Department of Civil Engineering
End Semester Examination
(CE 412) Transportation Engineering II

Maximum marks : 50
Figures to the right indicate full marks

Date : .12.05.2012
Time : 2.00pm to 5.00pm

Que. 1: a) Explain in short various types of overlays. Illustrate the concept of Benkleman beam test and the steps involved therein. **(03)**

b) Draw neat sketches of any five types of bridges and illustrate under which circumstances they are preferably used. **(03)**

c) Prepare wind rose diagrams Type II with the help of following data. Suggest the best possible orientation of the runway. **(04)**

Wind Direction	Duration of wind, percent		
	6.4 – 25 kmph	25-40 kmph	40-60 kmph
N	8.3	3.2	0.3
NNE	6.1	1.9	0.4
NE	2.6	0.8	0.7
ENE	1.8	0.5	0.2
E	3.2	1.2	0.4
ESE	0.3	0.4	0.0
SE	5.3	3.8	2.1
SSE	5.7	3.2	1.0
S	9.7	5.6	1.5
SSW	8.5	1.5	2.0
SW	4.2	2.2	0.7
WSW	4.3	2.7	2.9
W	5.2	0.9	2.3
WNW	1.5	0.5	0.8
NW	3.7	3.0	2.1
NNW	6.2	1.5	1.7

Que. 2: a) We have various types of bituminous layers (e.g. BM, DBM, AC etc.) to be provided in flexible pavements. Draw neat sketches (only cross section) to illustrate the various possibilities of layers which can be provided. Mention the required percentage of bitumen content in each mix. **(05)**

b) Prepare quality assurance plan for any one type of bituminous mix. **(05)**

OR

c) Explain in short various methods adopted for surface and subsurface Airport drainage. **(05)**

Que. 3: a) Explain the concept of Camber and superelevation in road construction. Suggest the method of its application and construction in field. **(03)**

b) Explain with neat sketch the Elastomeric Bridge Bearing. Write down at least four advantages of the same. **(03)**

c) Explain in detail airport Master Plan. Give the recommendations given by FAA for preparation of the master plan. **(04)**

Que. 4: a) Explain the use of Wind Rose Diagram. Explain any one method of drawing the same. **(03)**

b) Explain any six types of Concrete Pavement failures. Draw sketches to illustrate the same. **(03)**

c) Describe with sketches a bridge failure case study from our country in detail. **(04)**

Que. 5: a) Write short note on 'Heliport'. **(03)**

b) Explain the use of Flash and Fire Point of bitumen in road construction. **(03)**

c) Write detailed description of Balanced Cantilever Type of bridge launching system. Draw neat sketches to illustrate the same. **(04)**

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College of Engineering, Pune

Wellesley Road, Shivajinagar, Pune 411005

End-Semester Examination

(CE-410) Construction Equipments and Machinery (CEM)

Programme: B.Tech | Specialization: Civil Engineering
Year: 2011-12 | Day & Date: Monday 07/05/2012
Duration: Three Hours | Max. Marks: 100

Instructions

1. Read all the questions carefully before you start writing the answers.
2. Numbers to the right indicate full marks
3. Draw neat sketches wherever necessary
4. Marks may be deducted for leaving blank pages in between two questions.

Q. 1 It is proposed to connect JNPT Port to Main land by means of cable stayed bridge between Nava-Sheva Island and Navi Mumbai as shown in **Figure-01**. There is an Airport near vicinity of the proposed site therefore bridge should not obstruct landing and taking off of the aeroplanes. In order to facilitate faster goods transport Railway Authorities are ready to partially fund the bridge , provided it enables rail traffic by providing a double decker bridge giving a separate passage for trains. As airport is near, entry to the cable stayed bridge needs to be through a tunnel. For this purpose Near Navi Mumbai side an artificial island may be needed for the transition of vehicular movement. It is easier to cast the tunnel segments in the area Near Navi Mumbai Coast. Your company is interested in submitting a proposal for the work. Prepare your proposal taking in to consideration following points. **(20)**

i) Schematic sketch of the over all project showing the tunnel portion and Bridge portion needs to be given.
ii) Sketches need to be provided for the casting and transporting of the bridge and tunnel segments to the proposed alignment and sinking them.
iii) The Railway authorities want the bridge super structure in steel as it is reliable as well as better quality control is possible so sketches of bridge cross section need to be provided.
iv) Procedure for the construction of artificial island for the transition need to be elaborated.
v) Method of launching of bridge super structure needs to be given with sketches and explanation where needed.
vi) Typical sketches showing the bridge piers as well as protection for the bridge piers against impact by Ships.
vii) The alignment shown is over a fisheries harbour used by fishermen in Navi Mumbai.

