Bharatiya Vidya Bhavan's

SARDAR PATEL COLLEGE OF ENGINEERING

(An Autonomous Institution Affiliated to University of Mumbai)

<u>Re Exam</u>

Date: 17th Dec 2014
Duration: 4 Hours

Total Marks: 100
Class/Sem: <u>T.E. (Civil), Sem V.</u>   Subject: <u>Building Design & Drawing</u>

1. Attempt any Five out of Seven.
2. Answers to all sub questions should be grouped together.
3. Illustrate answer with neat sketches wherever required.
4. Make suitable assumptions where necessary and state them clearly.
5. Figure to right indicate full marks.

MASTER FILE

Q1) Draw a developed ground floor & first floor plan of residential building G+1 framed structure with the following requirements. Calculate the total built-up area and give schedule of openings. The ext. wall tk. is 230 mm and int. wall tk. is 150 mm. Draw to a scale of 1:50 or suitable. **(20M)**

Sr. No.	Type of Unit	No. of Units	Internal area of No. Unit (in sq.m.)
1	Living room	01	18
2	Bedroom	02	12
3	Additional bedroom with attached toilet	01	16
4	Kitchen	01	12
5	W.C.	02	1.8
6	Bath	02	2.8
7	Staircase	01	Use suitable dimensions

Q2 Design a single-storeyed restaurant building. The following units are to be provided:
  (*i*) Entrance and general stationary shop = 45 m²
  (*ii*) Dining hall = 300 m²
  (*iii*) Service = 35 m²
  (*iv*) Kitchen = 45 m²
  (*v*) Storeroom = 18 m²
  (*vi*) Cloakroom for keeping baggage = 15 m²
  (*vii*) Water closet for gents = 2 nos.
  (viii)Water closet for ladies = 2 nos.
  (ix)Assume any additional suitable data if necessary and mention it clearly with justification.

  Draw to a scale of 1:50 or suitable

(a) Draw Developed Ground Floor Plan showing location of doors and windows. **(15)**
(b) Show line sketches of furniture arrangement in dinning hall and give furniture details **(5)**

page no. 1.

Q3a) Explain the factors affecting orientation of building & state C.B.R.I suggestion for obtaining optimum orientation. **(10)**

Q3b) Explain following principles of planning a) Sanitation & b) Ventilation. **(10)**

Q4a) Explain the bye law of Minimum standard dimensions of building element. **(10)**

Q4b) Explain the principles of town planning and State the necessity of town planning **(10)**

Q5a) Explain briefly growth of town according to origin. **(10)**

Q5b) Draw two point Perspective view of **(Q1) or (Q2)** **(10)**

- Eye level at 2 m above ground level.
- Station point 8 m away from picture plane vertically below the corner of the steps touching the picture plane.
- Draw to suitable.

Q6a) Define green building what are advantages and disadvantage of green building and State the organization related with certification of green building. **(10)**

Q6b) Draw elevation and plumbing layout for the structure you have planned in **Q1 or Q2** with schedule. **(10)**

Q7a) Draw a cross sectional elevation passing through the stairs, a door & window and a sanitary unit for the structure you has planned in **Q.1. Or Q.2** With Construction notes. **(20)**

page no. 2.

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Bharatiya Vidya Bhavan's
SARDAR PATEL COLLEGE OF ENGINEERING
(An Autonomous Institution Affiliated to University of Mumbai) 01st Nov 2014.

Date:

Total Marks: 100 T.E (civil), Sem -V **Duration: 4 Hours**

Class/Sem: T.E. (Civil), Sem V. **Subject:** <u>Building Design & Drawing</u>

1. **Attempt any Five out of Seven.**
2. **Answers to all sub questions should be grouped together.** Master
3. **Illustrate answer with neat sketches wherever required.**
4. **Make suitable assumptions where necessary and state them clearly.**
5. **Figure to right indicate full marks.**

Q1) A R.C.C. framed G + 1 Bungalow is to be planned in a plot of land 280 square meter The maximum permissible plinth area is 100 sq. m. while the total built up area is 200 sq. m. Following accommodation is to be provided:

Ground floor- Living room, Kitchen cum dining room and Master bedroom with attached w.c.& bath.

First floor -- Children's Bed room, Guest room and study room.

Provide adequate sanitary units, passage, verandah, staircase etc.

a) **Draw Developed Ground Floor Plan showing location of doors and windows.** (15)

b) **Draw a Front Elevation** (5)

Q2) It is proposed to construct a load bearing structure of Post-office with the following data

(i) Entrance–cum–waiting space = 50 sq.m.
(ii) Public dealing counter (six in numbers) = total 30 sq.m.
(iii) Working space for other staff = 35 sq.m.
(iv) Post separation room = 30 sq.m
(v) Post-master office = 15 sq.m.
(vi) Storeroom = 15 sq.m
(vii) Meeting room = 20 sq.m.
(viii) Sanitary units: as per standards
(ix) All passages = 2000 mm wide
(x) Assume any additional suitable data if necessary and mention it clearly with justification:

(a) **Draw Developed Ground Floor Plan showing location of doors and windows.** (15)

(b) **Show line sketches of furniture arrangement.** (5)

Q3a) Write a short note on Indus valley civilization. **(8)**

Q3b) State the features of satellite town. **(4)**

Q3c) Draw Electric layout of the structure planned in **Que 2** with Electric schedule. **(8)**

Q4a) Write short note on GRIHA **(8)**

Q4b) Draw two point Perspective view of **(Que 1)** **(12)**
- Eye level at 2 m above ground level.
- Station point 9 m away from picture plane vertically below the corner of the steps touching the picture plane.
- Draw to suitable.

Q5a) What orientation would you suggest for locating building in. **(4)**
  i) Mumbai   ii) Delhi   iii) Himachal Pradesh   iv) Tamilnadu

Q5b) State the architectural compositions and explain Mass Composition and Contrast. **(6)**

Q5c) State the principles of planning and explain Circulation and Privacy **(10)**

Q6a) Explain the following Submission drawing & Working Drawing. **(8)**

Q6b) Draw Drainage plan & Give Staircase design of the structure you have planned in **Que 1 or Que 2** **(12)**

Q7a) Draw a cross sectional elevation passing through the stairs, a door & window and a sanitary unit for the structure you has planned in **Que.1**. or **Que 2** With Construction notes. **(20)**

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T.E. (civil) sem V - Re- exam.

SARDAR PATEL COLLAGE OF ENGINEERING
[An Autonomous Institution Affiliated to University of Mumbai]

Class: T.E (CIVIL) [Sem: V]
Subject: Entrepreneurship & Management

Exam: Re- EXAM

Marks: 100. (3 hours.)

Instruction:

Date: 20/12/2014

1. Attempt any five.
....

MASTER FILE -

Q.1. a) Explain the concept of Entrepreneur and Entrepreneurship? Also explain the difference between

them?   (10 marks)

b) What are the different factors affecting to entrepreneurship process?   (10 marks)

Q.2. a) Discuss the various classification/types of entrepreneurs along with one examples.   (10 marks)

b) Explain the Maslows need for hierarchy theory for motivation?   (10 marks)

Q.3. a) Describe contribution made by "Elton Mayo" human relation approach towards management?

(10 marks)

b) Describe contribution made by "Henry Fayol" towards Administrative approach

management?   (10 marks)

Q.4. a) what do you mean by the Project? Explain the stages, identification, selection of project?

(10 marks)

b) What are different sources & types of finance available for entrepreneurship in India?

