



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



**Class : SE (CIVIL) | SEM III | KT**  
**Subject : ENGINEERING GEOLOGY**

**Exam : K.T Exam**

Marks : 100 ( 3 Hour )

Instructions :

Date : 26/06/2015

- 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

*Mester.*

- 1A. Write a note on geological action of river. (5)
- 1B. Write a note on seismic waves and internal structure of the Earth. (2+3)
- 1C. Explain in detail about landforms created by glaciers. (10)
- 2A. Give names of any four ore forming minerals. Give names of silicate structures with their Si:O ratio. (2+3)
- 2B. What does mineralogy of a particular rock suggest about its strength? Explain with suitable example. (5)
- 2C. Write a note on Amphibole and pyroxene group of minerals. (10)
- 3A. Write a note on agents of metamorphism (5)
- 3B. Write a note on different types of sandstones. (5)
- 3C. Write a note on Laccolith, Lopolith, Phacolith, Batholith, Dyke (2+2+2+2)

(P.T.O)

SE (CIVIL), Semr III, A.T.K.T, 26/06/15.  
Engineering Geology

- 4A. Write a note on different types of joints. (5)
- 4B. What is the principle of Uniformitarianism. Explain. (5)
- 4C. i) Write a note on classification of fault.  
ii) Write a note on parts of the fold. (5+5)
- 5A. Write a brief note on wenner array and schlumberger array method. (5)
- 5B. Write a brief note on properties of road aggregates. (5)
- 5C. Write a note on site improvement by different methods. (10)
- 6A. Write a note on preliminary and detail Surveys for the selection of dam site. (5)
- 6B. Write a note on water table. (5)
- 6C. Write a note on precautions to be taken during selection of a dam site considering geological aspects. (10)
- 7A. Write a note on ideal site for tunneling. (5)
- 7B. Explain various geological considerations for choosing sites and alignment of a tunnel. (15)
- .....

29b  
25/06/15

SE (CIVIL), Sem-III, A.T.K.T, 25/06/15  
Building Materials & Construction

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

Total Marks: 100  
Class/Sem: S.E. (Civil), Sem III.  
Date: 2015  
Duration: 3 Hours  
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 the different type of rubble masonry. (10M)
- b) Classify building material with example & state requirement of building materials. (10M)
- Q2a) Enlist different types of doors & explain any two with neat sketch (10M)
- b) Write the features and working of Hoffman's kiln with neat sketch (10M)
- Q3a) Explain defects due to seasoning in timber with neat sketch. (10M)
- b) Explain with sketch various type of shallow foundation. (10M)
- Q4a) Explain with a flow chart dry process of manufacturing cement. (10M)
- b) State the points to be considered while selecting a flooring. (10M)

SE (CIVIL), Sem-III, A.T.K.T, 25106115  
Building Materials & Constructions.

- Q5a) Explain defects in plastering. (10M)
- b) Plan a dog legged stair case for a government building in which the vertical distance between each floor is 3.2m. The size of stair case room is 5.2m x 3m. (6M)
- c) State the properties of mortar (4M)
- Q6a) Enlist different types of concrete and explain in detail fibre reinforced concrete (10M)
- b) State use of plastic as construction material. (10M)
- Q7a) Write a note on couple roof with a neat sketch (5M)
- b) Write a note on membrane damp proofing. (5M)
- c) How painting of new and old wood work is done. (5M)
- d) Write a short note on artificial ventilation. (5M)

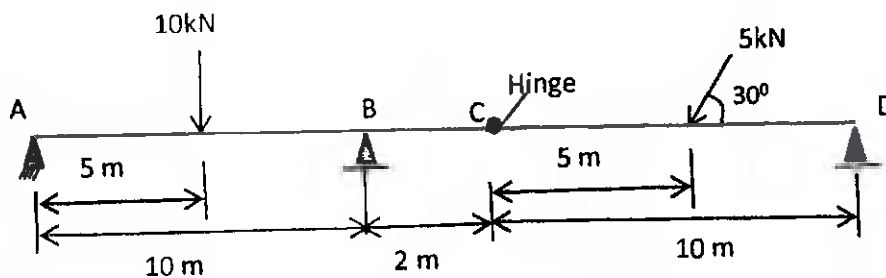
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- Attempt any FIVE questions out of SEVEN questions.

*Master*

Q1.a) Draw the B.M., S.F., and A.F. diagrams for a beam loaded as shown in fig

(12)

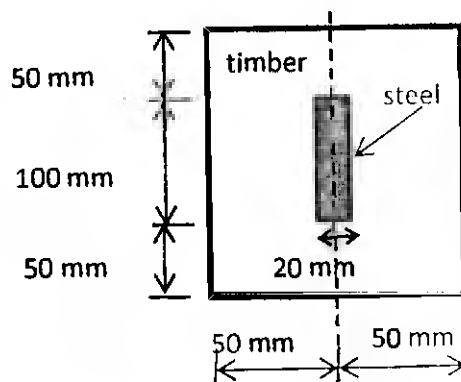


Q1.b) A thin closed cylindrical shell of diameter 1200 mm, thickness 12 mm, length 2 m, is filled with a fluid at a pressure 1.5 N/mm<sup>2</sup>. Modulus of elasticity (E) =  $2 \times 10^5$  N/mm<sup>2</sup>, Poisson's ratio ( $\nu$ ) = 0.3. Calculate (a) Circumferential stress (b) Longitudinal stress (c) Change in diameter (d) Change in length

