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20/12/14

S.E. (Civil), sem III - Re-exam.  
Bharatiya Vidya Bhavan's

**SARDAR PATEL COLLEGE OF ENGINEERING**

(An Autonomous Institution Affiliated to University of Mumbai)

Re-Exam

Date: 20<sup>th</sup> Dec 2014

Duration: 3 Hours

Subject: Building Construction

Total Marks: 100

Class/Sem: S.E. (Civil), Sem III.

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

Q1a) Enlist different components of building with a neat sketch and state difference between load bearing structure & framed structure. (10M)

b) Explain with sketch various type of deep foundation. (10M)

Q2a) Explain the different type of ashlar masonry. (10M)

b) Enlist different types of window & explain any two with neat sketch. (10M)

Q3a) Explain madras terrace roof and Punjab terrace roof with neat sketch. (10M)

b) Enlist different types of floors and Write about Mud flooring and Brick flooring. (10M)

Q4a) Write a note on different types of staircase. (10M)

b) Draw plan & elevation view of 1 brick thick wall for header bond & stretcher bond, 1 ½ brick thick wall for English bond & Flemish bond & enlist the tools used for brick work. (10M)

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P.T.O

S.E. Civil - Sem III

Building construction.

20/12/14.

Q5a) What is scaffolding, enlist different types of scaffolding and give detail about component part of scaffolding. (10M)

b) Define shoring when it is used & explain in detail Raking shore with neat sketch. (10M)

Q6a) State the principles of pipe layout & explain anti-siphonage pipe with neat sketch. (10M)

b) Explain Green building. (10M)

Q7a) Explain in detail different types of ventilation. (10M)

b) Explain the acoustic design principle of auditorium. (10M)

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P.T.O



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

Date: 10<sup>th</sup> Nov 2014

Duration: 3 Hours

Total Marks: 100

Class/Sem: S.E. (Civil), Sem III.

Subject: Building Construction

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

Q1a) Define building and give classification of building based on occupancy. (10M)

Q1b) State the requirement of foundation and Explain grillage foundation with neat sketch. (10M)

Q2a) Design a open newel stair for a hospital with staircase of internal dimension 5.6 x 4.5 m.  
floor to floor height 4.5m. (8M)

Q2b) Explain the following with neat sketch. (12M)

- i) Revolving door
- ii) Ventilators
- iii) Fixtures and fastening for doors and windows

Q3a) Explain construction of cement concrete flooring (6M)

Q3b) Explain with neat sketch jack arch floors and reinforced brick slab. (6M)

Q3c) Enlist different types of pitched roof and explain two types of pitched roof. (8M)

P.T.O

- Q4a) List out the reason of failure of formworks and write a note on slip formwork (6M)
- Q4b) write a note on dead shores and pit method of underpinning (8M)
- Q4c) Enlist different types of Composite masonry and explain brick-stone composite masonry in detail. (6M)
- Q5a) How will you provide sound insulation in a building. (6M)
- Q5b) State various methods of thermal insulation. (8M)
- Q5c) State the method of damp proofing for foundation and floors. (6M)
- Q6a) Write a short note on green building. (8M)
- Q6b) Explain defects in plastering. (6M)
- Q6c) Explain Stay bracing and Box sheeting (6M)
- Q7a) Explain different types of joint in stone masonry. (6M)
- Q7b) Explain with neat sketch garden bonds. (6M)
- Q7c) Explain method of Cement plastering. (4M)
- Q7d) Explain with neat sketch polygon walling and flint walling in stone masonry. (4M)

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**Bharatiya Vidya Bhavan's**  
**SARDAR PATEL COLLEGE OF ENGINEERING**  
(An Autonomous Institution Affiliated to University of Mumbai)  
**KT-Exam (old syllabus)**

Date: 10<sup>th</sup> Nov 2014  
Duration: 3 Hours

Total Marks: 100  
Class/Sem: S.E. (Civil), Sem III.

Subject: Building Material & Construction

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

Q1a) Explain natural defects in timber with neat sketch. (10M)

b) Explain with sketch various type of deep foundation. (10M)

Q2a) Explain the different type of ashlar masonry. (10M)

b) Classify building material with example & state requirement of building materials. (10M)

Q3a) Enlist different types of window & explain any two with neat sketch (10M)

b) Write the features and working of Bull's trench kiln with neat sketch (6M)

c) Prepare a flow diagram of wet process of cement manufacturing? (4M)

Q4a) Enlist different test performed on brick, Explain crushing strength test and absorption test. (10M)

b) Enlist different types of floors and Write about Mud flooring and Brick flooring. (10M)

P.T.O

Q5a) Explain Slump test with neat sketch (6M)

b) Enlist the test carried on mortar and explain briefly tensile strength test (8M)

c) Write a note on defects of concrete. (6M)

Q6a) Write a note on different types of staircase. (10M)

b) Plan a dog legged stair case for a Public building in which the vertical distance between each floor is 3.6m. The size of stair case room is 5.5m x 3m. (6M)

c) Explain English bond and Flemish bond with neat sketch (4M)

Q7a) State different methods used for damp-proofing. Explain any one (5M)

b) Mention uses of plastic in construction. (5M)

c) How painting of new and old wood work is done. (5M)

d) Write a short note on air conditioning. (5M)

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SE (Civil), Sem-III, Re-exam, Engineering Geology.

U/b  
19/12/14



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



**CLASS: SE/CIVIL/SEM III**

**SUBJECT: ENGINEERING GEOLOGY**

**Exam : RE-EXAMINATION**

**Marks : 100 ( 3 Hour )**

**Instructions :**

**Date : 19/12/2014**

i) Attempt any FIVE questions.

ii) Each main Question is for 20 Marks (Figures in brackets indicate marks for particular question).

iii) Draw neat and labeled diagram wherever necessary

MASTER FILE

1A. Write a note on different stages of river. (5)

1B. Write a detail note: Application of structural geology to field of civil engineering. (5)

1C. Write a note on : (10)

i) Cirque    ii) Arete    iii) U-shaped    iv) Moraine    v) Oxbow lake

2A. Explain the statement: "Study of mineralogy is helpful for the field of civil engineering." (5)

2B. i) Name the mineral present (as veins) in the conglomerate basement of St. Francis Dam. (1)

ii) Name any four varieties of Quartz based on its colour. (2)

iii) A mineral is getting scratched by the Quartz but not by the Apatite, hence its relative hardness on Moh's scale is ? (2)

2C. Write a note on i) Five types of silicate structures (5)

ii) Five physical properties of minerals (5)

Page no.1.

(P.T.O)

S.E. Civil - sem III, Re-exam  
Engineering Geology 19/12/14.