(10 Marks)

Q.5. a) Define the small scale industry and also Highlight the chief characteristics of it?   (10 marks)

b) Explain in detail various steps to be followed in start up the small scale industry?   (10 marks)

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Q.6. a) Write short note on: Pay-back period.   **(4 Marks)**

b) An initial investment in plant & machinery of ₹12000 is expected to generate cash flows of ₹ 2342, ₹2200, ₹3850, ₹5230 at the end of first, second, third & fourth year respectively. At the enfd of fourth year machines will be sold for ₹650 as salvage value. Calculate the net present value of the investment if the discount rate is 11%.   **(6 Marks)**

c) Journalize the following transactions in the books of Mr. Rahul for Dec 2014 & also post them in ledger for cash account only.   **(10 marks)**

Date	Transactions	Amount
1	He started the business with cash	300000
3	Sold goods to Mr.Amar for cash	1600
8	Purchased goods on credit from rakesh.	34000
10	Paid office rent by cheque of Bank of india	4800
12	Paid commission to Raj	600
16	Purchased furniture from SHAH furniture Mart	11000
19	Deposited money in bank of india	20000
24	Returned goods to Mr.Nagesh	2000
26	Received interest	17000

Q.7. Write short notes on: - (any four)   **(20 marks)**

  i.   SWOT analysis.
  ii. Environment for Entrepreneurship.
  iii. Break-Even analysis
  iv. Barriers affecting to Entrepreneurship.
  v.   Importance of Small Scale Industries in India.
  vi. Line & line-staff Organisation.

SARDAR PATEL COLLAGE OF ENGINEERING
[An Autonomous Institution Affiliated to University of Mumbai]

Class: T.E (CIVIL) [Sem: V]
Subject: Entrepreneurship & Management

Exam: End Semester EXAM   **Marks: 100. (3 hours.)**

Instruction: Date: 11-11-2014

1. **Attempt any five.**   *Master*

....

Q.1. a) Explain the concept of Entrepreneur & Entrepreneurship with one examples?   **(10 marks)**

b) What are the different kinds of characteristics should possess by entrepreneur? (Any ten)

                                                              (10 marks)

Q.2. a) Discuss the various classification/types of entrepreneurs along with one examples.   **(10 marks)**

b) Explain the McClelland Need for Achievement Theory with Kakinada experiments?   **(10 marks)**

Q.3. a) Describe contribution made by "Fredrick Taylor" towards scientific management?   **(10 marks)**

b) Describe contribution made by "Henry Fayol" towards Administrative approach

management?   **(10 marks)**

Q.4. a) what do you mean by the Project? Explain the formulation of project?   **(10 marks)**

b) What are different sources & types of finance available for entrepreneurship in India?

                                                              (10 Marks)

Q.5. a) Define the small scale industry and also Highlight the chief characteristics of it?   **(10 marks)**

b) Explain in detail various steps to be followed in start up the small scale industry?   **(10 marks)**

Q.6. a) Write short note on: Break-even analysis.   **(4 Marks)**

b) An initial investment in plant & machinery of ₹ 11000 is expected to generate cash flows of ₹
2342, ₹ 3200, ₹ 4850, ₹ 6230 at the end of first, second, third & fourth year respectively. At the
enfd of fourth year machines will be sold for ₹ 800 as salvage value. Calculate the net present
value of the investment if the discount rate is 13%.   **(6 Marks)**

c) Journalize the following transactions in the books of Mr. Raheja for Oct 2014 & also post them in ledger for cash account only. **(10 marks)**

Date	Transactions	Amount
1	He started the business with cash	300000
3	Received interest	1600
8	Purchased goods on credit from Devang.	34000
10	Paid office rent by cheque of Bank of india	4800
12	Paid commission to Rajkumar	600
16	Deposited money in bank of india	20000
19	Sold goods to Mr.Anwar for cash	7500
24	Returned goods to Mr.Narayan	2000
26	Purchased furniture from Keshav furniture Mart	17000

Q.7. Write short notes on: - (any four) **(20 marks)**

  i.   SWOT analysis.
  ii.   Discounted Cash Flow Technique.
  iii. Social-Cost benefit analysis.
  iv.   Matrix & Functional Organization.
  v.   Importance of Small Scale Industries in India.
  vi.   Line & line-staff Organisation.

Bharatiya Vidya Bhavan's
SARDAR PATEL COLLEGE OF ENGINEERING
(An Autonomous Institution Affiliated to University of Mumbai)
RE-EXAM

TE (Civil), sem-V, Re-exam Date: 16 December 2014

Total Marks: 100 **Duration: 3 Hours**

CLASS/SEM: T.E. Sem. V. (Civil),   **SUBJECT: Geotechnical Engineering - I**

Master

- Attempt any FIVE questions out of SEVEN questions.
- Answers to all sub questions should be grouped together.
- Figure to right indicate full marks.
- Make suitable assumptions where necessary and state them clearly.

Q1. **a)** From the first principles, with usual notations, prove that   **(05)**

$$\gamma_d = \frac{\gamma_b}{(1+m)}$$

b) Explain the following terms: coefficient of consolidation, degree of   **(05)** consolidation, time factor, pre-consolidation pressure and compression index.

c) Explain the UU laboratory shear test on soil with respect to the following points: **(10)**
Schematic showing stresses acting on soil sample
Procedure
Typical graphs
Typical results

Q2. **a)** Differentiate between standard and modified Proctor tests   **(05)**

b) Explain the importance of conducting geotechnical investigations for a   **(05)** construction project.

c) Draw a typical grain size distribution curve for a well graded soil and a gap   **(10)** graded soil. Explain how you will determine D_{10}, D_{30}, D_{60}, Cu and Cc. State the how you can determine if a soil is well graded or not, based on this.

Q3. **a)** A 1000cc container was filled with sand in its loosest possible state and then   **(05)** compacted to densest possible state. The dry weight of the sand was noted as 1608 gm and 1932 gm respectively. The in-situ sand has a void ratio of 0.64 and its specific gravity is 2.67. Determine the relative density of the sand in-situ.

b) In a falling head permeability test, the following observations were noted: **(05)**
  i. Cross-section of specimen = 15 cm^2
  ii. Cross-section of stand pipe = 0.075^2
  iii. Length of specimen = 10 cm
  iv. Initial head above datum = 27.5 cm

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     v. Head after 5 min = 20 cm

    Determine the coefficient of permeability

  c) Derive Laplace's equation for flow in two dimensions   **(10)**

Q4. a) State Darcy's Law and assumptions he made.   **(05)**

  b) Calculate the compression index for an NC clay soil with LL = 65%.   **(05)**

  c) In a direct shear test (box size 6cm x 6cm) on a sandy silt sample, the following **(10)** observations were made. Determine the shear parameters. Also calculate the magnitude and orientation of principle stresses for the second sample.

Sample No.	Normal Load (kN)	Shear Load (kN)
1	45.00	30.00
2	84.60	57.60
3	124.12	85.32

Q5. a) The following soil profile and properties were obtained from a site: **(10)**

    0 to 2m – Silt (γ_b = 1.7 t/m^3)

    -2m to 12m – Sand (γ_b = 1.82 t/m^3) and (γ_{sat} = 1.95 t/m^3)

    GWT at 3.0m from ground surface.

    12m to 17m – NC clay (γ_{sat} = 1.87t/m^3) having (LL = 67%, NMC = 45% and G =2.66)

    Additional load due to construction of a structure is estimated to be 4.1t/m^2 at the center of the clay layer. Estimate the magnitude of consolidation settlement.

  b) Explain in detail any five factors affecting permeability   **(10)**

Q6. a) Draw the total pressure, effective pressure and hydrostatic pressure diagram for **(05)** a soil 8 m thick, having ground water level at 3 m below ground surface and dry unit weight 17.5 kN/m^3 and saturated unit weight as 19.7 kN/m^3.

  b) Draw typical curves showing Standard and Modified Proctor Test results. What **(05)** is the zero air voids line?

  c) For an NC soil, drained Triaxial test was conducted with confining pressure of **(10)** 16kN/m^2 and deviator stress at failure was noted as 41kN/m^2. Determine angle of friction and comment on value of cohesion. Determine the angle that the failure plane makes with the principal plane and also draw Mohr's circle.