(8)

Q2.a) 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)

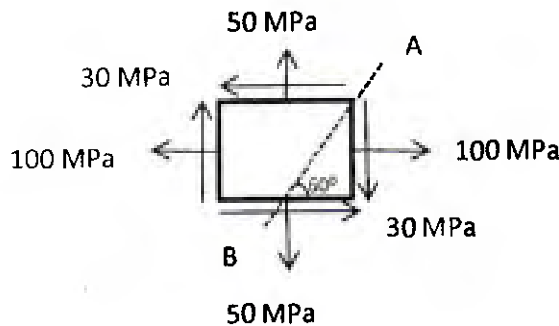


Q2.b) A beam of rectangular cross section (width  $B = 150$  mm, depth  $D = 300$  mm) is subjected to a shear force of 15 kN. Calculate (a) Shear stress ( $\tau$ ) developed at a layer 80 mm above the neutral axis of the section. (b) Maximum shear stress ( $\tau_{max}$ ) in the section (c) Draw the shear stress distribution diagram.

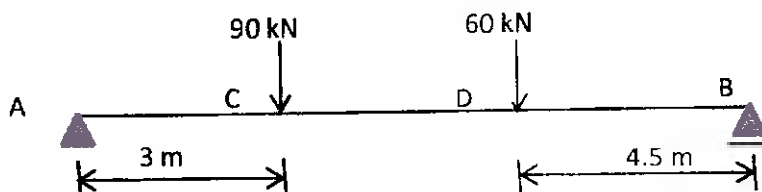
(10)

Strength of materials

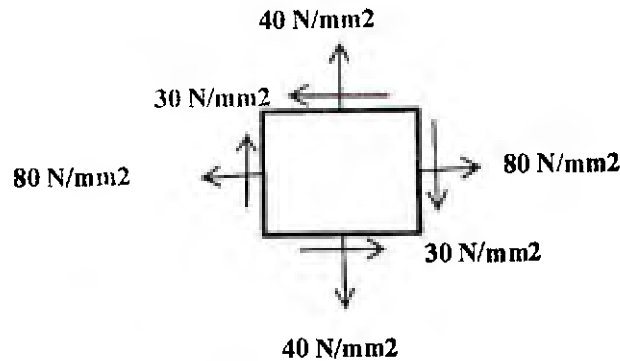
- Q3.a) Two plates of 8 mm thickness are joined by a single riveted lap joint. The rivets are of 16 mm diameter and the pitch is 50 mm. Calculate the efficiency of the joint. Take  $f_t = 120$  N/mm<sup>2</sup>,  $f_s = 90$  N/mm<sup>2</sup>,  $f_b = 160$  N/mm<sup>2</sup> (8)
- Q3.b) Determine the diameter of a shaft that can transmit power of 200 kW at 200 rpm. Maximum shear stress ( $\tau$ ) allowed is 50 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 4m wide at the top and 10m 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 18 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 60 degrees as shown. (5)



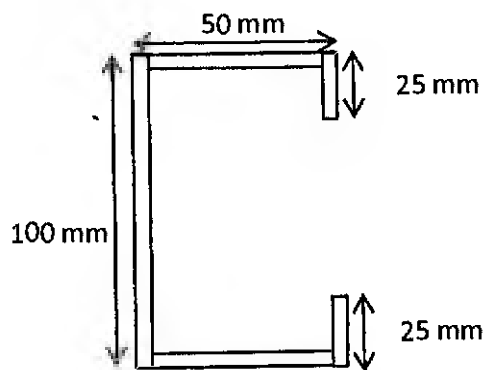
- Q5.a) A steel girder of uniform section, 14 m long is simply supported at its ends. It carries concentrated loads of 90 kN and 60 kN at points 3 m and 4.5 m from the two ends respectively, as shown. Calculate: (1) The deflection of the girder at the points under the two loads. (2) The maximum deflection. Take  $I = 64 \times 10^4$  m<sup>4</sup> and  $E = 210 \times 10^6$  kN/m<sup>2</sup> (10)



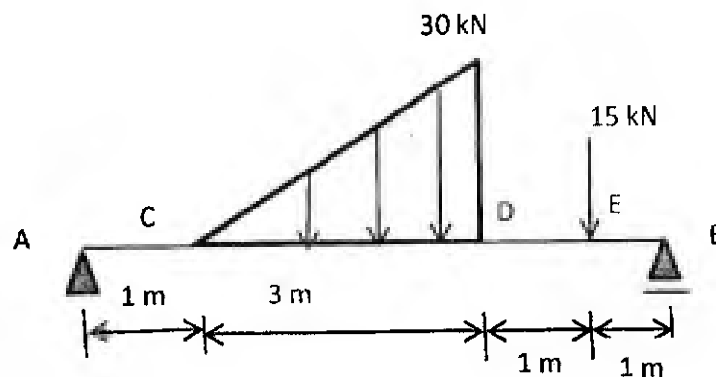
- Q5.b) A point in a material has the following state of stress: Determine (a) the magnitude and direction of the principal stresses ( $\sigma_1, \sigma_2, \theta_p$ ) (b) the magnitude and direction of the maximum shear stress ( $\tau_{max}, \theta_s$ ). (10)