- 3A. Write a note on agents of metamorphism. (5)
- 3B. Write a note on types of sandstones. (5)
- 3C. Write a note on : (10)
- i) Laccolith ii) Lopolith iii) Phacolith iv) Batholith v) Porphyritic Texture
- 4A. Write a note on classification of Joints. (5)
- 4B. Write a note on parts of fault and its classification. (5)
- 4C. Explain any five principles of Stratigraphy. (10)
- 5A. Write a note on geophysical investigations of a site. (10)
- 5B. Write a note on site improvement methods in rocks. (10)
- 6A. Write a note on Objects and Preliminary surveys under geological considerations for tunnels. (5)
- 6B. Write a note on geological considerations in the selection of dam site at narrow river valley. (5)
- 6C. Write a note on parts and types of dam. (10)
- 7A. Explain Tunneling through folded rocks commenting on its alignment with rocks and stability. (5)
- 7B. Write a note on tunneling through: (15)
- (3 Marks for Each point)
- i) Faulted Rocks
- ii) Jointed Rocks
- iii) Soft Ground
- iv) Horizontal strata
- v) Steeply inclined strata



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7-11-14

**SARDAR PATEL COLLEGE OF ENGINEERING**  
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**Class : SE (CIVIL) [ SEM III ]**  
**Subject : ENGINEERING GEOLOGY**

master

**Exam : End Semester**

**Marks : 100 ( 3 Hour )**

**Instructions :**

**Date : 07/11/2014**

- i) Attempt any FIVE questions.
- ii) Each main Question is for 20 Marks ( Figures in brackets indicate marks for particular question).
- iii) Draw neat and labelled diagram wherever necessary

- 
- 1A. Write a note on application of geology to civil engineering (5)
- 1B. Write a note on depositional and erosional features of glaciers. (5)
- 1C. Explain in detail five types of Sand Dunes and five types of Mechanical weathering. (10)
- 2A. Write a note on different silicate structures. (5)
- 2B. Answer in brief
- i) Why quartz occur in different color ? (1)
  - ii) Why diamond and graphite are different in physical form even though having same composition ? (2)
  - iii) "Granite is more resistant to weathering than limestone" explain the reason emphasizing on Mineralogy of Granite and Limestone. (2)
- 2C. Write a note on different physical properties of minerals. (10)
- 3A. write a note on any five sedimentary structures (5)

(P.T.O)

3B. Name the Following :

- i) Texture in which large euhedral grains are embedded in fine grained groundmass. (1)
- ii) A volcanic equivalent of granite, diorite (2)
- iii) Parent rock of -- Quartzite, Slate, Marble, Amphibolite (2)

3C. Write a note on :

- i) Schistose ii) Gneissose iii) Granulose iv) Cataclastic
- ii) Agents of metamorphism (10)

4A. Define strike and dip. (5)

4B. What are unconformities? Give its classification. (5)

4C. Write a note on (10)

- i) Principle of cross cutting relationship
- ii) Stratigraphy of Cuddapah Group of rocks in India

5A. Write a brief note on Resistivity methods. (5)

5B. Write a brief note on properties of road aggregates. (5)

5C. Write a note on Engineering properties of Rocks. (10)

6A. Explain in brief : Water Table and Cone of Depression (5)

6B. Write a note on geological profile of a tunnel. (5)

6C. Write a note on effects associated with Geological structures for selection of Dam site. (10)

7A. Mention about most favorable and unfavorable cases for tunnel site selection.

OR (5)

7A. Write a note on tunneling through folded rocks.

7B. Write a note on landslides and its types. (5)

7C. Explain about various geological structures which can be encountered during tunneling and its counter measures. (10)



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03/11/14

Bhartiya Vidya Bhavan's  
**SARDAR PATEL COLLEGE OF ENGINEERING**  
Munshi nagar, Andheri(west), Mumbai 400058

Total Marks-100

Date: 03/11/2014

Class/Sem: S.E (CIVIL), Sem III

Duration-3 hours

Subject: Engineering materials

Master  
3/11/14

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.

- 
- Q1. a) Explain the terms with neat sketch:- Queen closure, Seasoning, Quarrying, Annealing, Contraction joint (10)
- b) Describe the process of cement manufacturing process by wet and dry process. (10).
- Q2. a) Enlist the various tests on cement concrete, and explain three of them in detail. (10)
- b) Explain any four tests for bricks. (10)
- Q3. a) Enlist various varieties of cement and explain any five of them with their constituents and application purpose. (10)
- b) Name and describe the properties of Bases, Driers, Solvent (07)
- c) Enlist the types of glass and explain any one. (03)
- Q4. a) Enumerate the various defects in timber. (10)
- b) Explain manufacturing process for wrought iron. (10)

- Q5. a) Write down all the tests for stones. (07)
- b) Sketch a neat labeled diagram for hoffman's kiln. (03)
- c) Write down the whole manufacturing process for Pig iron. (10)
- Q6. a) Define:- Bulking of sand, Expansion joint, King closure, Workability, Tempering. (10)
- b) Explain all the methods for proportioning the cement concrete. (10)
- Q7. a) Explain the desirable characteristics of a good brick. (05)
- b) What are the factors affecting workability. Explain. (10)
- c) Explain the different process to preserve timber. (05)

18/12/14

SEC(CIVIL), Sem-III, Re-exam

Bhartiya Vidya Bhavan's  
**SARDAR PATEL COLLEGE OF ENGINEERING**  
Munshi nagar, Andheri(west), Mumbai 400058

Re Exam

Total Marks-100

Class/Sem: S.E (CIVIL), Sem III

Duration-3 hours

Subject: Engineering materials

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. a) Explain the desirable properties of stones as a building material and explain three tests conducted on them. (10)

b) Write down physical and mechanical properties for building materials, explain two from each category (07)

c) Explain the desirable characteristics of a good brick. (03)

Q2. a) Compare Asbestos cement sheet and Galvanized Iron corrugated sheets as a roofing material. (07)

b) Explain manufacturing process of cement. Also differentiate wet and dry process. (10)

c) State characteristics of good varnish and write a note on types of Varnish. (03)

Q3. a) Explain various physical and laboratory tests for cement. (07)

b) What are the advantages and disadvantages of steel truss over timber trusses? (07)

c) Write short note on: (06)

(1) Mangalore Tiles (2) PVC sheet.



S.E. (Civil) Sem III, Re-exam  
Engineering Materials.

18/12/14.

- Q4. a) Mention the object of painting and point out the characteristics of an ideal paint. (07)  
b) Explain manufacturing process for wrought iron with labeled sketch. (10)  
c) What are different flooring materials used? (03)
- Q5. a) What are the common defects found in painting work? (05)  
b) State the uses of following stones: (10)  
(i) Gravel (ii) Basalt (iii) Sand stone (iv) Marble (v) Slate  
c) State requirements of fine and coarse aggregates used in mortar and concrete. (05)
- Q6. a) Define:- Construction joint, Workability, Annealing, Seasoning, Gauged mortar (10)  
b) Explain all the methods for proportioning the cement concrete. (10)
- Q7. a) State the different market forms of steel and give their uses. (05)  
b) Discuss causes of decay in timber. Enlist preservative treatments adopted against decay of timber. (10)  
c) Describe the process for manufacturing of bricks with flow chart (05)

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**SARDAR PATEL COLLEGE OF ENGINEERING**

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SEC (CIVIL) Sem - III

October 2014

Total Marks: 100

Duration: 3 Hours

CLASS/SEM: S.E (CIVIL)/III

SUBJECT: ENGINEERING MATHEMATICS III

- Attempt any FIVE questions out of SEVEN questions.
- Answers to all sub questions should be grouped together.
- Figures to the right indicate full marks.