Q 7. a) Write a short note on soil as a three phase system. Also illustrate saturated and **(05)** dry soil conditions.

  b) With a neat sketch explain the construction and use of a split spoon sampler.   **(05)**

  c) Explain the procedure of determining the liquid limit of a soil sample   **(10)**

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SARDAR PATEL COLLEGE OF ENGINEERING
(An Autonomous Institution Affiliated to University of Mumbai)

Total Marks: 100   TE.(Civil), Sem- V   Date: 30th October 2014
Duration: 3 Hours

CLASS/SEM: T.E. Sem. V (Civil)   SUBJECT: Geotechnical Engineering - I

Master

- Attempt any FIVE questions out of SEVEN questions.
- Answers to all sub questions should be grouped together.
- Figure to right indicate full marks.
- Make suitable assumptions where necessary and state them clearly.

Q1. **a)** From the first principles, with usual notations, prove that   (05)

$$\gamma_{sat} = \frac{(G+e)\gamma_w}{(1+e)}$$

b) Explain the spring analogy for primary consolidation of saturated soil with neat sketches.   (05)

c) A thin layer of silt exists at a depth of 18 m below ground surface. The ground water table is at ground level and the bulk unit weight of the soil up to 18 m is determined to be 2.1 g/cc. The shear parameters on undisturbed sample of silt were determined as follows: (10)

$c_u = 45 kN/m^2$, $\phi_u = 18^o$, $c' = 35 kN/m^2$ and $\phi' = 27^o$.

Estimate the shearing resistance of the silt on a horizontal plane when

(i) the shear stress builds up rapidly

(ii) the shear stress builds up slowly.

Q2. **a)** Differentiate between compaction and consolidation   (05)

b) Draw a typical borelog and show all information obtained from the field.   (05)

c) Classify the following soil as per IS 1498:   (10)

IS Sieve	Soil A % Finer	Soil B % Finer
4.75 mm	100	-
2 mm	98	-
600 m	86	100
200 m	66	95
75 m	37	74
LL	Non-plastic	32%
PL		24%

Q3. **a)** A core cutter was used to determine the field density of the soil at a site. **(05)** Determine the void ratio and field density of the soil based on the following observations:

Core cutter internal diameter = 100 mm
Core cutter height = 130 mm
Weight of empty core cutter = 1989 g
Weight of soil from field + core cutter = 3869 g
Moisture content of sample = 22.4%

b) What is a flow net? Explain its characteristics with a neat sketch. **(05)**

c) Explain in detail the square root of time fitting method to determine the **(10)** coefficient of consolidation from laboratory data.

Q4. **a)** Explain what is meant by quick sand condition. What is the difference **(05)** between permeability and seepage?

b) Draw Mohr's circle for a c-f soil. From the first principles, derive the **(05)** relationship between σ_1 and σ_3 for the same soil.

c) The following data was noted during a modified proctor test conducted in **(10)** the laboratory. Determine the OMC and MDD of the soil.

Trial Number	1	2	3	4	5
Weight of mould + soil (g)	3771	3860	3949	3959	3934
Weight of empty mould (g)	2017				
Volume of mould	Standard Mould as per IS 2720				
Moisture content	12%	14%	17%	18%	22%

Q5. **a)** Geotechnical investigations at a site have indicated that the sub-surface **(10)** profile at a site consists of 5 m thick layer of NC clay sandwiched between two layers of sand as shown in **Figure 1**. Groundwater table was observed 1.0 m below the existing ground surface. The bulk and saturated unit weights of sand were determined as 17.0 and 18.5 kN/m³. An oedometer test carried out on an undisturbed sample obtained from the center of the clay layer showed that the compression index was 0.75. The natural water content of the clay was 42.5% and specific gravity was 2.74. An industrial structure was proposed to be constructed at this site which would impose 30kPa on the ground surface. Estimate the final consolidation settlement of the industrial structure, assuming the settlement in sand to be negligible.

b) What is the Standard Penetration Test? Explain in detail. **(10)**

Q6. **a)** A 10m thick sandy silt is underlain by intact impermeable rock. The water **(05)** table is at 3 m below existing ground surface. During a pumping out test, at steady state, water is being pumped out of a 450 mm diameter well at

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the rate of 5140 liters per minute. Two observation wells at a distance of 3.5 and 25.0 m noted a drop in water levels by 2.5 m and 1.2 m respectively. Determine the permeability of the soil.

b) What are the various causes of slope failures? Illustrate the different types (05) of failures of a slope.

d) Plot the variation of total, neutral and effective stress for a 15 m thick (10) saturated clay layer situated below the bottom of a lake 6 m deep. The average water content of the clay is 40% and specific gravity is 2.65.

Q 7. a) Explain the Swedish Circle method of determining the stability of slopes. (05)

b) A sample of dry sand is tested under triaxial conditions. If the angle of (05) friction is 38^0 and the minor principal stress is 250 kPa, determine graphically the major principal stress at which the sample will fail.

c) Derive an expression for the average permeability of a stratified soil (10) deposit when the flow is

(i) perpendicular to the bedding planes

(ii) parallel to the bedding planes.

Figure 1.
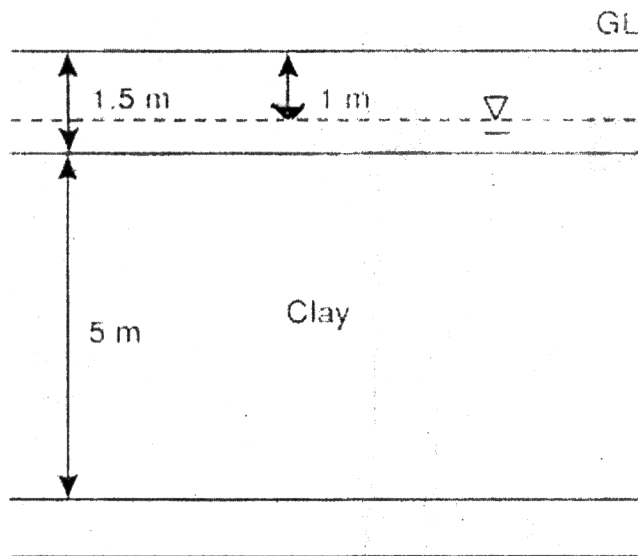
GL

1.5 m   1 m

5 m   Clay

Bharatiya Vidya Bhavan's
SARDAR PATEL COLLEGE OF ENGINEERING
(An Autonomous Institution Affiliated to University of Mumbai)
KT Paper (OLD)

Total Marks: 100   T. E. (CIVIL), Sem. V   **Date: 30th October 2014**
Duration: 3 Hours

CLASS/SEM: T.E. Sem. V. (Civil))   **SUBJECT:** Geotechnical Engineering - I

Master

- Attempt any FIVE questions out of SEVEN questions.
- Answers to all sub questions should be grouped together.
- Figure to right indicate full marks.
- Make suitable assumptions where necessary and state them clearly.