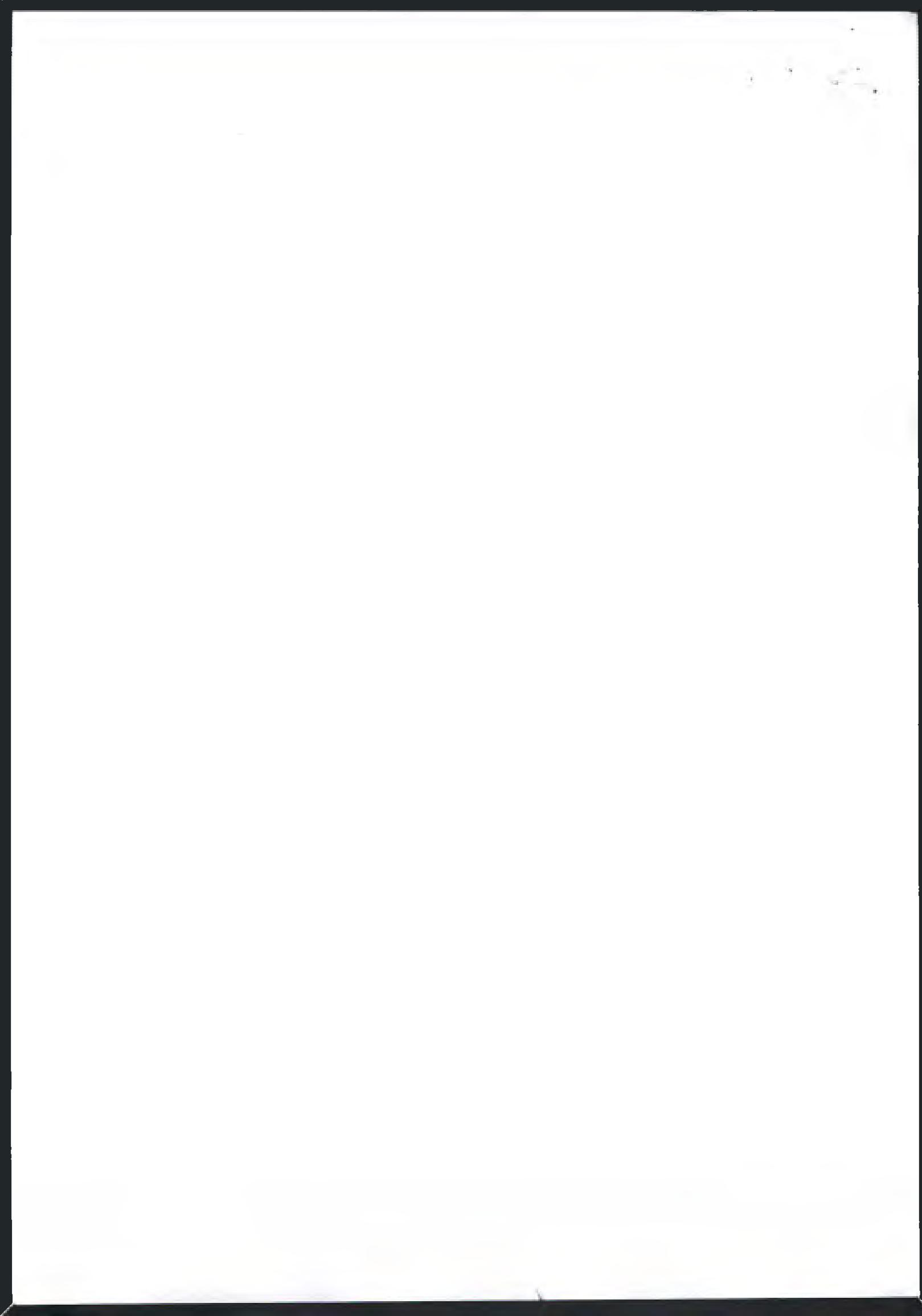


- Q6.a) Derive equation for the hoop stress in the thin closed cylindrical shell (10)
- Q6.b) Derive the Simple Bending Theory Equation in detail (10)
- Q7.a) Locate the shear centre of the thin section of thickness ( $t$ ) as shown: (10)



- Q7.b) Calculate the values of the maximum and minimum bending moments and shearing forces for the simply supported beam loaded as shown in figure below. Also draw the B.M., S.F. and A.F. diagrams and indicate the significant values along the beam. (10)







*Strength of Materials*  
Bharatiya Vidya Bhavan's

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

**STRENGTH OF MATERIAL (KT Exam)**

SE (CIVIL) SEM III

Date- June 2015

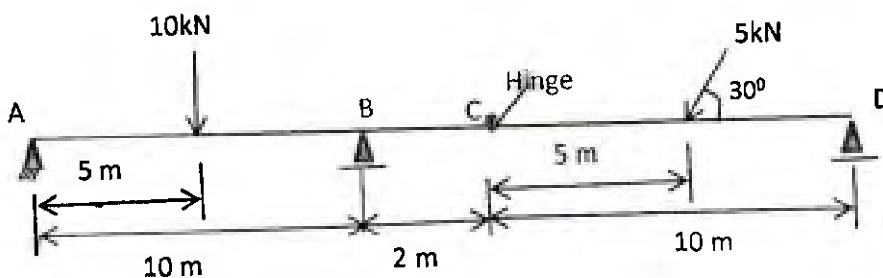
Duration : 3 Hour

(100 MARKS)

- Attempt any FIVE questions out of SEVEN questions.