Master

Q.1 (a) Reduce the following matrix to normal form and hence find its rank

6

$$\begin{bmatrix} -1 & -3 & 3 & -1 \\ 1 & 1 & -1 & 0 \\ 2 & -5 & 2 & -3 \\ 3 & -6 & 3 & -4 \end{bmatrix}$$

(b) Evaluate  $\int_A^B (3x^2y - 2xy)dx + (x^3 - x^2)dy$  along  $y^2 = 2x^3$  from  $A(0,0)$  to  $B(2,4)$ .

6

(c) Obtain Fourier series expansion of the following function in the interval  $[0, 2\pi]$

8

$$f(x) = \begin{cases} x & 0 \leq x \leq \pi \\ 2\pi - x, & \pi \leq x \leq 2\pi \end{cases}$$

Q.2 (a) Find Laplace transform of the following function

6

$$f(t) = \begin{cases} \sin t, & 0 < t < \pi \\ 0, & \pi < t < 2\pi \end{cases}, \quad f(t) = f(t + 2\pi)$$

(b) Verify Cayley Hamilton Theorem for the following matrix A and find  $A^{-1}$  if it exists.

6

$$A = \begin{bmatrix} 1 & -3 & 4 \\ 2 & -1 & 1 \\ 1 & 0 & 3 \end{bmatrix}$$

- (c) Using method of Laplace Transform, solve the following differential equation

$$\frac{d^2 y}{dx^2} - 2 \frac{dy}{dx} + y = e^x \text{ where } y(0) = 2, y'(0) = -1$$

- Q.3 (a) Obtain complex form of Fourier series of the following function

$$f(x) = \cosh 2x + \sinh 2x \quad x \in (-3, 3)$$

- (b) Evaluate  $\oint_C (3x - 7y)dx + (3x + 5y)dy$  where C is the rectangle whose sides are

$$x = -1, x = 1, y = -2, y = 2$$

- (c) Find Eigen values and corresponding Eigen vectors of  $A^3$ , where

$$A = \begin{bmatrix} 2 & 2 & 1 \\ 1 & 3 & 1 \\ 1 & 2 & 2 \end{bmatrix}$$

- Q.4 (a) Obtain Half range Fourier Sine series expansion of the following function in  $[0, 1]$

$$f(x) = \begin{cases} \frac{1}{4} - x & 0 < x \leq \frac{1}{2} \\ x - \frac{3}{4}, & \frac{1}{2} \leq x < 1 \end{cases}$$

- (b) Test the consistency of the following equations and solve them if they are consistent

$$4x - 2y + 6z = 8$$

$$x + y - 3z = -1$$

$$15x - 3y + 9z = 21$$

- (c) Verify Gauss Divergence Theorem for  $\vec{F} = (x^2 - yz)\hat{i} + (y^2 - xz)\hat{j} + (z^2 - xy)\hat{k}$  over the surface

of the cuboid  $0 \leq x \leq 2, 0 \leq y \leq 4, 0 \leq z \leq 3$

- Q.5 (a) If  $L\{f(t)\} = \frac{s}{2s^2 - 3s - 4}$ , find  $L\left\{e^{-3t}f\left(\frac{t}{3}\right)\right\}$



- (b) Evaluate  $\oiint_S \vec{F} \cdot \hat{n} ds$ , where  $\vec{F} = (2x + yz)\hat{i} + (3y + xz)\hat{j} - (4z - xy)\hat{k}$  and S is the surface of the sphere  $x^2 + y^2 + z^2 - 2x + 4y + z - 1 = 0$  6
- (c) Express the function  $f(x) = \begin{cases} 0, & x < 0 \\ e^{-x}, & x \geq 0 \end{cases}$  as a Fourier Integral 8
- 6(a) Prove that the matrix  $A = \frac{1}{2} \begin{bmatrix} 1+i & -1+i \\ 1+i & 1-i \end{bmatrix}$  is unitary. 6
- (b) Evaluate  $L^{-1} \left\{ \frac{2s^2 + 3}{(s+1)^2 (s-3)} \right\}$  6
- (c) Verify Green's theorem in the plane for  $\oint_C (xy + y^2) dx + x^2 dy$ , where C is the closed curve of the region bounded by the curves  $y^2 = x$  and  $x = y$  8
- 7(a) Evaluate  $\iiint_S (\nabla \times \vec{F}) \cdot \hat{n} ds$ , where  $\vec{F} = (x^2 + y - 4)\hat{i} + 3xy\hat{j} + (2xz + z^2)\hat{k}$  and S is the surface of the hemispherical cap  $x^2 + y^2 + z^2 = 4$ ,  $z \geq 0$  above XY plane. 6
- (b) Obtain Fourier series expansion of the following function
- $$f(x) = \begin{cases} 0, & -2 < x < -1 \\ 2+x, & -1 < x < 0 \\ 2-x, & 0 < x < 1 \\ 0, & 1 < x < 2 \end{cases}$$
- (c) Evaluate  $L^{-1} \left\{ \frac{(s+2)^2}{(s^2 + 4s + 8)^2} \right\}$  8

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15/12/17

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**SARDAR PATEL COLLEGE OF ENGINEERING**

(An Autonomous Institution Affiliated to University of Mumbai)

SEC (CIVIL), Sem - III, ~~A.T.K.T~~  
A.T.K.T Re-exam

December 2014

Total Marks: 100

Duration: 3 Hours

CLASS/SEM: S.E (CIVIL)/III

SUBJECT: ENGINEERING MATHEMATICS III

- Attempt any FIVE questions out of SEVEN questions.
- Answers to all sub questions should be grouped together.
- Figures to the right indicate full marks.

Master

Q.1 (a) Reduce the following matrix to normal form and hence find its rank

6

$$\begin{bmatrix} 1 & 2 & 3 & 4 \\ -4 & 3 & -3 & -1 \\ 0 & 2 & 6 & 7 \\ 5 & -1 & 6 & 5 \end{bmatrix}$$

(b) Evaluate  $\int_A^B (2xy^2 + 4x^3y)dx + (2x^2y + x^4)dy$  along  $2y^3 = x^2$  from  $A(0,0)$  to  $B(4,2)$ .