Q1.	a)	From the first principles, with usual notations, prove that $$e = (\gamma_w \cdot G / \gamma_d) - 1$$	(05)
	b)	Draw a typical borelog and show all information obtained from the field.	(05)
	c)	Explain the various parameters that affect the permeability of soil.	(10)
Q2.	a)	Differentiate between compaction and consolidation	(05)
	b)	Explain the spring analogy for primary consolidation of saturated soil with neat sketches.	(05)
	c)	Define relative density and explain the method to obtain the same in a laboratory, given the density of a sample in the field.	(10)
Q3.	a)	A core cutter was used to determine the field density of the soil at a site. Determine the void ratio and field density of the soil based on the following observations: Core cutter internal diameter = 100 mm Core cutter height = 130 mm Weight of empty core cutter = 1989 g Weight of soil from field + core cutter = 3869 g Moisture content of sample = 22.4%	(05)
	b)	What is a flow net? Explain its characteristics with a neat sketch.	(05)
	c)	Explain in detail the log of time fitting method to determine the coefficient of consolidation from laboratory data.	(10)
Q4.	a)	Explain what is meant by quick sand condition. What is the difference between permeability and seepage?	(05)
	b)	Draw Mohr's circle for a c-ϕ soil. From the first principles, derive the relationship between σ_1 and σ_3 for the same soil.	(05)

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	c)	The following data was noted during a modified proctor test conducted in the laboratory. Determine the OMC and MDD of the soil.						(10)

Trial Number	1	2	3	4	5
Weight of mould + soil (g)	3771	3860	3949	3959	3934
Weight of empty mould (g)	2007				
Volume of mould	Standard Mould as per IS 2720				
Moisture content	11%	13%	16%	17%	21%

Q5.	a)	A clay layer is expected to show a total settlement of 30mm. If it settles by 3mm at the end of 4 months after application of load, how much settlement will occur in 12 months?	(05)
	b)	Differentiate between void ratio and porosity	(05)
	c)	What is the Standard Penetration Test? Explain in detail.	(10)
Q6.	a)	A 10m thick sandy silt is underlain by intact impermeable rock. The water table is at 3 m below existing ground surface. During a pumping out test, at steady state, water is being pumped out of a 450 mm diameter well at the rate of 5000 liters per minute. Two observation wells at a distance of 3.8 and 23.0 m noted a drop in water levels by 2.5 m and 1.2 m respectively. Determine the permeability of the soil.	(05)
	b)	Draw typical curves showing Standard and Modified Proctor Test results. What is the zero air voids line?	(05)
	d)	Draw the total pressure, effective pressure and hydrostatic pressure diagram for a soil 8 m thick, having ground water level at 3 m below ground surface and dry unit weight 19 kN/m^3 and saturated unit weight as 20.5 kN/m^3. Assume capillary rise of 1 m above the ground water table.	(10)
Q 7.	a)	State Darcy's Law and assumptions he made.	(05)
	b)	A sample of dry sand is tested under triaxial conditions. If the angle of friction is 35° and the minor principal stress is 260 kPa, determine graphically the major principal stress at which the sample will fail.	(05)
	c)	In a direct shear test (box size 6cm x 6cm) on a sandy silt sample, the following observations were made. Determine the shear parameters. Also calculate the magnitude and orientation of principle stresses for the second sample.	(10)

Sample No.	Normal Load (kN)	Shear Load (kN)
1	0.36	0.18
2	0.54	0.24
3	0.72	0.31

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Bharatiya Vidya Bhavan's

Sardar Patel College of Engineering

(An Autonomous Institution Affiliated to University of Mumbai)

Department of Civil Engineering

Re-Examination-December 2014

2014-2015

Class/Sem: T.E. Civil Sem. V   Subject: **Hydraulic Engineering-I**

Max. Marks: 100

Duration: 3 hours

- Solve **any five questions** out of seven.
- Answer to all sub questions should be grouped together.
- **Figure** to right indicates full marks.
- Assume suitable data wherever necessary and state it **clearly**.   MASTER FILE.

Q.No.1.	(a)	Three pipes of diameters 20, 30 and 25 cm. having length 250, 150 and 200 meter each has friction factor as 0.019, 0.020 and 0.018 respectively are arranged in series and connect the reservoirs with elevation difference of 30 m. Considering minor losses; determine discharge and draw HGL and TEL. (10)
	(b)	A siphon of length 800 m has its vertex 7 meters above the water level in the upper reservoir. The length of inlet leg of siphon is 200 m and total head loss in siphon is 20 m. Determine diameter of the siphon such that pressure at summit do not fall below vapour pressure of water. Take f = 0.021. (10)
Q.No.2.	(a)	A water sprinkler has 8 mm dia. Nozzles at either end of a rotating arm each of which is discharging water in opposite direction at right angles to the rotating arm, at a velocity of 10 meter/sec. If the axis of rotation is at a distance of 25 cm from one end and 15 cm from the other. If friction is neglected, determine the torque required to hold the arm stationary. Also determine constant angular speed of the arm. (10)
	(b)	Find the force on a 45^0 horizontal reducing pipe bend of size 20 cm x 10 cm carrying 200 liters/sec of water at an inlet pressure of 20 meters. (10)
Q.No.3.	(a)	A jet of water having velocity of 25 m/s strikes on a series of radial curved vanes mounted on a wheel which is rotating at 225 rpm. The jet makes an angle of 20° with tangent to the wheel at inlet and leaves the wheel with velocity of 5 m/s at angle of 130° to tangent to wheel at outlet. Water is flowing outward in a radial direction. The outer and inner radii of wheel are 0.5 m and 0.25 m respectively. Determine : (i) Vane angle at inlet and outlet, (ii) workdone per unit weight of water, (iii) Efficiency of wheel. (10)
	(b)	Show that the efficiency of a free jet striking normally on a series of flat plates mounted on the periphery of a wheel can never exceed 50%. (10)

page no. 1

p.t.o.

Q.No.4. (a) Classify turbines. Explain factors governing selection of type of turbine to be used in a hydroelectric project. **(06)**

(b) Write short notes on: Specific speed of hydraulic turbine. **(06)**

(c) A Kaplan turbine runner is to be designed to develop 9000 kw. The net available head is 5.6 m. If the speed ratio = 2.09, flow ratio = 0.60, overall efficiency = 86% and diameter of the boss is one third the diameter of the runner. Find the diameter of the runner, its speed and the specific speed of the turbine. **(08)**

Q.No.5 (a) What is priming? Where it is required? Why it is important? Explain. **(10)**

(b) The impeller of a centrifugal pump is 30 cm in diameter and 6cm wide at the periphery. The blades are inclined backwards such that the blade tips make an angle of 60^0 from the radius. The pump delivers 16 m³/min and the impeller rotates at 950 rpm. Assuming, radial flow. Determine: **(10)**

(i) Speed and direction of water as it leaves the impeller,

(ii) Shaft power required, and

(iii) Lift of the pump.

Q.No.6. (a) Explain in brief working of (*any two*): **(10)**

(i) Hydraulic Ram,

(ii) Hydraulic press,

(iii) Hydraulic accumulator

(b) Explain concept of Velocity Triangles and Draw velocity triangles for (*any two*) **(10)**

(i) Pelton Wheel,

(ii) Francis Turbine,

(iii) Centrifugal Pump

Q.No.7. (a) Derive an expression for mean velocity for laminar flow through a pipe. **(10)**

(b) Oil of viscosity 0.10Pa.s. and specific gravity 0.90, flows through a horizontal pipe of 25 mm diameter. If the pressure drop per meter length of the pipe is 12 kPa, determine: **(10)**

(i) The rate of flow in N/min,

(ii) the shear stress at the pipe wall,

(iii) The Reynold's number of the flow; and

(iv) The power required per 50 m length of pipe to maintain the flow.

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page no. 2.

Bharatiya Vidya Bhavan's

Sardar Patel College of Engineering

(An Autonomous Institution Affiliated to University of Mumbai)

End Semester Examination-Oct-Nov. 2014

2014-2015

Class/Sem: T.E. Civil Sem. V (_OLD_) – (As per the University Syllabus pattern)

Subject: Hydraulic Engineering-I

Max. Marks: 100

Duration: 3 hours

- Solve **any five questions** out of seven.

- Answer to all sub questions should be grouped together.

- **Figure** to right indicates full marks.