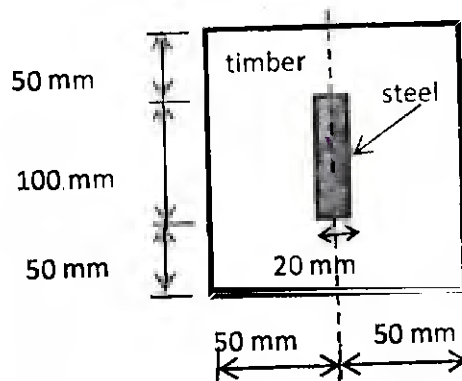
*Master*

Q1.a) Draw the B.M., S.F., and A.F. diagrams for a beam loaded as shown in fig (12)



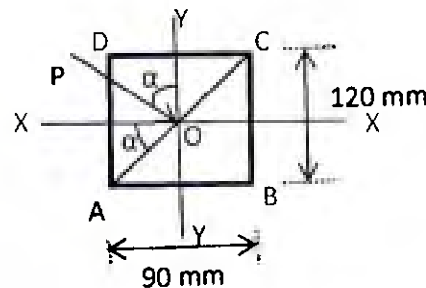
Q1.b) A thin closed cylindrical shell of diameter 1200 mm, thickness 12 mm, length 2 m, is filled with a fluid at a pressure 1.5 N/mm<sup>2</sup>. Modulus of elasticity (E) =  $2 \times 10^5$  N/mm<sup>2</sup>, Poisson's ratio ( $\nu$ ) = 0.3. Calculate (a) Circumferential stress (b) Longitudinal stress (c) Change in diameter (d) Change in length (8)

Q2.a) 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)

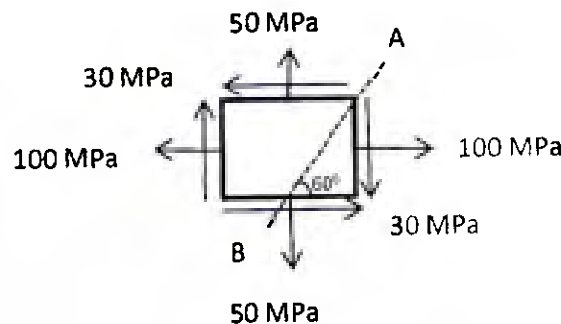


Q2.b) A beam of rectangular cross section (width B = 150 mm, depth D = 300 mm) is subjected to a shear force of 15 kN. Calculate (a) Shear stress ( $\tau$ ) developed at a layer 80 mm above the neutral axis of the section. (b) Maximum shear stress ( $\tau_{max}$ ) in the section (c) Draw the shear stress distribution diagram. (10)

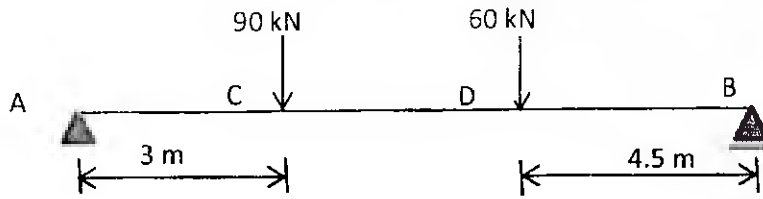
- Q3.a) A beam of rectangular section 90 mm x 120 mm deep as shown in fig is subjected to a bending moment of 1000 Nm. The trace of the plane of loading being at right angles to one of the diagonals. Locate the neutral axis of the section and determine the stresses at all corners of the section. (12)



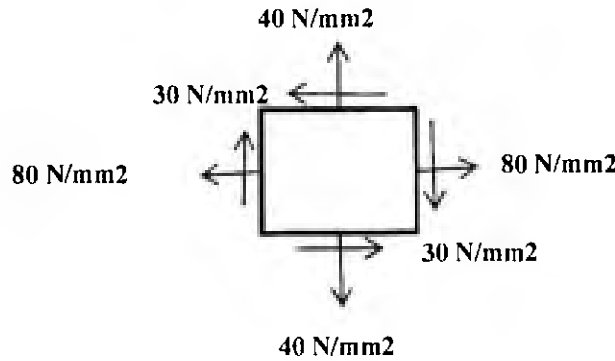
- Q3.b) Determine the diameter of a shaft that can transmit power of 200 kW at 200 rpm. Maximum shear stress ( $\tau$ ) allowed is 50 N/mm<sup>2</sup>. Modulus of rupture ( $G$ ) = 70 Gpa. If the angle of twist allowable is 2 degree over the entire length, what should be the length of the shaft? (8)
- Q4.a) A retaining wall is 4 m wide at the top and 10 m 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 18 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)
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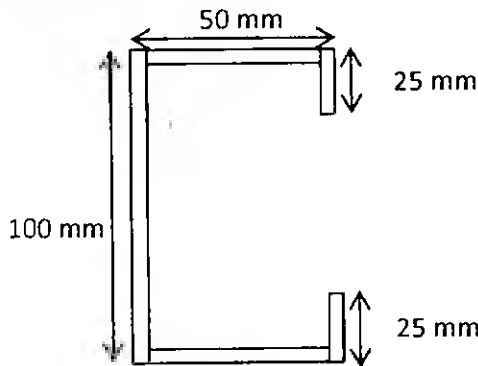
- Q5.a) A steel girder of uniform section, 14 m long is simply supported at its ends. It carries concentrated loads of 90 kN and 60 kN at points 3 m and 4.5 m from the two ends respectively, as shown. Calculate: (1) The deflection of the girder at the points under the two loads. (2) The maximum deflection. Take  $I = 64 \times 10^{-4} \text{ m}^4$  and  $E = 210 \times 10^6 \text{ kN/m}^2$  (10)