Q. 2 a) Identify following equipments shown in **Figure-21** and **Figure-22** and label their parts by redrawing the figures on your answer book. Also state the advantages and limitations in their use for each of them. **(10)**

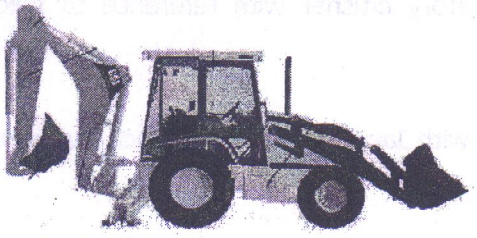

Figure-21

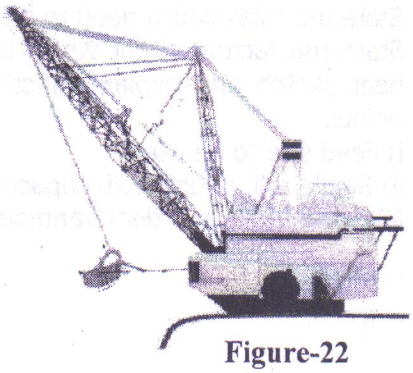

Figure-22

Q. 2 b) State most common types of mobile cranes used in civil engineering construction projects. Explain any one of them with neat sketches. **(10)**

Q. 3 a) i) Enlist different types of piles based on their function. **(10)**
ii) Draw neat sketches of cofferdam and caissons. State the advantages and dis-advantages of coffer dam and caissons.

b) A 2.5-cy short-boom dragline is to be used to excavate hard, tough clay. The depth of cut will be 18.4 ft, and the swing angle will be 90°. After completion of 50% work it rains and the clay becomes wet-sticky. Determine the probable production of the dragline, There are 55,000 bcy of material to be excavated. How long will the project require to complete if after completion of 50% work the clay has become wet-sticky ? **(10)**

Q. 4 a) i) Define Geosynthetics. Enlist different types of geosynthetics used in Civil Engineering. **(10)**
ii) Complete the following table linking relationship between properties and functions of geosynthetics, and their purpose and location

Properties	Functions	Purpose	Locations
Thickness			
Permeability			
Continuity			
Tensile strength			
Friction			

OR

a) A fleet of 22-ton rear-dump trucks being loaded with 3-cy bucket, with specifications as follows are used to haul sandy clay. The performance chart in Figure-02 is valid for these trucks. The trucks will be loaded by a hydraulic hoe having a 3-cy bucket. The haul road from the borrow site to the fill is a 3-mile down hill grade of 1%. It is earth, poorly maintained. Dump time will average 2 min because of expected congestion on the fill. The hoe should be able to cycle in 20 sec. The sandy clay has a loose unit weight of 2,150 lb/cy. A realistic efficiency estimate for this work is 50-min hour. Analyze the performance of the fleet. **(10)**
Specifications :
Capacity Struck – 14.7 cy, Heaped, 2:1, 18.3 cy
Net weight empty – 36,860, pay load 44,000 lb ,Gross vehicle weight – 80,860 lb

b) Why it is necessary to do soil stabilization ? List different methods of soil stabilization ? Explain any one of them in detail along with neat sketches. **(10)**

Q. 5 a) Draw neat sketches for Segmental Method of Construction of Bridge Super Structure and Incremental Launching Method of Constructing Bridge Super Structure using Triangular Wedges. Also differentiate between them in a tabular form by text. **(10)**

OR

a) State the rules which need to be followed to pump concrete successfully. **(10)**

b) State the factors about which knowledge is essential before selecting a crusher. Draw a neat sketch and explain functioning of a gyratory crusher with reference to following points. **(10)**
i) Feed size to be used
ii) Single roll, double roll, capacity
iii) Advantages and disadvantages as compared with Jaw Crusher and impact crushers.

Table-01 ▸ Effect of the depth of cut and swing angle on dragline production.