- Assume suitable data wherever necessary and state it **clearly**.

master

Q. No.1. Write short notes on: _(any four)_ (4*5 marks each)   (20)

    (a) Hydraulic crane

    (b) Multistage pumps

    (c) Cavitations in turbines

    (d) Rayleigh's method

    (e) Impulse momentum principle

Q. No.2. **(a)** A pipe of 30 cm diameter carrying 0.35 cum/sec of water has a right angled (10)
bend in a horizontal plane. Find the resultant force exerted on the bend if the
pressure at inlet and outlet of the bend are 250 kN/m^2 and 225 kN/m^2.

    (b) A lawn sprinkler has two nozzles of diameter 1 cm each at the end of the (10)
rotating arm and the velocity of flow of water from each nozzle is 10 meter/sec.
Both the nozzles are discharging water in opposite direction to each other. The
nozzles are at a distance of 30 cm. from the center of the rotating arm.
Determine the torque required to hold the sprinkler stationery and also
determine the constant speed of rotation of arm, if it is free to rotate.

Q. No.3. **(a)** Write short notes on: (10)
      (i) Distorted and undistorted models.
      (ii) Dimensional homogeneity.

    (b) The pressure difference between two points 'ΔP' in a pipe of diameter 'D' and (10)
length 'L' due to turbulent flow depend on velocity of flow 'V', viscosity of
fluid 'μ', density of fluid 'ρ' and roughness 'K'. Obtain an expression for 'ΔP'
using Buckingham's-π theorem.

Q. No.4. (a) Show that the efficiency of a free jet striking normally on a series of flat plates (10)
mounted on the periphery of a wheel can never exceeds 50%.

(b) A stationary vane having an inlet angle of zero degrees and an outlet angle of (10)
35^0 receives water at a velocity of 45 m/sec. Determine:

(i) The components of forces acting on it in the direction of the jet velocity and normal to it.

(ii) The resultant force in magnitude and direction.

(iii) If the vane is stated to move with a velocity of 15 m/sec in the direction of the jet, calculate the force components in the direction of the vane velocity and across it.

(iv) The resultant force in magnitude and direction when vane is stated to move.

Q. No.5. (a) Explain with neat sketch: (10)

(i) Working of a hydroelectric power plant.

(ii) Working of draft tube.

(b) A Kaplan turbine working under head of 32 m develops 15000 kW shaft power. (10)
The outer diameter of runner is 4 m and hub diameter is 2 m. The guide blade angle is 35°. The hydraulic and overall efficiencies are 88% and 84% respectively. If the velocity of whirl is zero at the outlet, determine runner vane angles at inlet and outlet, and speed of turbine.

Q. No.6. (a) Write short notes on: (10)

(i) Manometric head of a centrifugal pump.

(ii) Net Positive Suction Head (NPSH).

(b) Find the outlet blade angle for a centrifugal pump discharging 120 liters per (10)
second at 1450 rpm against head of 18 m. Take impeller diameter as 25 cm, outlet width is 6 cm and manometric efficiency 85%.

Q. No.7. (a) Explain in brief: Importance of priming in a centrifugal pump. (05)

(b) Differentiate between: pumps in series and pumps in parallel. (05)

(c) Explain working of: (10)

(i) Hydraulic intensifier.

(ii) Hydraulic press.

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Bharatiya Vidya Bhavan's

Sardar Patel College of Engineering
(An Autonomous Institution Affiliated to University of Mumbai)
Department of Civil Engineering
End Semester Examination-October. 2014
2014-2015

Class/Sem: T.E. Civil/Sem. V   Subject: **Hydraulic Engineering-I**

T·E (CIVIL), Sem -V

Max. Marks: 100
Duration: 3 hours

master

- Solve **any five questions** out of seven.
- Answer to all sub questions should be grouped together.
- **Figure** to right indicates full marks.
- Assume suitable data wherever necessary and state it **clearly**.

Q.No.1.   (a)   Give examples for the different types of minor losses in pipe flow and express the loss   (05)
function in terms of the velocity head.

        (b)   Obtain the condition for transmission of maximum power through a pipe when the   (05)
loss of head is due to friction only.

        (c)   Three pipes connected in series carries water from 75 meter level to 40 meter level.   (10)
Details of piping system are as given in **Table 1** below. Considering minor losses:
determine discharge and plot HGL and TEL.

Table 1.

Pipe	Length (m)	Diameter (cm)	Friction Factor (f)
1	1000	20	0.015
2	900	10	0.025
3	1100	15	0.020

Q.No.2.   (a)   Explain: Impulse-momentum principle with an example.   (05)

        (b)   How Lawn sprinkler works? Explain its working principle.   (05)

        (c)   A lawn sprinkler which has 1 cm diameter nozzles at the ends of a horizontal rotating
arm, discharges water with a velocity of 6 m/sec as shown in **Figure 1**. Determine:

          (i)   The torque required to hold the rotating arm stationary.   (10)

          (ii)   The constant speed of rotation when not held.

Figure 1.

15 cm   15 cm

30⁰

30⁰
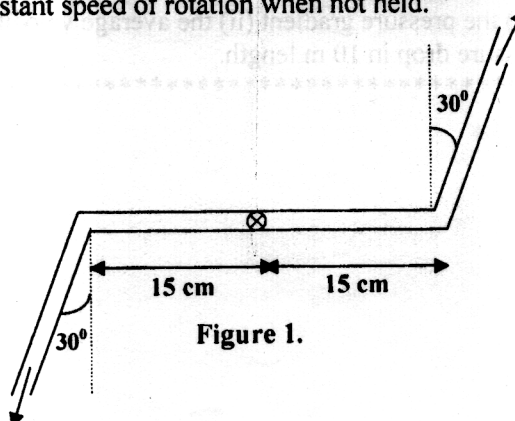
Q.No.3. (a) The jet strikes tangentially at one end of a smooth curved vane moving in the same direction as the jet. The jet gets reversed at the end of the vane. Show that the maximum efficiency is 59.30 %. Neglect friction. **(10)**

(b) Water jet at the rate of 10 kg/sec strikes the series of moving blades at a velocity of 50 m/sec. The blade angles with respect to the direction of motion are 35^0 (inlet) and 140^0 (outlet). If the peripheral speed is 25 m/sec, determine the inclination of the jet so that water enters the blades without shock. Also calculate the power developed and the efficiency of the system. Assume blades are mounting on the periphery of the wheel. **(10)**

Q.No.4. (a) Explain how unit quantities are useful in predicting the performance of a given hydraulic machine under various input output conditions. **(05)**

(b) Define speed ratio and flow ratio and explain its importance w.r.t. hydraulic turbines. **(05)**

(c) In an inward flow reaction turbine the diameter at inlet and outlet are 1.20m and 0.70 m. The hydraulic efficiency is 92%. When the head is 40m. The velocity of flow at outlet is 2 m/sec. The discharge at outlet is radial. The vane angle at outlet is 15^0. Flow width is 0.10 m. at inlet and outlet. Determine (i) the guide blade angle (ii) speed of the turbine (iii) vane angle at inlet and outlet (iv) volume flow rate. **(10)**

Q.No.5 (a) Write short notes on: (*any two*) **(10)**
    (i) Minimum starting speed of a centrifugal pump.
    (ii) Pumps in parallel and series.
    (iii) Iso-efficiency curves for rotodynamic pumps.