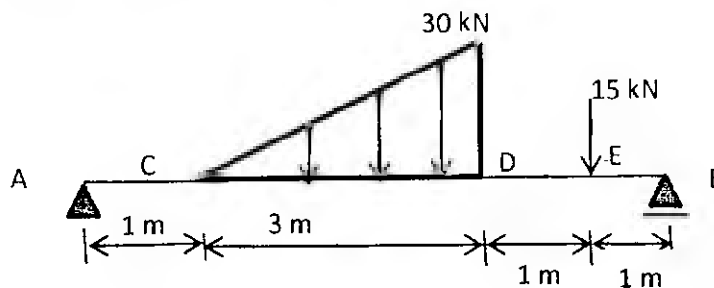
- Q5.b) A point in a material has the following state of stress: Determine (a) the magnitude and direction of the principal stresses ( $\sigma_1, \sigma_2, \theta_p$ ) (b) the magnitude and direction of the maximum shear stress ( $\tau_{max}, \theta_s$ ). (10)

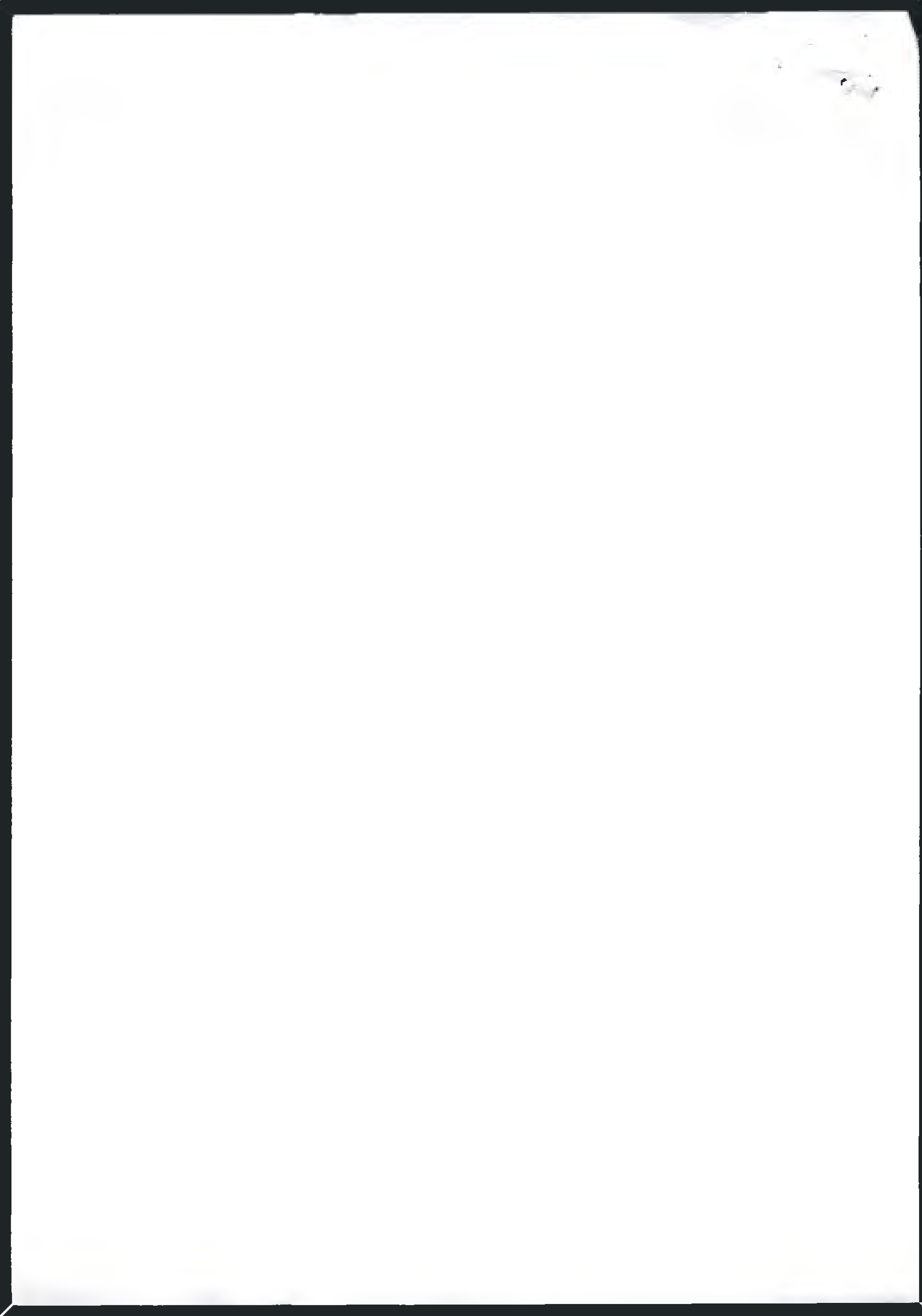


- Q6.a) Derive equation for the hoop stress in the thin closed cylindrical shell (10)
- Q6.b) Derive the Simple Bending Theory Equation in detail (10)
- Q7.a) Locate the shear centre of the thin section of thickness ( $t$ ) as shown: (10)



- Q7.b) Calculate the values of the maximum and minimum bending moments and shearing forces for the simply supported beam loaded as shown in figure below. Also draw the B.M, S.F. and A.F. diagrams and indicate the significant values along the beam. (10)





Engineering Mathematics - III

Bharatiya Vidya Bhavan's  
**SARDAR PATEL COLLEGE OF ENGINEERING**

(An Autonomous Institution Affiliated to University of Mumbai)

June 2015

ATKT

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

$$A = \begin{bmatrix} 6 & 1 & 3 & 8 \\ 4 & 2 & 6 & -1 \\ 16 & 4 & 12 & 15 \end{bmatrix}$$

(b) Evaluate  $\int_A^B (3x^2y - 2xy)dx + (x^3 - x^2)dy$  along  $y^2 = x$  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

$$f(x) = \left[ \frac{\pi - x}{2} \right]^2$$

Q.2 (a) Find Laplace transform of the function  $f(t) = te^{2t} \sin t$  6

(b) Verify Cayley Hamilton Theorem for the following matrix A and find  $A^{-1}$ , if it exists. 6

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

- (c) Using method of Laplace Transforms, solve the following differential equation 8

$$\frac{d^2 y}{dt^2} - 3 \frac{dy}{dt} + 2y = 4e^{2t} \text{ where } y(0) = -3, y'(0) = 5$$

- Q.3 (a) Obtain complex form of Fourier series of the function  $f(x) = e^x$   $x \in (-\pi, \pi)$  6

- (b) Evaluate  $\oint_C (3x - 7y)dx + (3x + 5y)dy$  where C is the rectangle whose sides are 6

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

- (c) Find Eigen values and corresponding Eigen vectors of A, where 8

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

- 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 6

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

$$x - 2y + z = 5$$

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

- (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 8

$$\text{of the cuboid } 0 \leq x \leq a, 0 \leq y \leq b, 0 \leq z \leq c$$