6

(c) Obtain Fourier series expansion of the following function in the interval  $[0, 2\pi]$

8

$$f(x) = x \cos x, \quad 0 \leq x \leq 2\pi$$

Q.2 (a) Find Laplace transform of the following function

6

$$f(t) = te^{-3t} \cos(at + b), \quad \text{where } a \text{ and } b \text{ are constants}$$

(b) Verify Cayley Hamilton Theorem for the following matrices and find  $A^{-1}$  if it exists

6

$$A = \begin{bmatrix} 1 & 5 & 4 \\ -2 & -2 & 1 \\ 0 & 1 & 2 \end{bmatrix}$$

- (c) Using method of Laplace Transform, solve the following differential equation

8

$$\frac{d^2 y}{dt^2} - 4 \frac{dy}{dt} + 4y = e^{2t} \text{ where } y(0) = 1, y'(0) = -1$$

- Q.3 (a) Obtain complex form of Fourier series of the following function

6

$$f(x) = \cosh 3x + \sinh 3x \quad x \in (-2, 2)$$

- (b) Evaluate  $\oint_C (4x + 2y)dx + (7x - 5y)dy$  where C is the circle  $x^2 + y^2 = 9$

6

- (c) Find Eigen values and corresponding Eigen vectors of  $A^2$ , where

8

$$A = \begin{bmatrix} 3 & -1 & 1 \\ -1 & 5 & -1 \\ 1 & -1 & 3 \end{bmatrix}$$

- Q.4 (a) Obtain Half range Fourier Cosine series expansion of the following function in  $[0, \pi]$

6

$$f(x) = x(\pi - x), \quad 0 < x < \pi$$

- (b) Test the consistency of the following equations and solve them if they are consistent

$$2x + 3y - z - 2 = 0$$

$$x + 2y + z + 3 = 0$$

$$3x + y - 2z - 1 = 0$$

6

- (c) Verify Gauss Divergence Theorem for  $\vec{F} = (x^2 - y)\hat{i} + y\hat{j} + xz\hat{k}$  over the surface of the cylinder  $x^2 + y^2 = 4, z = 0, z = 4$

8

- Q.5 (a) Express the function  $f(x) = \begin{cases} 1 - x^2, & 0 \leq x \leq 1 \\ 0, & x > 1 \end{cases}$  as a Fourier Sine Integral

6

- (b) Evaluate  $\iiint_S \vec{F} \cdot \hat{n} ds$ , where  $\vec{F} = (4x + y^2)\hat{i} + (7y - z^2)\hat{j} + (3z - x^3y)\hat{k}$  and S is the surface

6

$$\text{of the sphere } x^2 + y^2 + z^2 + 2x - 4y - z - 1 = 0$$



- (c) Evaluate  $\int_0^{\infty} e^{-3t} t^2 \sin t \, dt$  8
- 6(a) Determine constants  $a, b, c$  if  $A = \frac{1}{3} \begin{bmatrix} a & b & c \\ -2 & 1 & 2 \\ 1 & -2 & 2 \end{bmatrix}$  is orthogonal 6
- (b) Evaluate  $L^{-1} \left\{ \frac{s}{(s-1)(s+2)^2} \right\}$  6
- (c) Verify Green's theorem in the plane for  $\oint_C (xy + 2y^2) dx + x^2 dy$ , where  $C$  is the closed curve of the region bounded by the curves  $y^2 = x$  and  $x^2 = y$  8
- 7(a) Evaluate  $\iint_S (\nabla \times \vec{F}) \cdot \hat{n} \, ds$ , where  $\vec{F} = (x^2 - y + 3)\hat{i} + 2xy\hat{j} + (2xz + yz)\hat{k}$  and  $S$  is the surface of the hemispherical cap  $x^2 + y^2 + z^2 = 1, z \geq 0$  above  $XY$  plane. 6
- (b) Obtain Fourier series expansion of the following function 6  
 $f(x) = 4 - x^2, 0 \leq x \leq 2$
- (c) Evaluate  $L^{-1} \left\{ \frac{1}{s^2(s^2 + 4)} \right\}$  8

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31-10-14

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**SARDAR PATEL COLLEGE OF ENGINEERING**  
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**STRENGTH OF MATERIAL**

SE (CIVIL) SEM III

Date- 31/10/2014

*S.E.C (CIVIL), Sem - III*

Duration : 3 Hour

(100 MARKS)

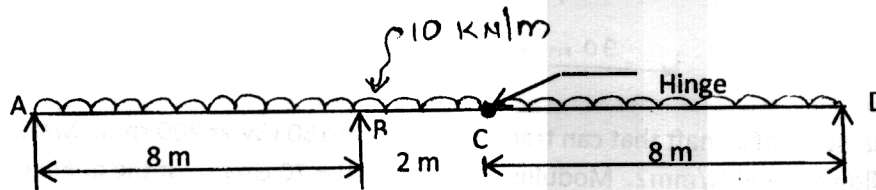
*master*

- Attempt any FIVE questions out of SEVEN questions.

Q1.a)

Draw the B.M., S.F., and A.F. diagrams for a beam loaded as shown in fig

(12)



Q1.b)

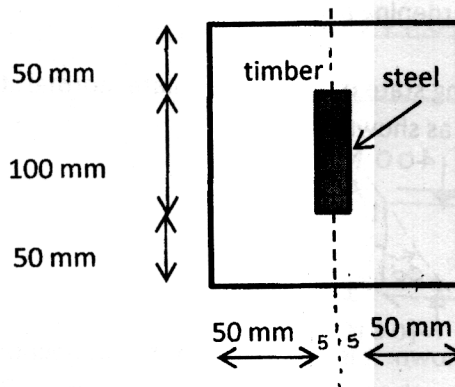
A thin spherical shell of diameter 500 mm, and thickness 10 mm is filled with a fluid at pressure 2 N/mm<sup>2</sup>. Modulus of elasticity ( $E$ ) = 200 Gpa, poisons ratio ( $\nu$ ) = 0.3 Calculate (a) Tensile stress on shell ( $\sigma_1$ ) (b) Change in diameter ( $\delta d$ ) (c) Change in volume ( $\delta V$ )

(8)

Q2.a)

Calculate M.R. of the flitched beam section shown. Take maximum permissible stress in wood as 8MPa and in steel as 120MPa. Take  $E_s = 20 E_w$ .

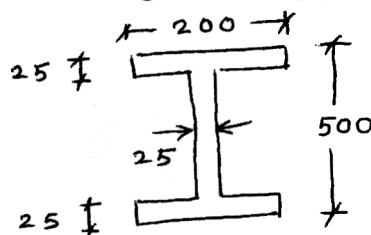
(10)



Q2.b)

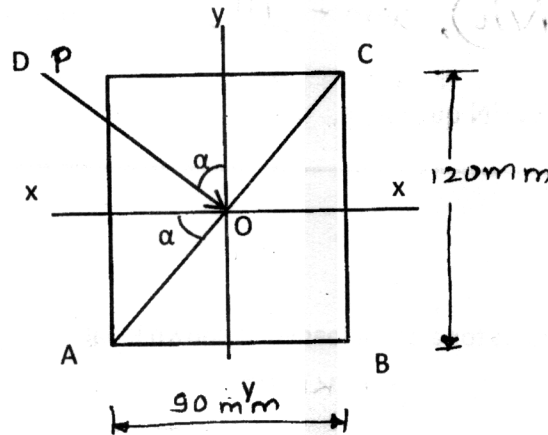
For the I-beam section shown below calculate (a) the maximum shear stress ( $\tau_{max}$ ), (b) shear stress ( $\tau$ ) at the junction of flange and web, (c) ratio of maximum to average shear stress.

(10)



P.T.O.