Percentage of optimum depth	Angle of swing (degrees)							
	30	45	60	75	90	120	150	180
20	1.06	0.99	0.94	0.90	0.87	0.81	0.75	0.70
40	1.17	1.08	1.02	0.97	0.93	0.85	0.78	0.72
60	1.24	1.13	1.06	1.01	0.97	0.88	0.80	0.74
80	1.29	1.17	1.09	1.04	0.99	0.90	0.82	0.76
100	1.32	1.19	1.11	1.05	1.00	0.91	0.83	0.77
120	1.29	1.17	1.09	1.03	0.98	0.90	0.82	0.76
140	1.25	1.14	1.06	1.00	0.96	0.88	0.81	0.75
160	1.20	1.10	1.02	0.97	0.93	0.85	0.79	0.73
180	1.15	1.05	0.98	0.94	0.90	0.82	0.76	0.71
200	1.10	1.00	0.94	0.90	0.87	0.79	0.73	0.69

Table-02 ▸ Optimum depth of cut and ideal production of short-boom draglines.*

Class of material	Size of bucket [cy (cu m)]†								
	$\frac{3}{8}$ (0.29)†	$\frac{1}{2}$ (0.38)†	$\frac{3}{4}$ (0.57)†	1 (0.76)†	$1\frac{1}{4}$ (0.95)†	$1\frac{1}{2}$ (1.14)†	$1\frac{3}{4}$ (1.33)†	2 (1.53)†	$2\frac{1}{2}$ (1.91)†
Moist loam or light sandy clay	5.0 (1.5)‡ 70 (53)§	5.5 (1.7)‡ 95 (72)§	6.0 (1.8)‡ 130 (99)§	6.6 (2.0)‡ 160 (122)§	7.0 (2.1)‡ 195 (149)§	7.4 (2.2)‡ 220 (168)§	7.7 (2.4)‡ 245 (187)§	8.0 (2.5)‡ 265 (202)§	8.5 (2.6)‡ 305 (233)§
Sand and gravel	5.0 (1.5) 65 (49)	5.5 (1.7) 90 (69)	6.0 (1.8) 125 (95)	6.6 (2.0) 155 (118)	7.0 (2.1) 185 (141)	7.4 (2.2) 210 (160)	7.7 (2.4) 235 (180)	8.0 (2.5) 255 (195)	8.5 (2.6) 295 (225)
Good common earth	6.0 (1.8) 55 (42)	6.7 (2.0) 75 (57)	7.4 (2.4) 105 (81)	8.0 (2.5) 135 (104)	8.5 (2.6) 165 (127)	9.0 (2.7) 190 (147)	9.5 (2.8) 210 (162)	9.9 (3.0) 230 (177)	10.5 (3.2) 265 (204)
Hard, tough clay	7.3 (2.2) 35 (27)	8.0 (2.5) 55 (42)	8.7 (2.7) 90 (69)	9.3 (2.8) 110 (85)	10.0 (3.1) 135 (104)	10.7 (3.3) 160 (123)	11.3 (3.5) 180 (139)	11.8 (3.6) 195 (150)	12.3 (3.8) 230 (177)
Wet, sticky clay	7.3 (2.2) 20 (15)	8.0 (2.5) 30 (23)	8.7 (2.7) 55 (42)	9.3 (2.8) 75 (58)	10.0 (3.1) 95 (73)	10.7 (3.3) 110 (85)	11.3 (3.5) 130 (100)	11.8 (3.6) 145 (112)	12.3 (3.8) 175 (135)

*In cubic yards (cubic meters) bank measure (bcy) per 60-min hour.
†These values are the sizes of the buckets in cubic meters (cu m).
‡These values are the optimum depths of cut in meters (m).
§These values are the optimum ideal outputs in cubic meters (cu m).