- Q.5 (a) find  $L^{-1} \{ \cot^{-1}(s+2) \}$  6

- (b) Evaluate  $\oiint_S \vec{F} \cdot \hat{n} ds$ , where  $\vec{F} = (3x - yz)\hat{i} + (6y + 5xz)\hat{j} + (4z - 7xy)\hat{k}$  and S is the surface of 6

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

- (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  $A = \frac{1}{2} \begin{bmatrix} \sqrt{2} & -i\sqrt{2} & 0 \\ i\sqrt{2} & -\sqrt{2} & 0 \\ 0 & 0 & 2 \end{bmatrix}$  is unitary. 6
- (b) Evaluate  $L^{-1} \left\{ \frac{s^2 + 6}{(s+1)^2 (s-2)} \right\}$  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  $y = x^2$  and  $x = y$  8
- 7(a) Evaluate  $\iint_S (\nabla \times \vec{F}) \cdot \hat{n} ds$ , 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  $x^2 + y^2 + z^2 = 9, z \geq 0$  above XY plane. 6
- (b) Obtain Fourier series expansion of the following function 6  
 $f(x) = x - x^2, -1 < x < 1$
- (c) Using Convolution theorem, Evaluate  $L^{-1} \left\{ \frac{(s+2)^2}{(s^2 + 4s + 8)^2} \right\}$  8

The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that every entry, no matter how small, should be recorded to ensure the integrity of the financial statements. This includes not only sales and purchases but also expenses and income. The document also highlights the need for regular reconciliation of bank statements and the company's records to identify any discrepancies early on.

In the second part, the author provides a detailed breakdown of the accounting cycle. It starts with identifying the accounting period and ends with the preparation of financial statements. Each step is explained in detail, including the necessary journal entries and the use of T-accounts to organize the data. The document stresses that following these steps meticulously is crucial for producing reliable financial information.

The third section focuses on the classification of accounts. It explains how to distinguish between assets, liabilities, and equity accounts, as well as the difference between debit and credit balances. This part is particularly useful for students who are learning to analyze the balance sheet and understand the relationship between different types of accounts.

Finally, the document concludes with a summary of the key points covered. It reiterates the importance of accuracy and consistency in accounting practices. The author encourages students to practice regularly and seek help when needed to ensure they have a solid understanding of the subject.



SE (Civil), Sem - III, A.T. K.T, 24/6/15.

