investment in Rs. Lakh.	30	30
Useful life in years	10	15
Annual Benefits in Rs. Lakh	6	5
Discount Rate	8%	8%

Discuss the choice of the projects based on NPV and B/C ratio. Ranks the projects.

Total No. of Questions: 08 **Total No. of Pages: 02**

[4364-8]

B.E. (Civil) Examination

STRUCTURAL DESIGN OF BRIDGES (ELECTIVE I)

(2003 COURSE)

Time: Three Hours **Maximum Marks: 100**

Instructions to the candidates:

1) From **Section I** answer **Q.1** or **Q.2**; **Q.3** or **Q.4** and from **Section II** answer **Q.5** or **Q.6**; **Q.7** or **Q.8**
2) Answers to the two sections should be written in separate answer books
3) Figures in bold to the right, indicate full marks
4) IS 456, IS 800, IS 1343 and Steel table are allowed in the examination
5) Neat diagrams should be drawn where ever necessary
6) If necessary, assume suitable data and indicate clearly
7) Use of electronic pocket calculator is allowed

SECTION I

Q.1 **a)** Explain with neat sketches various loadings specified for highway bridges. **(10)**

b) Explain economic span for a T-beam deck slab bridge. **(10)**

c) What are the functions of bearings? **(05)**

OR

Q.2 **a)** Explain Carboun's method. **(10)**

b) Explain the PTFE bearings used in R.C. bridges. **(10)**

c) List the different types of loads considered in the design of a highway bridge. **(05)**

Q.3 An R.C. T-Beam deck slab bridge shown in **Fig. 1** has the following details. **(25)**

a) Thickness of railings – 100 mm
b) Thickness of footpath – 150 mm
c) Thickness of wearing coat – 60 mm
d) Span of main girder – 15.0 m
e) Spacing of cross-beams – 3.0 m c/c
f) Live load – IRC Class AA Tracked Vehicle
g) Materials – M35 grade of concrete and Fe 415 grade of steel

Adopt $m_1 = 0.07$ and $m_2 = 0.05$

Design the deck slab and sketch the details of reinforcement.

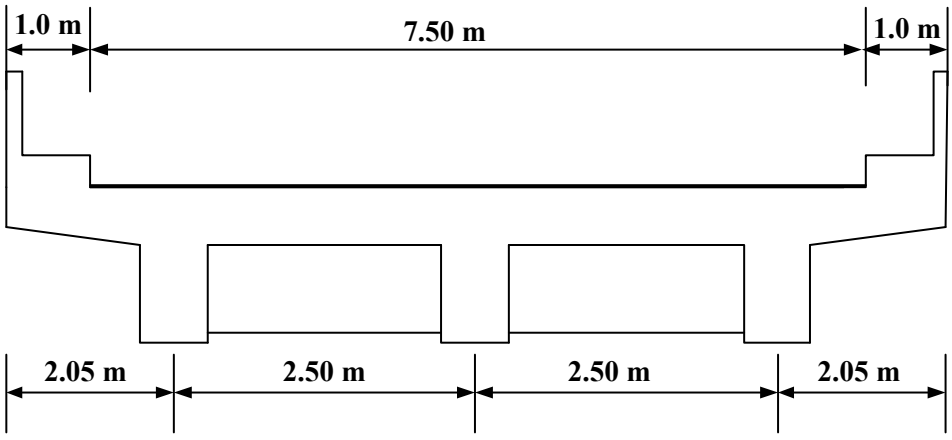


Fig. 1

OR

(25)

Q.4 For the R.C. T-Beam deck slab bridge given in **Q.3,** design the intermediate post-tensioned girder. Use M45 grade of concrete and high tension strands of 7 ply 15.2 mm diameter having an ultimate tensile strength of 1600 N/mm^2. Use Fe 415 steel for supplementary reinforcement. Consider loss ratio as 0.80. Sketch the details.