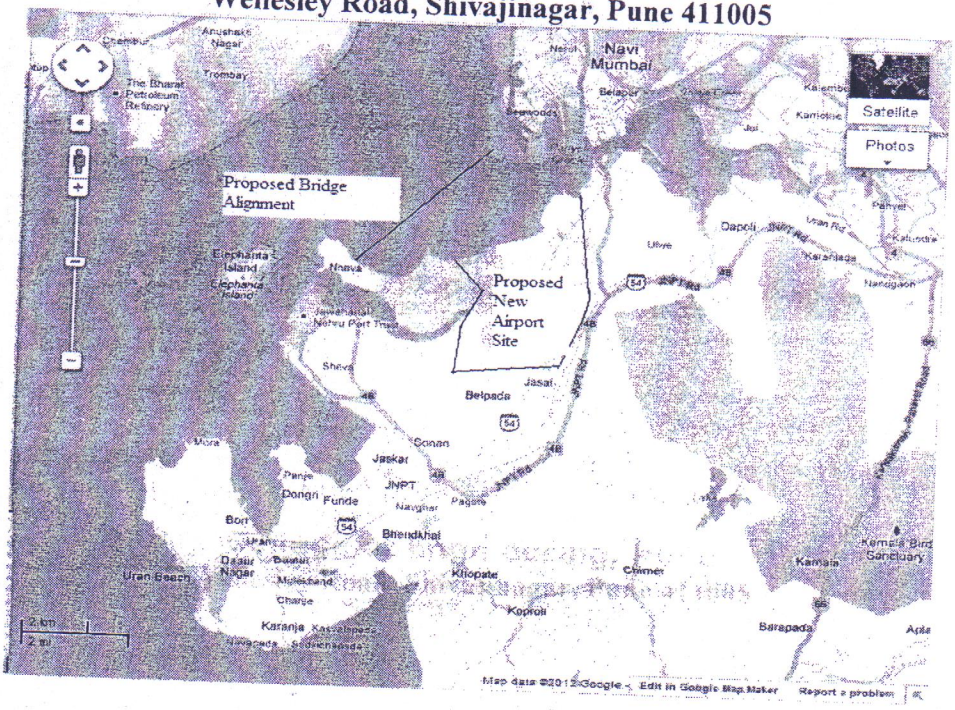

Figure-01

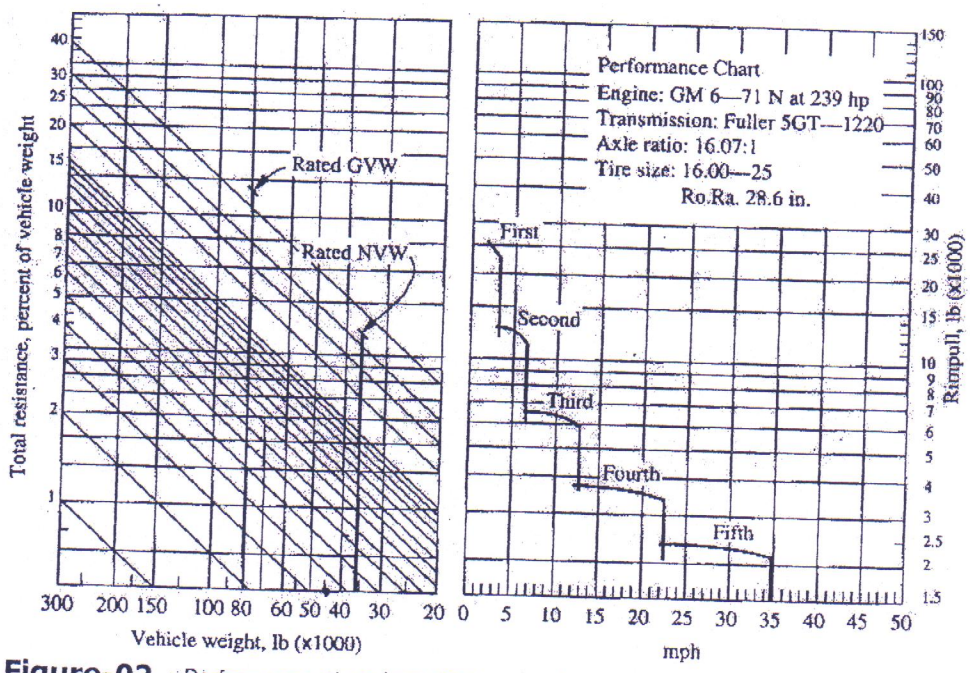

Figure-02 : Performance chart for a 22-ton rear-dump truck.

College of Engineering, Pune
End Semester Exam – May 2012
B. Tech. Civil
(CE 455)- Water Resources Planning and Management

Date- 05/05/2012 Time: - 2 pm to 5pm
Maximum Marks: 50 Duration – 3 hrs.

Instructions:
1. All questions are compulsory.
2. Draw neat figures wherever required.
3. Assume suitable data if necessary.
4. Use of scientific calculator is allowed.