Engineering materials

fib  
24/06/15

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

AKT

Total marks: 100

Duration: 3 Hours

CLASS/SEM: S.E.CIVIL / SEM-III

SUBJECT: ENGINEERING MATERIALS

- Attempt any FIVE questions out of seven questions.
- Answer to all sub questions should be grouped together.
- Figures to right indicate full marks.
- Assume suitable data if necessary and state them clearly.

Master.

Q.1 a) What are the physical and mechanical properties of building materials? (10)  
b) What are the methods of quarrying stones? Explain any two in detail. (10)

Q.2 a) How bricks are manufactured? Explain stepwise in detail. (12)  
b) Compare concrete blocks with bricks considering various aspects. (08)

Q.3 a) Explain wet process of manufacturing of cement. (10)  
b) What are the ingredients of concrete according to their proportions? (10)

Explain placing of concrete.

Q.4 a) Classify building tiles according to their suitability? Explain burning process of tiles during manufacturing process. (10)

b) Describe earthenware and stoneware in detail. (10)

Page - ①

SE (Civil), Sem. III, A.T.K.T, 24/6/15.

Engineering materials.

Q.5 a) What is preservation of timber? Explain methods of preservation of timber. (10)

b) Describe ferrous metals along with properties and their uses. (10)

Q.6 a) What are the properties of oil-paint and varnish? (10)

b) State various properties of bitumen. (05)

c) What are the uses of plastic? (05)

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

a) Asbestos b) Cork

c) Rubber d) Gypsum e) Waterproofing materials.

SE (Civil), Sem - III, A.T. K.T.  
Building Construction

Lib  
22/06/15

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

Date:

KT-2015

Total Marks: 100

Duration: 3 Hours

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) Write a note on various components of building. (10M)

Q1b) What are the causes of failure of foundation? What remedial measures you will adopt. (10M)

Q2a) Write a note on any three appliances used for lifting of stone masonry with neat sketch. (10M)

Q2b) Write a note on different types of staircase. (10M)

Q3a) Explain the term with neat sketch: stretcher, header, Quoin, Perpend, Half Bat, queen closer & king closer. (10M)

b) Enlist different types of roof covering material & write a short note on Madras terrace roof with a neat sketch (10M)

Q4 a) Write a short note on: Distemper, white or color washing & wallpapers. (10M)

b) Explain different types of pointing with neat sketch. (10M)

SEC CIVIL), Sem-III, P.T.M.T, 22/6/15.  
Building construction

Q5a) Write a note on couple roof with a neat sketch (5M)

b) Write a note on membrane damp proofing. (5M)

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

d) Write a short note on artificial ventilation. (5M)

Q6a) Enlist different types of finishes in plastering, explain cement plastering. (10M)

b) Explain briefly acoustic design of a movie theatre. (10M)

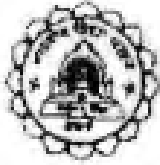
Q7a) Explain English bond and Flemish bond with a neat sketch. (10M)

b) Discuss the location of door & window in building and Explain in detail about Rolling shutter door. (10M)

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SE (CIVIL), Semr III, A.T.K.T.  
Surveying - I

lib  
28/06/15



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



June: 2015

S. E. (Civil), Semester - III, (K.T. Examination)  
Subject: Surveying - I, Marks: 100, Duration- 3 Hour

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.

Master.

- Que.1 a. What is reciprocal levelling? 05
- b. How will you measure magnetic bearing of line using a theodolite? 05
- c. Explain the basic principles of surveying. 05
- d. A 50m long steel tape weighed 15 N and was standardised at a temperature of  $25^{\circ}\text{C}$  and with a pull of 125 N. if the temperature during measurement was  $49^{\circ}\text{C}$  and the pull applied was 180 N, find the correction per tape length, if it was supported at the end points only. The thermal coefficient of expansion is  $11.5 \times 10^{-6}$  per  $^{\circ}\text{C}$ . 05
- Que.2 a) Describe with the help of neat sketches a line ranger. 05
- b) Explain profile levelling with its suitability? 05
- c) The bearings of the lines of a traverse are given below. Find the included angles and correct the bearings for local attraction, if any. 10

Line	PQ	QR	RS	ST	TP
FB	$73^{\circ}40'$	$113^{\circ}50'$	$164^{\circ}20'$	$223^{\circ}40'$	$303^{\circ}50'$
BB	$252^{\circ}30'$	$295^{\circ}20'$	$344^{\circ}20'$	$43^{\circ}$	$123^{\circ}45'$

- Que.3 a) Explain the permanent adjustments of Theodolite. 08
- b) Explain the procedure of correction to bearings (Local attraction), when none of the line in a polygon gives exact difference of  $180^{\circ}$ . 08
- c) Classify the survey based on the purpose of work. 04
- Que.4 a) Discuss direct method of contouring. 05
- b) What are offsets? Explain different types of offsets with their suitability. 06

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 Surveying - I.