(b) A centrifugal pump running at 1250 rpm, develops a head of 25 m, when delivering 250 lit/sec. The flow velocity is 3 m/sec. The vane angle at outlet is 35^0. The manometric efficiency of the pump is 80%. Determine (i) outer diameter of the impeller and (ii) width at outlet. **(10)**

Q.No.6. (a) What is cavitation? What are its causes? How will you prevent the cavitations in the hydraulic machines? **(10)**

(b) Explain with neat sketch working of: **(10)**
    (1) Hydraulic crane
    (2) Hydraulic ram

Q.No.7. (a) Obtain an expression for head loss when laminar flow takes place between two stationary parallel plates and sketch velocity and shear stress distribution. **(10)**

(b) An oil of viscosity 0.05 Ns/m^2 flows between two stationery parallel plates maintained 12 mm apart. The width is 0.80 m. The velocity midway between plates is 1.80 m/sec. Determine (i) the pressure gradient (ii) the average velocity (iii) the flow rate (iv) wall shear (v) pressure drop in 10 m length. **(10)**

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TE (Civil), Sem - V, Re. exam

December 2014
Duration : 3 Hours

Total Marks : 100
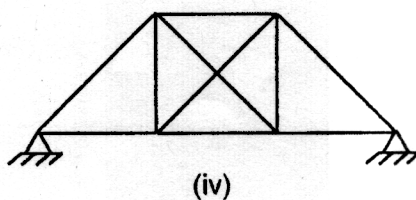CLASS/SEM : TE (CIVIL) SEM V
SUBJECT : STRUCTURAL ANALYSIS - II

Master

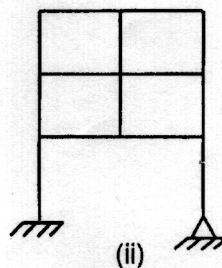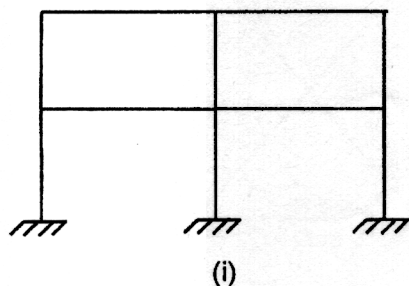- Attempt any FIVE questions out of SEVEN questions.
- If there are sub questions, **answers to all sub questions should be grouped together.**
- Figures to the right indicate full marks.
- Assume suitable data if necessary and state the same clearly.

Q.1 (a) **Determine the static and kinematic indeterminacy of the structures shown** (10)
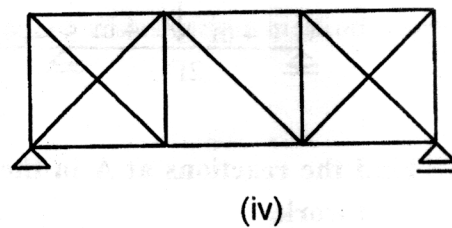**in figures below.**

(i)

(ii)

(iii)

(iv)

(v)

Q.1 (b) **For the frame shown in figure calculate the horizontal deflection of C due to** (10)
change in temperature as indicated in figure. Take $\alpha = 12 \times 10^{-6}/{}°C$ and depth
of all members as 400 mm.

1
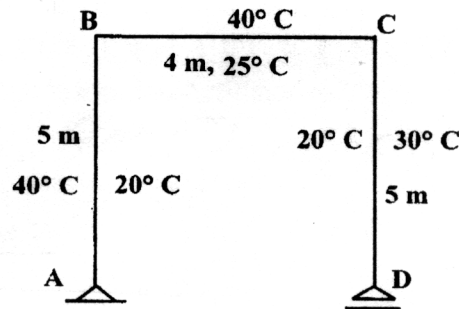
B ——— 40° C ——— C

4 m, 25° C

5 m   20° C | 30° C

40° C | 20° C   5 m

A   D

Q.2 (a) Find the forces in all members of the truss shown in figure below. Take (14) force in member AC as the redundant force. Assume AE to be same for all the members.

40 kN

B   C   E   → 5 kN

4 m   4 m

A   F
    3 m   D   3 m
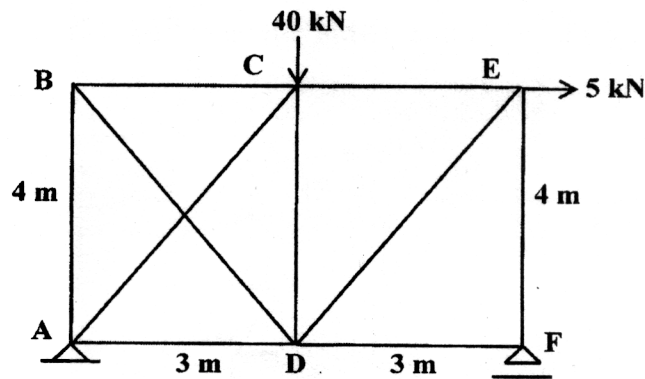
Q.2 (b) Analyse the continuous beam shown in figure using three moment theorem. (06)

30 KN   60 KN

A   2 m   3 m   B   3 m   4 m   C
        2I   I
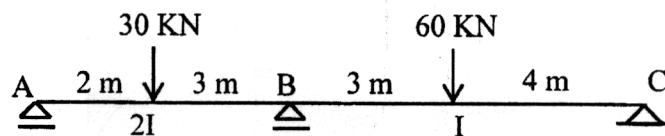
Q.3 (a) Find the reactions at A in the continuous beam shown in figure using the (10) theorem of least work.
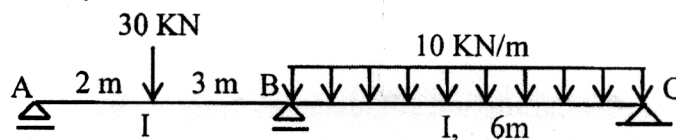
30 KN
                        10 KN/m
A   2 m   3 m B↓↓↓↓↓↓↓↓↓↓ C
        I   I, 6m

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SARDAR PATEL COLLEGE OF ENGINEERING

(An Autonomous Institution Affiliated to University of Mumbai)

TE (civil), sem - V
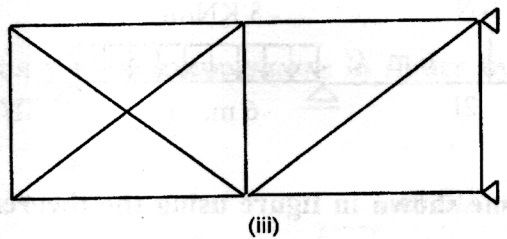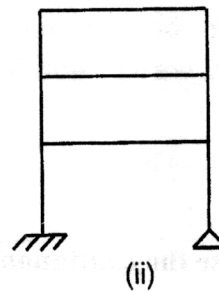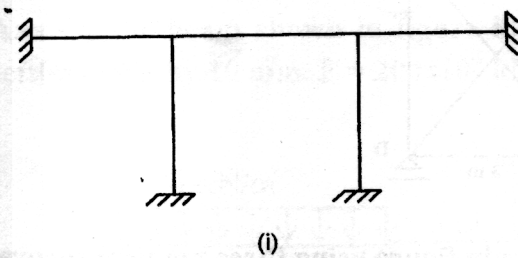
October 2014
Duration : 3 Hours

master

Total Marks : 100
CLASS/SEM : TE (CIVIL) SEM V
SUBJECT : STRUCTURAL ANALYSIS - II

- Attempt any FIVE questions out of SEVEN questions.
- If there are sub questions, **answers to all sub questions should be grouped together.**
- Figures to the right indicate full marks.
- Assume suitable data if necessary and state the same clearly.

Q.1 (a) Determine the static and kinematic indeterminacy of the structures shown   (10) in figures below.