SECTION II

Q.5 **a)** What are the advantages of steel bridges over concrete bridges? **(10)**

b) Explain with neat sketches truss type and through type railway steel bridges **(15)**

OR

Q.6 **a)** Suggest and design a bearing for the given data and also sketch the details. **(18)**

1. Reaction from the girder = 1550 kN
2. Allowable pressure on bearings = 4 N / mm^2
3. Allowable pressure on bearing plate = 1800 N / mm^2
4. Allowable pressure on concrete bed = 5 N / mm^2

b) What are elastomeric pad bearing. **(07)**

Q.7 Design the members U_1-U_1, U_2L_1 and U_1-L_2 for the railway steel truss bridge shown in Fig. 2. **(25)**
Also draw a neat sketch of the connection of members at U_1

a) Weight of stock rail – 0.65 kN/m
b) Weight of check rail – 0.5 kN/m
c) Timber sleepers of size – (0.25 x 0.25 x 2.5) m @ 0.45 m c/c
d) Unit weight of timber – 6.2 kN/m^3
e) Spacing of truss – 6.5 m c/c
f) The bridge supports a eudl of 2950 kN

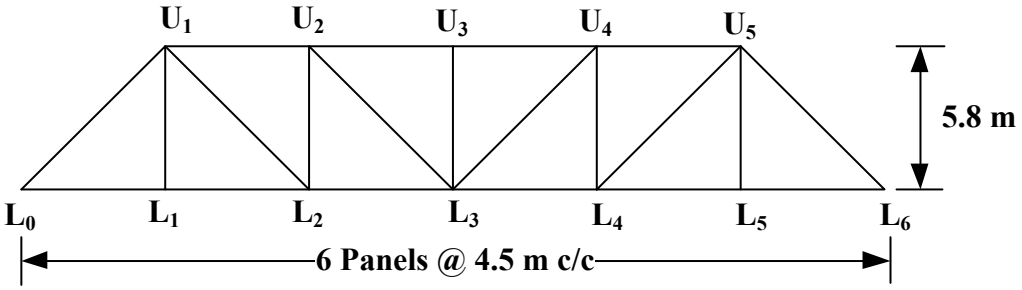


Fig. 2

OR

Q.8 For the railway bridge shown in Fig. 7, design the top and bottom lateral bracing with the given data. **(25)**
The rails are 750 mm above the bottom chord. The chord members are 500 mm deep and 400 mm wide. The end posts are 500 mm deep and 455 mm wide. The web members are 450 mm deep and 250 mm wide.

UNIVERSITY OF PUNE
[4364-9]
B.E.(Civil) Examination 2013
Architecture & Town Planning
(2003 pattern)

Time-Three hours **Maximum Marks-100**
[Total No. of Question=12] **[Total no. of printed pages= 3]**
Instructions:
(1)Solve 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)Figures to the right indicate full marks.
(3)Assume suitable data whenever necessary.

SECTION-I

Q.1 (a)Explain how building planning principles and Architecture planning principles are usefull in designing any area. (9)
(b)How factor in architecture influence the design of the building? (8)

OR

Q.2 (a)Compare and contrast Gothic & Renaissance architecture,giving suitable examples. (9)
(b)Giving suitable examples explain 'A structure depicts qualities of architecture.' (8)

Q.3 (a)Explain the Neighbourhood concept in case of urban design. (9)
(b)Write a short notes on any three:Work of Ebenzar Haward.,Garden city giving examples,T.P.Schemes,Planners role in controlling hapharzard growth of a town. (8)

OR

Q.4 (a)What planning aspect are deal with Neibourhood? (9)
(b)Establish the relation within connectivity matrix and planning. (8)

Q.5 (a)How infrastructure is supported through UDPFI? (8)
(b)Describe the contents of MRTP Act with respect to RP & TPS. (8)

OR

Q.6 (a)Explain in detail ULC Act. (8)
(b)Define D.P.and mention the surveys & aspect of D.P. (8)

SECTION-II

Q.7 (a)Describe in details the different landscaping elements,with necessary sketch. (9)

(b)Differentiate between the concept soft & hard landscape. (8)

OR

Q.8 (a)What is landscape design?Explain with sketches the various aspects of landscape planning. (9)

(b)Write a short note on:Soft landscape,Elements of landscape (8)

Q.9 (a)Explain in details how will you carry out a traffic & transportation survey for D.P. (8)

(b)Which factors will you consider for the drainage system of a new town? (9)

OR

Q.10 (a)Write a note on Demographic survey. (8)

(b)Which factors will you consider for the water supply scheme of a new town?Explain. (9)

Q.11 (a)Describe the role of GIS ,GPS & remote sensing in town planning. (8)

(b)Explain the importance of new techniques such as GIS,GPS & remote sensing during disasters. (8)

OR

Q.12 Write a short note on:Use of GPS in transportation,GPS segments , Remote sensing,Applications of GIS in town planning. (16)