Q.1 A Regulate a hydropower reservoir for a dependable (firm) yield of 150 MCM/month. The live storage capacity of reservoir is 742 MCM. Take a constant head of 320m. The power plant capacity is 210 MW and the overall efficiency is 0.85. Assume reservoir has storage of 230 MCM in the beginning of June. Take the river flows of the year 2006-07 from the table given below. Take 30.417 days every month. 06

Month	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Inflow (MCM)	65	201	342	389	424	110	68	70	50	47	39	35

B Explain standard operating policy of reservoir operation. 02

Q.2 A Calculate the present worth of net benefits for the project with the following data. The project requires 1 year for construction and provides 5 years of benefits after construction. The applicable discount rate is 10%. Each amount is an end-of-year value. 06

Year	Construction cost	Operation cost	Benefits
1	100	-	-
2	-	10	20
3	-	10	40
4	-	10	60
5	-	10	80
6	-	10	100

B Differentiate between optimization and simulation. 02

Q.3 The flow duration curve data at a run-of-river hydro plant site is given below: 08
If the constant head is 50 m and the power plant efficiency is 60%

(i) Calculate total amount of firm energy available,
(ii) If the power plant capacity is 90 kW, calculate the amount of peak energy available
(iii) Calculate the total energy potential available,
(iv) If at least 0.05 cumecs flow must be maintained in the stream for environmental considerations, calculate peak energy available.

Table – Weekly flow duration curve data

Stream discharge in cumecs	0.60	0.35	0.30	0.17	0.12
Period during which discharge is equalled or exceeded in %	8	21	28	80	100

Q.4 A Discuss the type of structures, data needed and analysis required for water conservation and flood control measures for Stage III in respect of a water resources development plan in a river basin. 05

B Discuss the steps involved in planning an irrigation reservoir 03

Q.5 There are two crops to be grown on 120 hectare area (CCA).The other data is given in Table below: 08

Crop	Net return from crop (Rs. 10^3/tonne	Crop Yield (tonnes/ha)	Gross irrigation requirement (m)
1	2	2.2	0.7
2	1.5	3.1	0.4

Also
(i) total water available for irrigation diversion from a reservoir is 600 ha.m
(ii) crop 2 should occupy at least 30 hectare, and
(iii) Area of crop 1 should not exceed 45 hectare.
Formulate and solve an LP model to maximize net returns from the crops.

Q.6 Write short notes on any **Two** 10

a) Inter-state river water disputes in India
b) Inter-basin river water transfers in Indian rivers
c) Integrated river basin management
d) Environmental considerations in planning

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Department of Civil Engineering

College of Engineering Pune (CoEP)

Subject: CE 431 Advanced Environmental Engineering

Programme: BTech (Civil) Max. Marks: 50

End Semester Examination

Instructions to the candidate:

1. All questions are compulsory
2. Assume suitable data if necessary

Q.1. a. Explain with neat sketch rotary atomizer technique of odour control. (3)

b. Enumerate the application of stone crusher dust (2)

c. Explain the procedure for operation of RDS (3)

d. The maximum ground level concentration of SO_2 occurs at a distance x = 850 m. If plumes standard deviation in cross wind direction is 38m, effective height of stack is 80m, plume standard deviation in vertical direction is 56.6 m and the wind velocity at the top of the stack is 8.0 m/sec determine the concentration SO_2 in $\mu g/m^3$. (2)

Q.2 a. What are the objectives of water quality monitoring (2)

b. Write in detail on water quality assurance programme (4)

c. The ratio of head losses (H_{L1}/H_{L2}) through the pipe is 1.8 m/s(where H_{L1} is the head loss through pipe as per Darcy Weisbach Equation and H_{L2} is head loss through pipe as per Hazan Williams formula). If $K_1 = K_2$. Find the corrected discharge through the pipe. (2)

d. What is AQI? Explain in detail how to calculate AQI. (2)

Q.3 a. Explain with neat sketch electrostatic precipitator (3)

b. Explain the Environmental (Protection) Act, 1986 (3)

c. An air streams with a flow rate of 7 m^3/s is passed through a cyclone of standard proportions. The diameter of the cyclone is 2.0m and the air temperature is 77^0C. (Take $\mu = 2.1 \times 10^{-5}$ kg/m.s)

(i) Determine the removal efficiency for a particle with a density of 1.5 g/cm^3 and a diameter of 10 μm.