- Q3.a) A beam of rectangular section 90mm x 120mm deep as shown in fig is subjected to a bending moment of 1000 Nm, the trace of the plane of loading being at right angles to one of the diagonals. Locate the neutral axis of the section and determine the stresses at all corners of the section. (12)

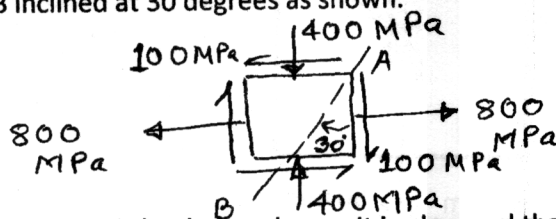


- Q3.b) Determine the diameter of a shaft that can transmit power of 150 kW at 200 rpm. Maximum shear stress ( $\tau$ ) allowed is 60 N/mm<sup>2</sup>. Modulus of rupture ( $G$ ) = 70 Gpa. If the angle of twist allowable is 2 degree over the entire length, what should be the length of the shaft? (8)

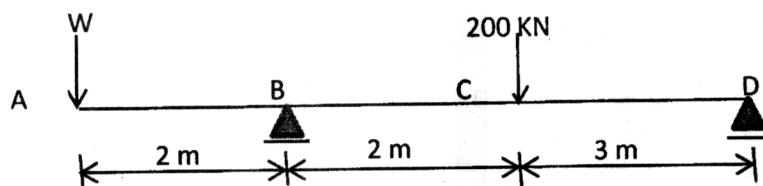
- Q4.a) A retaining wall is 3m wide at the top and 8m wide at the bottom and is 18m high. It is subjected to earth pressure on the back. If the weight of masonry is 25 kN/m<sup>3</sup> and that of earth 16 kN/m<sup>3</sup> and the angle of repose of earth be 30° and top of the earth is horizontal and level with the top of the wall, find the maximum and minimum intensities of pressure on the base. Examine the stability of the wall if  $\mu=0.62$  (10)

- Q4.b) Draw stress-strain curve for mild steel and indicate (a) elastic Limit (b) yield stress (c) ultimate stress (d) Breaking point (e) Strain hardening region (5)

- Q4.c) A point in a material has the following state of stress: Calculate normal stress and shear stress on a plane AB inclined at 30 degrees as shown. (5)

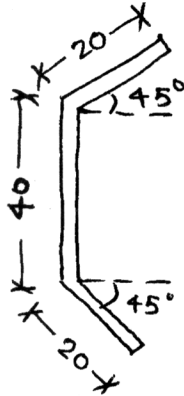


- Q5.a) An overhanging beam is loaded as shown. It is observed that the deflection at A is zero. Find the value of W for this condition. Find also the location and the maximum deflection anywhere in the beam AD. (10)

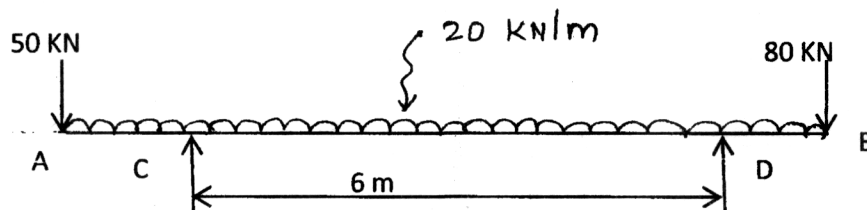




- Q5.b) A point in a material has the following state of stress: Determine (a) the magnitude and direction of the principal stresses ( $\sigma_1, \sigma_2, \theta_p$ ) (b) the magnitude and direction of the maximum shear stress ( $\tau_{max}, \theta_s$ ). (Refer fig. in Q.4(c)) (10)
- Q6.a) Derive equation for the hoop stress in the thin closed cylindrical shell (10)
- Q6.b) Derive the Simple Bending Theory Equation in detail (10)
- Q7.a) Locate the shear centre of the thin section of thickness ( $t$ ) as shown: (10)



- Q7.b) A beam AB 10M long carries a uniformly distributed load of 20 KN/m over its entire length together with concentrated load of 50 KN at the left end A and 80KN at the end. The beam is to be supported at two props at the same level, 6m apart, so that the reaction is the same at each. Determine the positions of the supports and draw S.F. and B.M. diag. Find the value of maximum B.M. Locate the points of contraflexure, if any. (10)



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

**STRENGTH OF MATERIAL (RE-EXAM)**

SE (CIVIL) SEM III

Duration : 3 Hour

Date-

(100 MARKS)

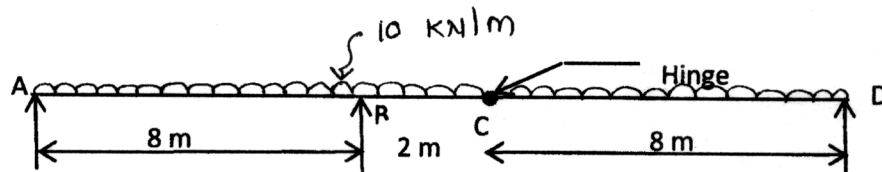
- Attempt any FIVE questions out of SEVEN questions.

MASTER FILE.

Q1.a)

Draw the B.M., S.F., and A.F. diagrams for a beam loaded as shown in fig

(12)

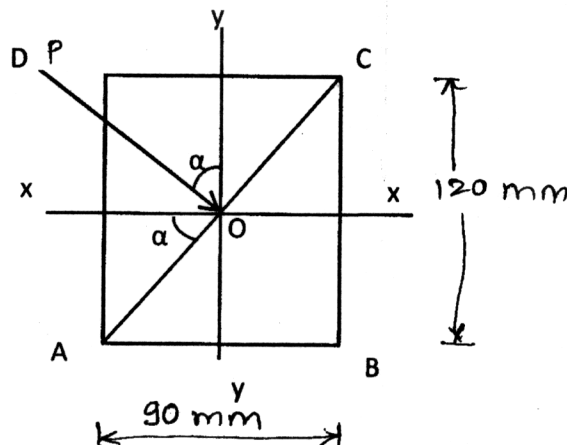


- Q1.b) A thin closed cylindrical shell of diameter 1000 mm, thickness 12 mm, length 3 m, is filled with a fluid at a pressure 1.5 N/mm<sup>2</sup>. Modulus of elasticity ( $E$ ) =  $2 \times 10^5$  N/mm<sup>2</sup>, poisson's ratio ( $\nu$ ) = 0.3 Calculate (a) Circumferential stress (b) Longitudinal stress (c) Change in diameter (d) Change in length (8)

- Q2.a) A T beam of span 5 m has a flange 125 mm x 12.5 mm and web 187.5 mm x 8 mm. If the maximum permissible stress is 150 Mpa, find the maximum u.d.l. the beam can carry. (10)

- Q2.b) A beam of rectangular cross section (width  $B = 100$  mm, depth  $D = 200$  mm) is subjected to a shear force of 10 kN. Calculate (a) Shear stress ( $\tau$ ) developed at a layer 80 mm above the neutral axis of the section. (b) Maximum shear stress ( $\tau_{\max}$ ) in the section (c) Draw the shear stress distribution diagram. (10)

- Q3.a) A beam of rectangular section 90mm x 120mm deep as shown in fig is subjected to a bending moment of 1000 Nm, the trace of the plane of loading being at right angles to one of the diagonals. Locate the neutral axis of the section and determine the stresses at all corners of the section. (12)