(i)

(ii)

(iii)

(iv)

(v)

Q.1 (b) For the frame shown in figure calculate the vertical deflection of D due to   (10) change in temperature as indicated in figure. Take $\alpha = 12 \times 10^{-6}/°C$ and depth of all members as 300 mm.
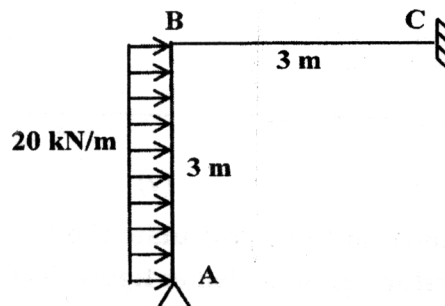
1

Page - ①.
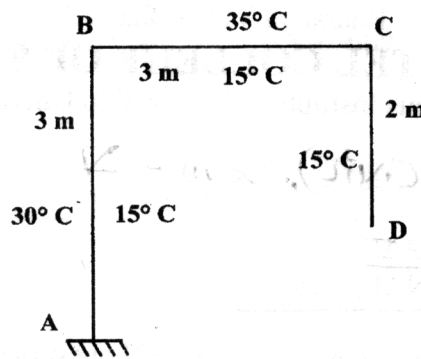
Q.2 (a) Find the forces in all members of the truss shown in figure below. Take (10)
force in member AC as the redundant force. Assume AE to be same for all
the members.
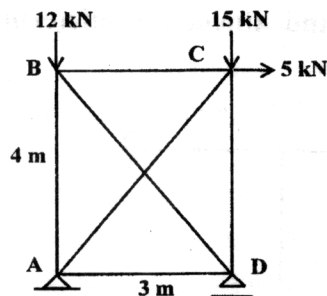
Q.2 (b) Analyse the continuous beam shown in figure using three moment theorem. (10)
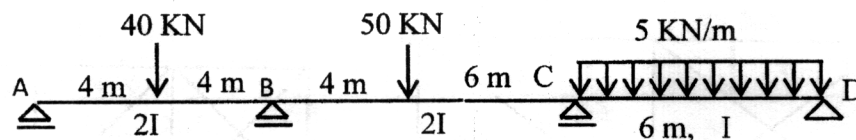
Q.3 (a) Find the reactions at A in the frame shown in figure using the theorem of (10)
least work.

2

page - ②

Q.3 (b) A two hinged parabolic arch of span 20 m and rise 4 m carries a (10) concentrated load of 40 kN at a distance of 5 m from the left support. Determine the horizontal thrust in the arch. The moment of inertia (MI) of the section of the arch varies as $I = I_0 \sec\theta$, where I_0 = MI of the section at the crown.

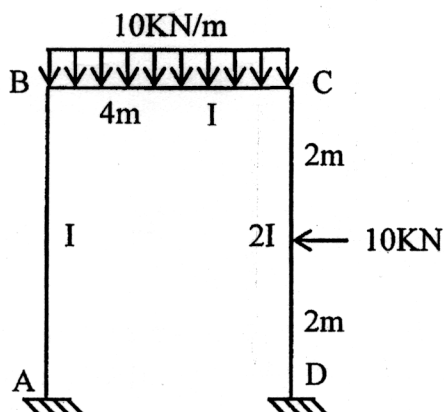**Q.4 (a)** Calculate the flexibility coefficients for the frame shown in figure w.r. to the (10) coordinates indicated in figure.
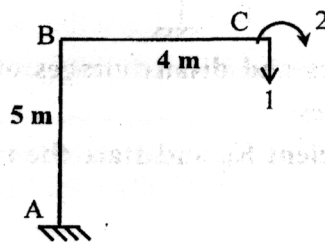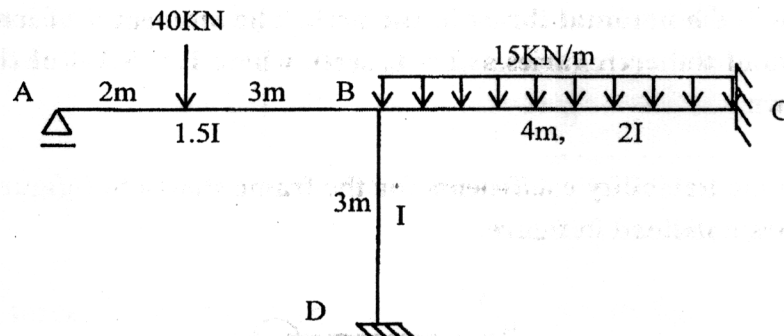

Q.4 (b) Analyse the beam shown in figure by slope deflection method. Support B (10) settles down by 10 mm. $E = 200 \times 10^6$ kN/m^2, $I = 80 \times 10^6$ mm^4. Draw BMD.
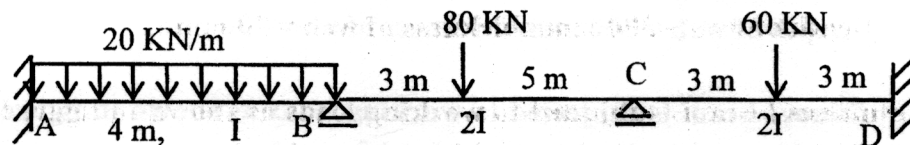
Q.5 Analyse the frame shown in figure by moment distribution method. Draw (20) BMD.

3

Q.6 (a)   Analyse the frame shown in figure by stiffness method. Draw BMD.   (12)

Q.6 (b)   (i) Explain the advantages and disadvantages of indeterminate structures over determinate structures.   (04)

(ii) Define stiffness coefficient K_{ij} and state the important properties of the stiffness matrix   (04)

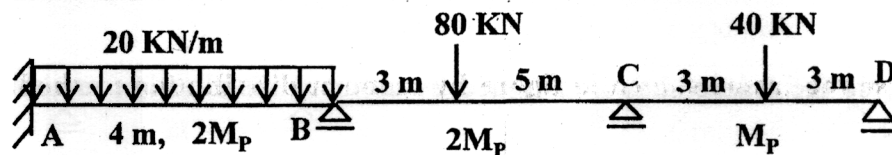**Q.7 (a)**   Find the shape factor for the unsymmetrical I section with the following data.   (10)

>   Top flange - width = 350 mm, thickness = 20 mm
>   Bottom flange - width = 250 mm, thickness = 20 mm
>   Depth of web = 300 mm, thickness of web = 20 mm.

Q.7 (b)   A continuous beam is subjected to working loads as shown in figure below. If M_P = 60 kN-m, calculate the (true) load factor for the beam.   (10)

4

page - (4)

Bharatiya Vidya Bhavan's
Sardar Patel College of Engineering
MUNSHI NAGAR, ANDHERI (WEST), MUMBAI-400 058.

Final – EXAMINATION/T. E. Civil (Sem - V), Nov. 2014
SUBJECT – TRANSPORTATION ENGINEERING – I

TE (Civil), Sem-V, Re-exam,   MASTER FILE.

MARKS: 100

Note: (i) Solve any five Questions out of seven

(ii) Assume suitable data if required.

Q.1. Solve any four (5 marks each sub question)   (20)
(a) Discuss Role of Transport in the society.
(b) Explain with sketch coning of wheel and tilting of rail.
(c) exit taxiway
(c) Explain with sketch Negative cant. What is their permissible value for different gauge
(e) Explain the procedure of determining actual runway length required at particular site.

Q.2. (five Marks each)   (20)
(a) what is creep of rail? How to measure it.
(b) Explain with sketch the working of Absolute Block System
(c) Enlist the advantages and disadvantages of Uniformity of gauge
(d) What is sleeper density? Using sleeper density of $(n + 5)$ find out the number of sleepers and rails required for construction of railway track of 1240 m long.

Q.3.
(a) Write short notes on.   · (06)
(i) Actual and theoretical nose of crossing.
(ii) Angle of crossing and number of crossing.
(b) Explain the classification of signals based on operational Characteristics. (06)
(c) Design an exit taxiway joining runway and parallel main taxiway. The total angle of turn is 30^0 and turning speed 80 km/hr. draw a neat sketch showing all design elements.   (08)

Q.4.
(a) Classification of airport as per ICAO   (06)
(b) write short notes on (i) cross wind component (ii) wind coverage.   (08)
(c) A 5^0 branch curve diverge out from a 2^0 main curve in opposite direction of the meter gauge track. If the speed is restricted to 30 km/hr on main line and cant deficiency Permissible is 5.1 cm. what would be the speed limit on branch line.   (06)

Q.5 Transportation Engg - I

(a) The length of runway under standard is 1800 m. the airport is to be provided at an elevation of 150 m above the mean sea level. The airport reference temperature is 25^0 the construction plan includes the following data. Determine the actual length of runway to be provided by applying requisite corrections. (12)

End to end of runway, m	Grade (%)
0 to 300	+ 1.00
300 to 900	- 0.30
900 to 1500	+ 0.60
1500 to 1800	+ 1.00
1800 to 2200	- 0.30

(b) Flexible and Rigid Dolphine. (08)

Q.6.