(ii) Determine the collection efficiency based on the above if a bank of 64 cyclones with diameters of 24 cm are used instead of the single large unit. (4)

Q.4 a. Explain with neat sketch soil washing technology (4)

b. Explain with neat sketch deep well injection method (4)

c. Explain the formation of micelle (2)

Q.5 a. Calculate the SDS loading in mg/g of Al_2O_3 if

(i) Equation of calibration is

$$Y = 0.1943\ x + 0.0055$$

$$R^2 = 0.9927$$

(ii) Absorbance of solute is 2.113

(iii) Volume of collected supernatant = 980 ml

(iv) Dilution used is 0.1 ml of supernatant to make 100 ml of diluted sample

(v) 20 g of SDS and 100g of Al_2O_3 are used. (4)

b. Total volume of wastewater treated to the point of exhaustion and breakthrough in litre are 30.38 and 15.66. The initial solute concentration is 100 mg/L and solute concentration at any time t is 12 mg/L. Assume height of exchange is 6.3 cm and bed depth is 10 cm. Find the percentage of the total column saturated at breakthrough. (3)

c. Explain with neat sketch column study for removal of contaminant (3)

COLLEGE OF ENGINEERING, PUNE

B. Tech. (Civil)

End-Semester Examination, May, 2012

(CE-416) SUSTAINABLE DEVELOPMENT

Day & Date: Saturday, 05/05/2012 Time: 2 PM to 5 PM

[Max. Marks: 50] Duration: 3 Hours

Instructions to Candidates:

1. **Q.1** and **Q. 5** are compulsory
2. Answer **any two** questions in each section from the remaining.
3. Neat diagrams must be drawn wherever necessary
4. Assume suitable data if necessary
5. Figures to the right indicate full marks

Section I

Q.1 Explain the term "Ecological Foot Print" in detail **(09)**

Q.2 What do we mean by EIA? Explain its importance. **(08)**

Q.3 Describe about 'Life Cycle assessment. **(08)**

Q.4 Write a detailed note on Triple Bottom Line. **(08)**

Section II

Q.5 With the help of one example of any construction project, explain how EIA is conducted for the same. **(09)**

Q.6 Explain the importance of learning sustainable development for Civil Engineer. **(08)**

Q.7 Write your views on use of locally available building material for construction. **(08)**

Q.8 Write a note on use of non conventional energy sources to achieve a goal of sustainable development **(08)**

COLLEGE OF ENGINEERING

(Formerly Government College of Engineering, Pune)

END-SEM EXAM: 2011-12: Semester II

(CE-409) Quantity Surveying & Valuation

B. Tech – CIVIL

Timing: 02.00 pm – 05.00 pm | Day & Date: Wednesday 09/05/12

Duration: 3.00 hrs | Max. Marks: 100

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Draw neat diagrams wherever required.
4. Assume suitable data if required and mention it clearly.

Marks

Q.1 Figure no.1 shows the plan & section of a residential building. Take out the quantities for the following items and record the measurements in proper form.

i) Excavation for foundation
ii) B.B. Masonry in c.m. (1:6)
iii) Marble mosaic flooring
iv) External plaster

(20)

Q.2 A) Calculate the present book value of the property from the following data :

i) Built up area of building = 370 sq.m.
ii) Area of the plot = 1,200 sq.m.
iii) Year of construction of building = 1970
iv) Cost of construction = Rs.1000/sq.m.
v) Cost of land purchased = Rs. 100/sq.m.

Assume any other suitable additional data if required and mention it clearly.

(8)

B) An owner has constructed 8 flats on a plot of land measuring 600 sqm. The land was purchased for Rs. six lacs and the cost of construction including all its ancillary costs, electrification etc was Rs. thirty lacs. Eight flats are given on rent to Eight tenants, calculate standard rent for each flat per month assuming following:

i) Owner expects 8% return on cost of construction.
ii) Owner expects 5% Return on cost of land.
iii) Life of building is 75 years.
iv) Sinking fund to be created at 4% interest rate.
v) Annual repair and maintenance cost to be 1% of cost of construction.
vi) Other outgoings including taxes at 30% of net returns from the building.

Assume any other suitable additional data if required and mention it clearly.

(8)

Q.3 A) What is depreciation? Explain various methods of depreciation. (10)

B) What is outgoing? Explain usual types of outgoings.