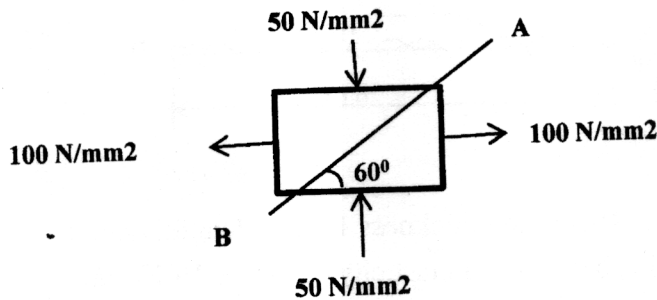
SEC(CIVIL) Strength of Material (Re-exam)

17/12/14

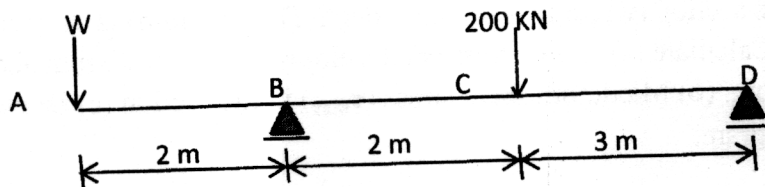
Q3.b) A solid circular shaft of diameter 100 mm and length 1000 mm is used to transmit the power of 150 kW at 200 rpm. Modulus of rupture ( $G$ ) =  $0.7 \times 10^5 \text{ N/mm}^2$ . Find (a) angle of twist ( $\theta$ ) over the entire length. (b) Maximum shear stress in the shaft (8)

Q4.a) A masonry chimney 24 m high, of uniform circular section, 3.5 m external diameter and 2 m internal diameter is subjected to a horizontal wind pressure of 1 kN/sq m of projected area. Find the maximum minimum stress intensities at the base, if the specific weight of masonry is 22 kN/cu m. (10)

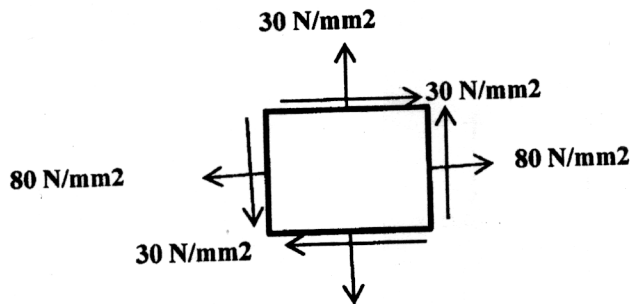
Q4.b) Principal stress at a point in a material are 100 N/mm<sup>2</sup> ( $\sigma_1$  Tensile) and 50 N/mm<sup>2</sup> ( $\sigma_2$  Compressive). At the plane AB as shown below, determine (a) Normal stress (b) Tangential stress (c) Resultant stress (d) Also calculate the maximum shear stress ( $\tau_{\max}$ ) at any point in the material. (10)



Q5.a) An overhanging beam is loaded as shown. It is observed that the deflection at A is zero. Find the value of W for this condition. Find also the location and the maximum deflection anywhere in the beam AD. (10)



Q5.b) A point in a material has the following state of stress: Determine (a) the magnitude and direction of the principal stresses ( $\sigma_1, \sigma_2, \theta_p$ ) (b) the magnitude and direction of the maximum shear stress ( $\tau_{\max}, \theta_s$ ). (10)



Q6.a) Derive equation for Simple Bending Theory in detail (10)

SECCIVIL).

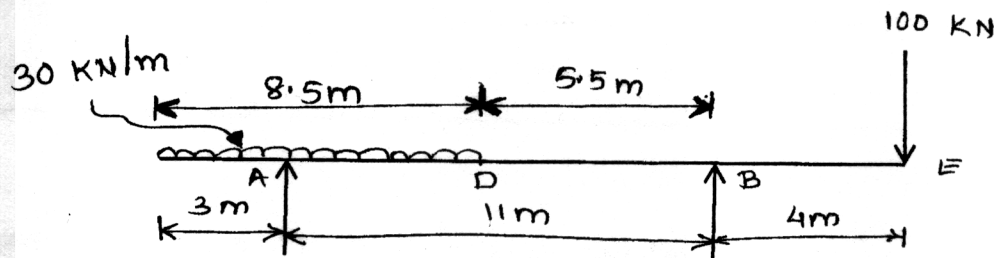
Strength of Material (Re-exam) 17/12/14.

Write the formula for shear stress distribution ( $\tau$ ) across a section in a beam and explain all the terms in the formula. Also show that the maximum shear stress ( $\tau_{\max}$ ) for a rectangular section is 1.5 times the average shear stress ( $\tau_{\text{avg}}$ )

(10)

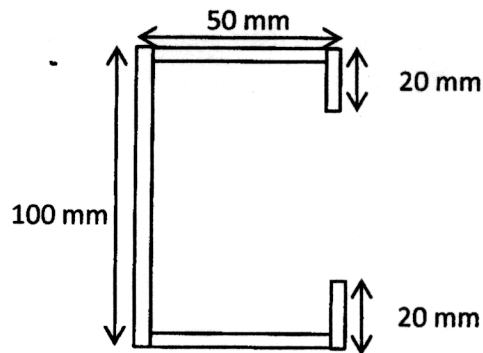
Q7.a) Draw the B.M. and S.F, diagrams for the beam loaded as shown in fig.

(10)



Q7.b) Locate the shear centre of the thin section of thickness ( $t$ ) as shown:

(10)



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Lib  
31-10-14

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

**STRENGTH OF MATERIAL**

SE (CIVIL) SEM III

Date- 31/10/2014

Duration : 3 Hour

(100 MARKS)

Master

KT - EXAM (O.D)

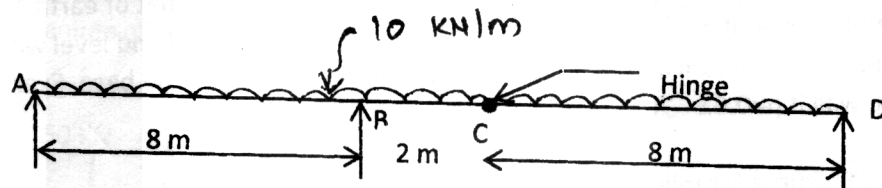
- Attempt any FIVE questions out of SEVEN questions.