(a) Discuss in detail how you will decide the Basic Length of Runway. (07)

(b) Explain with sketch various marking on runway. (07)

(c) Following is the average wind data for 10 years. An airport is to be designed for runways. Determine the best runway orientation and total wind coverage. The permissible cross wind component may be assumed as suitable for mixed category of aircraft. (06)

Direction	Percentage of time with wind velocity (km/hr)			Direction	Percentage of time with wind velocity (km/hr)		
	6.4 to 25	25 to 40	40 to 60		6.4 to 25	25 to 40	40 to 60
N	0.3	1.3	0.1	S	1.6	1.2	0.0
NNE	2	4	0.1	SSW	2	2.0	0.1
NE	5	7.6	0.2	SW	3.2	2.5	0.1
EEN	2.1	1.2	0.1	WWS	5.6	4.5	0.2
E	0.6	0.5	0	W	2.6	1.6	0.1
EES	2.7	0.8	0.1	WWN	2.5	1.6	0.0
SE	3.9	3.0	0.2	NW	3.5	2.5	0.1
SSE	2.9	2.5	0.1	NNW	1.5	0.5	0.0

Q. 7. Write short notes on: (any four) (20)

(i) Breakwater   (ii) Airport drainage

(iii) Rail Joints.   (iv) Jetty and Fender

(v) Explain the term Cant Deficiency

Bharatiya Vidya Bhavan's
Sardar Patel College of Engineering
MUNSHI NAGAR, ANDHERI (WEST), MUMBAI-400 058.

Final – EXAMINATION, T. E. Civil (Sem - V), Nov. 2014

SUBJECT – TRANSPORTATION ENGINEERING – I

MASTER FILE

MARKS: 100

Note: (i) Solve any five Questions out of seven
  (ii) Assume suitable data if required.

Q.1. Discuss with sketch   (20)

  (i) Take off climb surface   (ii) Approach surface

  (iii) Inner Horizontal surface   (iv) Conical Surface

Q.2.

(a) Discuss how will you orient runway considering (i) Direction and total duration of wind and

  (ii) Direction, Duration and Intensity of wind.   (10)

(b) Enlist the assumption made while calculating the basic length of runway. How will you calculate
  the basic length of runway.   (10)

Q.3.

(a) Derive the relationship between superelevation, speed, Gauge and radius of circular curve. What
  are its limiting values for different gauges.   (10)

(b) What is transition curve why it is provided. How will you decide the length of transition curve.

(10)

Q.4.

(a) What is turnout? Explain with sketch left and right hand turnout.   (10)

(b) Discuss theoretical nose of crossing and actual nose of crossing. Also, give the Relationship
  between number of crossing, permissible speed and angle of crossing.   (10)

Page (1)

Q.5.

(a) Calculate the elements required to set out 1 in 12 turnout, taking off from straight broad gauge track with its curve starting from toe of switch. Heel divergence = 13.3. (10)

(b) What are the points you will consider while selecting the site for station. (10)

Q.6.

(a) Draw a neat sketch of single line railway track in cutting and embankment. (10)

(b) Write short notes on (i) Different types of Gradient (ii) Negative cant and Cant Deficiency. (10)

Q.7. Write Short notes on (any five, four marks each) (20)

(a) Wet and dry docks

(b) Different types of breakwater

(c) factors affecting selection of site for Harbour.

(d) Necessarily of Airport Drainage system.

(e) Airport Marking.

(f) Creep of rail and its measurement.

(g) Coning of wheel and tilting of rail.

Page ②

Bharatiya Vidya Bhavan's
Sardar Patel College of Engineering
MUNSHI NAGAR, ANDHERI (WEST), MUMBAI-400 058.

Final – EXAMINATION, T. E. Civil (Sem - V), Nov. 2014
SUBJECT – TRANSPORTATION ENGINEERING – I (old) Master
8/11/14

MARKS: 100

Note: (i) Solve any five Questions out of seven

(ii) Assume suitable data if required.

Q.1. Solve any four (5 marks each sub question)   (20)
(a) Discuss Role of Transport in the society.
(b) Explain with sketch coning of wheel and tilting of rail.
(c) exit taxiway
(c) Explain with sketch Negative cant. What is their permissible value for different gauge
(e) Explain the procedure of determining actual runway length required at particular site.

Q.2. (five Marks each)   (20)
(a) what is creep of rail? How to measure it.
(b) Explain with sketch the working of Absolute Block System
(c) Enlist the advantages and disadvantages of Uniformity of gauge
(d) What is sleeper density? Using sleeper density of $(n + 5)$ find out the number of sleepers and rails required for construction of railway track of 1240 m long.

Q.3.
(a) Write short notes on.
(i) Actual and theoretical nose of crossing.   . (06)
(ii) Angle of crossing and number of crossing.
(b)Explain the classification of signals based on operational Characteristics.(06)
(c) Design an exit taxiway joining runway and parallel main taxiway. The total angle of turn is 30^0 and turning speed 80 km/hr. draw a neat sketch showing all design elements.   (08)

Q.4.
(a) Classification of airport as per ICAO   (06)
(b) write short notes on (i) cross wind component (ii) wind coverage.   (08)
(c) A 5^0 branch curve diverge out from a 2^0 main curve in opposite direction of the meter gauge track. If the speed is restricted to 30 km/hr on main line and cant deficiency Permissible is 5.1 cm. what would be the speed limit on branch line.
                                                                                      (06)

Q.5

(a) The length of runway under standard is 1800 m. the airport is to be provided at an elevation of 150 m above the mean sea level. The airport reference temperature is 25^0 the construction plan includes the following data. Determine the actual length of runway to be provided by applying requisite corrections. (12)

End to end of runway, m	Grade (%)
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900 to 1500	+ 0.60
1500 to 1800	+ 1.00
1800 to 2200	- 0.30

(b) Flexible and Rigid Dolphine. (08)

Q.6.

(a) Discuss in detail how you will decide the Basic Length of Runway. (07)

(b) Explain with sketch various marking on runway. (07)

(c) Following is the average wind data for 10 years. An airport is to be designed for runways. Determine the best runway orientation and total wind coverage. The permissible cross wind component may be assumed as suitable for mixed category of aircraft. (06)

Direction	Percentage of time with wind velocity (km/hr)			Direction	Percentage of time with wind velocity (km/hr)		
	6.4 to 25	25 to 40	40 to 60		6.4 to 25	25 to 40	40 to 60
N	0.3	1.3	0.1	S	1.6	1.2	0.0
NNE	2	4	0.1	SSW	2	2.0	0.1
NE	5	7.6	0.2	SW	3.2	2.5	0.1
EEN	2.1	1.2	0.1	WWS	5.6	4.5	0.2
E	0.6	0.5	0	W	2.6	1.6	0.1
EES	2.7	0.8	0.1	WWN	2.5	1.6	0.0
SE	3.9	3.0	0.2	NW	3.5	2.5	0.1
SSE	2.9	2.5	0.1	NNW	1.5	0.5	0.0

Q. 7. Write short notes on: (any four) (20)

(i) Breakwater   (ii) Airport drainage

(iii) Rail Joints.   (iv) Jetty and Fender

(v) Explain the term Cant Deficiency