OR

B) Explain various factors affecting cost of an item of work. (6)

Q.4 A) Explain purpose of specifications and types of specifications. (6)

B) Write in detail specification for **any one** of the following item.

i) Specification for concrete 1:2:4.

ii) Specification for brick work first sort. (10)

Q.5 A) Explain different types of contracts. (6)

B) Explain various types of delays in a construction projects. (5)

C) What is tender and what are different types of tenders.

OR

C) Explain essentials of a valid contract. (5)

Q.6 Write short notes on **any four** of the following

i) Contingencies and work charged establishment
ii) Termination of contract
iii) Rules of deduction for plastering
iv) Information to be given in a tender notice
v) Free hold and lease hold property
vi) Provisional and prime cost items (16)

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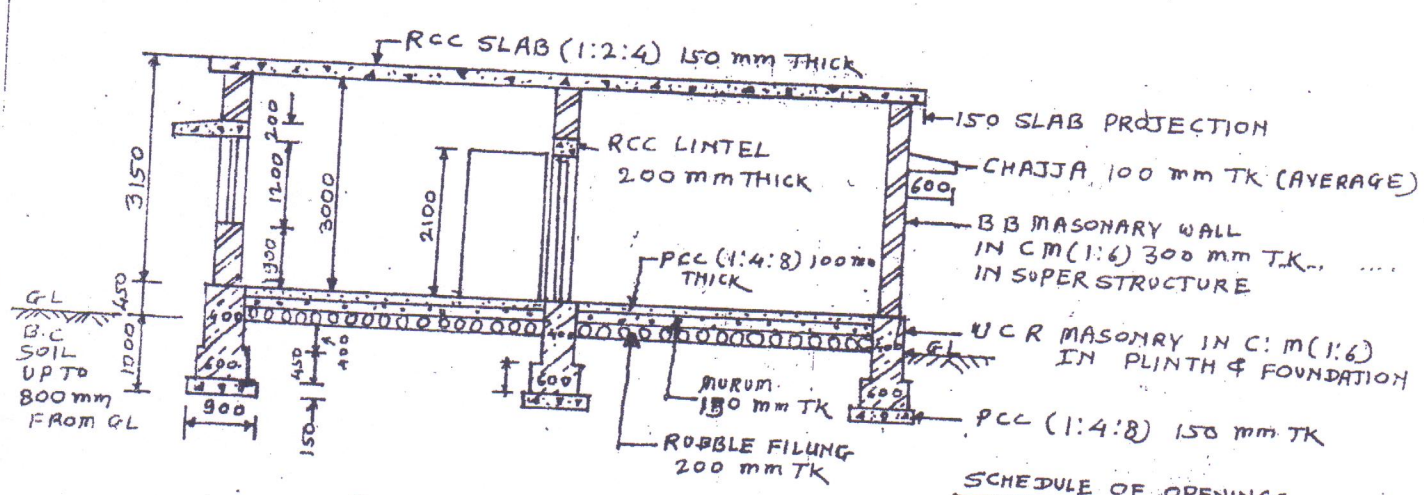
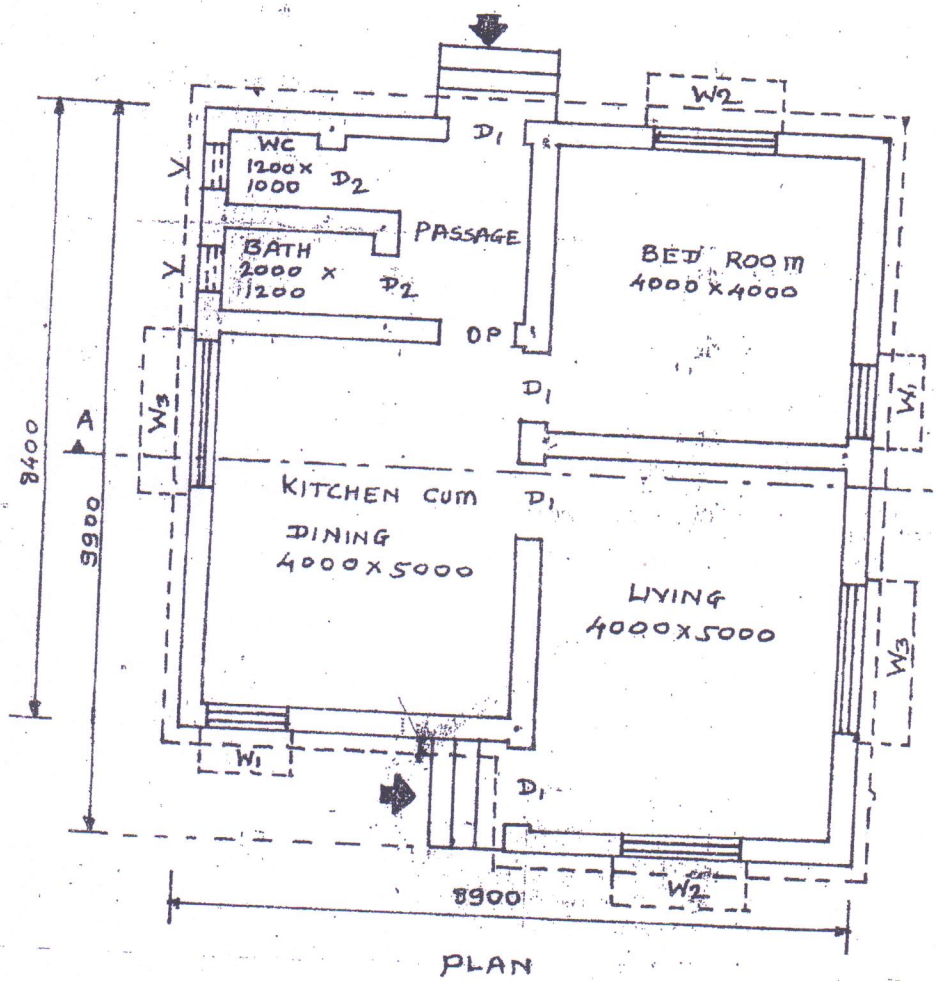
Q. No. 1 (fig. no. 1)