S.E.C. Sem III and

Q1.a)

Draw the B.M., S.F., and A.F. diagrams for a beam loaded as shown in fig

(12)



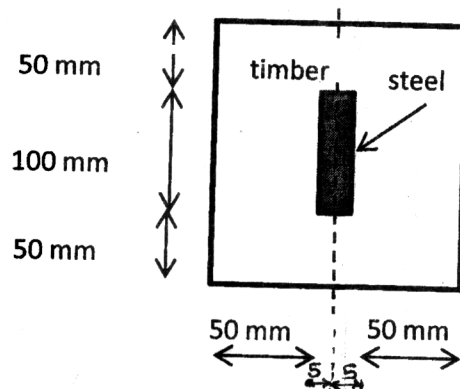
Q1.b)

A thin spherical shell of diameter 500 mm, and thickness 10 mm is filled with a fluid at pressure 2 N/mm<sup>2</sup>. Modulus of elasticity ( $E$ ) = 200 Gpa, poisons ratio ( $\nu$ ) = 0.3 Calculate (a) Tensile stress on shell ( $\sigma_1$ ) (b) Change in diameter ( $\delta d$ ) (c) Change in volume ( $\delta V$ )

(8)

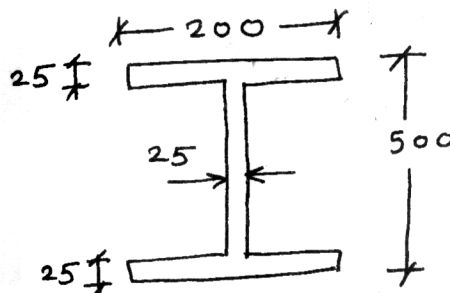
Q2.a) Calculate M.R. of the flitched beam section shown. Take maximum permissible stress in wood as 8MPa and in steel as 120MPa. Take  $E_s = 20 E_w$ .

(10)



Q2.b) For the I-beam section shown below calculate (a) the maximum shear stress ( $\tau_{max}$ ), (b) shear stress ( $\tau$ ) at the junction of flange and web, (c) ratio of maximum to average shear stress.

(10)



- Q3.a) Two plates of 8 mm thickness are joined by a single riveted lap joint. The rivets are of 16 mm diameter and the pitch is 50 mm. Calculate the efficiency of the joint. Take  $f_t = 120$  N/mm<sup>2</sup>,  $f_s = 90$  N/mm<sup>2</sup>,  $f_b = 160$  N/mm<sup>2</sup> (8)

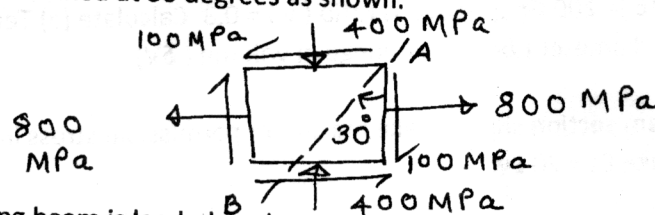
- Q3.b) Determine the diameter of a shaft that can transmit power of 150 kW at 200 rpm. Maximum shear stress ( $\tau$ ) allowed is 60 N/mm<sup>2</sup>. Modulus of rupture ( $G$ ) = 70 Gpa. If the angle of twist allowable is 2 degree over the entire length, what should be the length of the shaft? (8)

- Q3.c) A close coiled helical spring is to carry a load of 200 N. The mean coil diameter is 15 times that of wire diameter. If the maximum shear stress is not to exceed 75 N/mm<sup>2</sup>, find (a) the diameter of the wire (b) the diameter of the coil. (4)

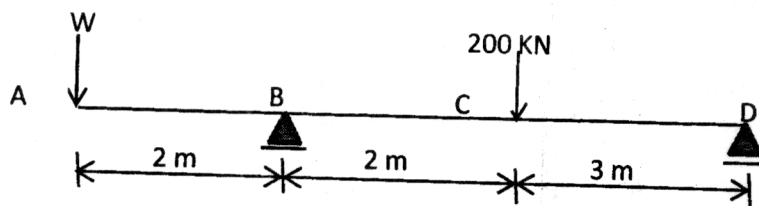
- Q4.a) A retaining wall is 3m wide at the top and 8m wide at the bottom and is 18m high. It is subjected to earth pressure on the back. If the weight of masonry is 25 KN/m<sup>3</sup> and that of earth 16 KN/m<sup>3</sup> and the angle of repose of earth be 30° and top of the earth is horizontal and level with the top of the wall, find the maximum and minimum intensities of pressure on the base. Examine the stability of the wall if  $\mu = 0.62$  (10)

- Q4.b) Draw stress-strain curve for mild steel and indicate (a) elastic Limit (b) yield stress (c) ultimate stress (d) Breaking point (e) Strain hardening region (5)

- Q4.c) A point in a material has the following state of stress: Calculate normal stress and shear stress on a plane AB inclined at 30 degrees as shown. (5)



- Q5.a) An overhanging beam is loaded as shown. It is observed that the deflection at A is zero. Find the value of W for this condition. Find also the location and the maximum deflection anywhere in the beam AD. (10)

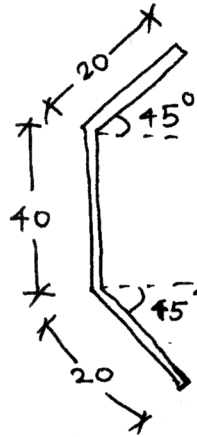


- Q5.b) A point in a material has the following state of stress: Determine (a) the magnitude and direction of the principal stresses ( $\sigma_1, \sigma_2, \theta_p$ ) (b) the magnitude and direction of the maximum shear stress ( $\tau_{max}, \theta_s$ ). [Refer to Fig. Q. 4(c)] (10)

- Q6.a) Derive equation for the hoop stress in the thin closed cylindrical shell (10)

- Q6.b) Derive the Simple Bending Theory Equation in detail (10)

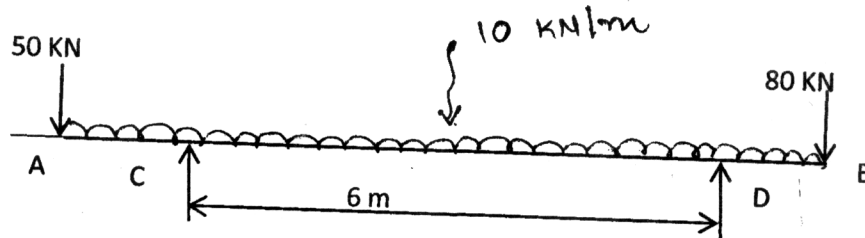
- Q7.a) Locate the shear centre of the thin section of thickness ( $t$ ) as shown: (10)



Q7.b)

A beam AB 10M long carries a uniformly distributed load of 20 KN/m over its entire length together with concentrated load of 50 KN at the left end A and 80KN at the end. The beam is to be supported at two props at the same level, 6m apart, so that the reaction is the same at each. Determine the positions of the supports and draw S.F. and B.M. diag. Find the value of maximum B.M. Locate the points of contraflexure, if any.

(10)



\* \* \* \* \*

U6  
16/12/14

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

Total Marks: 100

Class/Sem: S.E. (Civil), Sem III.

SE (Civil), Sem-III, Re-exam

Date: .....

Duration: 3 Hours

Subject: Surveying-I

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 a)** Define surveying and give classification of surveying (06)
- b)** State different types of scale and discuss in detail diagonal scale. (04)
- c)** Explain ranging by line ranger (04)
- d)** Explain how you will continue chaining past the following obstacle. (06)
- i) A Pond
- ii) A building

- Q2 a)** The following bearing were observed in running a closed traverse (10)

LINE	FORE BEARING	BACK BEARING
AB	S 37°30' E	N 37°30' W
BC	S 43°15' W	N 44°15' E
CD	N 73°00' W	S 72°15' E
DE	N 12°45' E	S 13°15' W
EA	N 60°00' E	S 59°00' W

Determine corrected magnetic bearing by included angle method.