SECTIONAL ELEVATION A-A

SCHEDULE OF OPENINGS

SY.	SIZE	DESCRIPTION
W_1	1000 X 1200	STEEL WINDOW
W_2	1500 X 1200	—— 11 ——
W_3	2000 X 1200	—— 11 ——
V	600 X 600	LOUVERED
D_1	1000 X 2100	CCTW FULLY PANNELED
D_2	800 X 2100	
OP	1000 X 2100	OPENING



PLAN

NOTES

1. HARD MURUM IS AVAILABLE AT 0.8 m DEPTH FROM G.L
2. MARBLE MOSAIC FLOORING IN ALL ROOMS & PASSAGE
3. WHITE GLAZED TILES FOR FLOORING AND DADO IN WC & BATH
4. B.B. MASONRY FOR STEPS. TREAD = 300 mm RISE = 150 mm
5. 15 mm THICK SAND FACED CEMENT PLASTER IN C.M. (1:4) PROVIDED TO ALL EXTERNAL SURFACES OF BRICK MASONRY.
6. 100 mm THICK RCC SLAB (1:2:4) IS PROVIDED OVER WC & BATH AT 2100 mm HEIGHT FROM FLOOR LEVEL

SCALE 1 CM = 1.0 m

ALL DIMENSIONS ARE IN mm

College of Engineering, Pune

Fiber Reinforced Cement Composites

ESE 2011-12

Class : .B.Tech.(CIVIL) Date : 05/05/2012

Time : 2.00P. M to 5.00 P.M Max. Marks : **50**

Instructions : 1. *All questions are compulsory*

2 . Each question carries equal marks.

Q. 1 Explain in detail:-- The composition of Portland cement based microstructure plays a significant role for the properties of composite containing fibers.

Q 2 What is the fracture mechanics approach to predict the strengths of FRCC.

Q 3) What are the basic requirements of coarse aggregates to be used in the preparation of FRCC.

Q 4) Explain in brief about the behavior under flexure of SIFCON.

Q 5) Using Drop Weight test how the evaluation of impact resistance of polymeric fiber-reinforced concrete can be done Explain in detail.

Q 6) Discuss the long term performance of FRCC in regard to corrosion of steel fibers in detail.

Q7) What is the test procedure to evaluate the contribution of fibers to drying shrinkage crack reduction.

Q 8)Comment on creep and shrinkage of GFRC.

Q 9)What are the mechanical properties of thin sheet products.

Q 10)Explain the importance of FRCC in Beam Column connection.

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ALL THE BEST