- b)** Define the following term with neat sketches
- i) True meridian      ii) Magnetic Meridian      iii) Magnetic declination (06)
- c)** Define local attraction and state the errors in compass surveying. (04)

Page no. 1.



Q3 a) Explain two point problem in plane table surveying

(08)

b) Explain in brief method of orientation of plane table.

(08)

c) In an old survey made when the declination was  $4^\circ W$ , the magnetic bearing of a given line was  $210^\circ$ . The declination in the same locality is now  $10^\circ E$ , what are the true & present magnetic bearing of the line.

(04)

Q4 a) A railway embankment 400m long is 10m wide at the formation level and has a side slope of 1:2. The ground levels at every 100m along the centre line are as under.

Chainage(m)	0	100	200	300	400
Level (h)m	2.2	1.8	1.5	2.8	2.7

Calculate the volume of earth work by prismoidal formula.

(06)

b) A planimeter was set on map with anchor point outside the map. The length of tracing arm was 14.9cm; length of anchor arm was 22.2cm. The wheel was placed outside the pivot point at a distance of 2.7cm, reading taken were as follow

i) Initial reading = 0.735

ii) Final reading = 7.835

The zero of the counting disc passed the index mark once in anti clockwise direction. Find area of map & area of zero circle ( $M=100$ ,  $C=20$ ).

(06)

c) The following give the value in m of the offsets from a chain line, to an irregular boundary: (08)

Distance(m)	0	20	40	60	80	100	120	140	160
Offset(m)	4.25	6.82	7.20	8.19	4.92	5.34	3.81	3.00	2.28

Calculate area in square meter included between chain lines by trapezoidal and Simpson's method.

Page no. 2.

S.E (Civil) Sem III, Re-exam

Dt. 16/12/14.

Q5 a) Explain theodolite traversing by following methods

(08)

i) Direct method with transiting

ii) Back bearing method

b) In a closed traverse ABCDEA carried out with a transit vernier theodolite; the following is the part of a Gale's Traverse Table.

(06)

LINE	LENGTH IN METER	REDUCED BEARING
AB	28.21	N 15°16'15" E
BC	21.25	N 23°10'20" W
CD	29.80	N 82°15'41" W
DE	34.10	S 14°16'21" W
EA	42.90	S 65°19'55" E

Compute the closing error, relative closing error & angular error

c) The following table gives the length and bearing of the line of a traverse PQRST, the length and bearing of line TP is omitted. Calculate the length & bearing of TP.

(06)

LINE	LENGHT	BEARINGS
PQ	110.0	80°30'
QR	216.0	25°20'
RS	287.0	270°
ST	122.0	215°20'
TP	?	?

Q6 a) Explain direct method of contouring.

(08)

b) Describe methods of interpolation of contour

(06)

c) What is grade contour? How will you locate it on ground & on map

(08)

Page no. 3.

S.E. (Civil) sem III, Re-exam 16/12/14

Q7 a) Discuss effects of curvature & refraction in levelling & find correction due to each and combined correction. (06)

b) In levelling between two point A & B on the opposite banks of river, the level was set up near A & the staff reading on A & B were 1.570 & 2.874 resp. the level was then moved & set up near B and the resp staff readings on B & A were 2.055 & 0.855. Find the difference between level A & B. (04)

c) The R.L of a factory floor is 100.00ft. Staff reading on floor is 4.62ft and staff reading when staff is held inverted with bottom touching the tie beam is 12.16ft. Find the height of tie beam above floor. (02)

d) State the difficulties in levelling work (08)

\*\*\*\*\* BEST OF LUCK \*\*\*\*\*

page - (4)



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



*S.E (Civil), sem - III*

October: 2014

S. E. (Civil), Semester – III, (End sem. Examination)

Subject: Surveying - I

Marks: 100, Duration- 3 Hour-

*Master*

1. Question Number 1 is compulsory
2. Attempt any four questions out of remaining six questions.
3. All questions carry equal marks.
4. Assume any data if required and state them clearly.

Que.1 a. What is hypotenusal allowance? How it is used while chaining on sloping ground. 05

b. The readings from a planimeter were the following: initial reading = 10.124, 05

final reading = 4.616, the zero crossed the index twice in the clockwise direction.

The anchor point was kept inside the areas and the constant were  $M = 100.5$  sq. cm.

and  $C = 30$ . Find the area of the plan.

c. Explain the construction of the diagonal scale. 05

d. How will you measure deflection angle of a survey line with a theodolite? 05

Que.2 a) Describe with the help of neat sketches an optical square. 05

b) Explain Fly levelling with its suitability? 05

c) A river is flowing from west to east. For determining the width of river two points 05

A and B are selected on southern bank such that distance  $AB = 50$  M. point A is

westwards. The bearings of a tree C, on the northern bank are observed to be

$48^\circ$  and  $348^\circ$  respectively from A and B. Calculate width of river?

d) What are different types of tapes used for measuring distances? 05



Que.3 a). Explain briefly the possible errors in the Theodolite work and the precautions taken to eliminate them. 07

b) The fore bearing of the line AB in a regular hexagon taken in the anticlockwise manner is  $57^\circ$ . Find bearing of all lines. Also determine true bearings if magnetic declination is  $2^\circ 25' W$ . 08

c). Classify the survey based on nature of field. 05

Que.4 a) Discuss spot levelling method of contouring. 05

b) Explain the step- by- step procedure to measure the vertical angle between two points. 05

c) An abstract from a traverse sheet for a closed traverse is given below. Balance the Traverse by transit rule. 10

Line	Latitude	Departure
AB	-173.20	100.00
BC	-314.50	128.40
CD	86.60	50.00
DE	250.00	0.00
EA	154.90	-280.00

Que.5 a) The offset taken from a survey line to a boundary are given below. 05

Find the area by Trapezoidal rule and Simpson's rule.

Chainage (m)	0	8	16	24	32	40	48
Offset (m)	2.1	4.5	4.8	5.2	4.8	5.4	4.8

b. Explain the characteristics of contour. 05

c. The following consecutive readings were taken with a level and 4 M levelling staff on a continuously sloping ground 0.865, 1.425, 2.445, 3.185, 3.675, 0.495, 1.265, 2.455, 2.745, 0.315, 1.065, 1.785, 2.495 3.230. The first reading was taken on a BM of 150.50 m. Rule out a page of level book and enters the above readings and Calculate R.L. of all points. Also check the accuracy of calculations. 10

Que.6 a) Explain the Reiteration method for measurement of horizontal angle.

05

b) During a Theodolite survey the following details were noted:

10

Line	Length (m)	W.C.B.
AB	550	60°
BC	1200	115°
CD	?	?
DA	1050	310°

Calculate the length and bearing of line CD.

c) Explain the intersection method of plane table survey.

05

Que.7 Write short notes on the following (any four)

20

- (i) Spire test
- (ii) Difficulties in leveling
- (iii) Testing of Chain
- (iv) Area of zero circle
- (v) Curvature and refraction correction