Que.4 c) The following notes refer to the reciprocal levels with one level, Find (i) True R L of B  
 (ii) combined correction for curvature and refraction 09

Instrument at	Staff readings on		Remark
	A	B	
A	2.150	3.540	Distance between A and B = 1650 M and RL of A = 540.50 m
B	1.965	3.410	

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	10	20	30	40	50	60
Offset (m)	3.4	6.5	4.9	5.8	6.7	8.4	7.8

b. Discuss horizontal equivalent and contour interval. 05

c. The following is the page of a level field book. Fill in the missing readings and 10  
 Calculate R.L.s. of all points. Check the accuracy of calculations.

Sl. No.	B.S.	I.S.	F.S.	Rise	Fall	R.L.	Remarks.
1	2.150					450.000	B.M.1
2	1.645		?	0.500			
3		2.345		?	?		
4	?		1.965	?			
5	2.050		1.825		0.400		
6	?		?	?		451.500	B.M.2
7	1.690		1.570	0.120			
8	2.865		2.100		?		
9			?	?		451.250	B.M.3

Que.6 a) Explain the Repetition method for measurement of horizontal angle. 05

b) During a Theodolite survey the following details were observed: 10

Line	AB	BC	CD	DE	EA
Length	280	170	250	?	90
Bearing	60°	115°	218°	280°	?

Calculate the length of line DE and bearing of line EA?

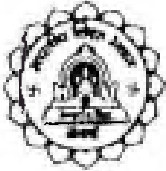
c) Explain the resection method of plane table survey. 05

Que.7 Write short notes on the following (any four) 20

- (i) Balancing of sight
- (ii) Gale's table
- (iii) Reciprocal ranging
- (iv) Diagonal scale
- (v) Auto level

SE (Civil), Sem-III, A.T.K.T, (Old).  
Fluid Mechanics-I

Lib  
22/06/15



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



Class: S.E (CIVIL) / Sem: III  
Subject: Fluid Mechanics-I

Exam: KT-EXAM / old

Marks: 100. (3 hours.)

Instruction:

DATE:

1. Question no 1 is compulsory & attempt any four out of remaining six questions.
2. Illustrate answer with neat sketches wherever required.
3. Make suitable assumptions where necessary and state them clearly.

*Master*

Q.1. Write a short note on the following Terms (any Four)

(20 marks)

- |  |                        |
|--|------------------------|
| a) Vapour pressure                       | b) Capillary action    |
| c) Buoyancy & floatation                 | d) Nozzle meter        |
| e) Absolute, gauge & atmosphere pressure | f) Boarda's Mouthpiece |

Q.2. a) Derive expression for Total pressure & Centre of pressure, when it acts on inclined plane surface under fully submerged conditions. (8 marks)

b) Write short on: stable, unstable & Neutral equilibrium. (6 marks)

c) State & Prove Pascal law when fluid is at rest. (6 marks)

Q.3. a) A water flows through pipe AB 1.2 m diameter at 2.0 m/sec & then pass through a pipe BC 3.5 m diameter. At c, the pipe branches into CD & CE. The branch CD is 0.8 m diameter & carries one-third flow in AB. The flow velocity in branch CE is 2.0 m/sec. find the volume rate of flow in AB & also velocity in BC & CD? (6 marks)

b) Derive an expression for Eulers's equation of motion for fluids. (8 marks)

c) Explain the Metacentre & Metacentric Height. (6 marks)

Q.4. a) Explain the different hydraulic coefficient used in flow measurement with their ranges?

(10 Marks)

b) Explain Rectangular Notch used for flow measurement? (5 marks)

c) What are the advantages of triangular notch over the rectangular notch? (5 Marks)

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Q.5. a) Explain a Source & Sink in Uniform flow. ( flow past Rankine oval). Also obtain expression for

Following terms:

(12 marks)

- i. Stream & Velocity potential function.
- ii. Location of stagnation point.
- iii. Distance of the surface of the body from origin. (r)
- iv. Length & Width of Rankine oval.

b) Discuss the following cases of Ideal flow with their equation of stream & velocity potential

function. A) Uniform Flow B) sink flow

(8 Marks)

Q.6. a) Derive an expression for Hydraulic Coef. for external orifices?

(8 Marks)

b) A 4.5 cm diameter orifice in the vertical side of the tank discharges water. The water surface in the tank is at constant level of 2.5 m above the centre of orifice. A fluid jet has diameter of 3 cm at its vena-contracta. The measured discharge is 8.5 lit/sec. determine  $C_c, C_v$  &  $C_d$  for the orifice?

(6 marks)

c) Derive the discharge equation for Triangular weir?

(6 Marks)

Q.7. A) A rectangular tank 2.5 m wide, 4.0 m long & 2.4 m deep contains water to depth of 1.4 m. find the horizontal acceleration which may be imparted to the tank in the direction of its length so that (a) there is no spilling of water from the tank (b) the front bottom corner of the tank is just exposed (c) the bottom of tank is exposed upto its mid-point. Calculate the volume of water that would spill out from the tank in case of (b) & (c) Also calculate the total forces on each end of the tank in each of the cases & show that difference between the forces equals the unbalanced force necessary to accelerate the liquid mass in the tank.

(12 marks)

B) A closed rectangular tank 1.4 m high, 3.0 m long & 1.5 m wide is two-third full of gasoline (sp.gravity 0.8). Calculate the acceleration which may be imparted to the tank so that bottom front end of the tank is just exposed. Also calculate the total forces on each end of the tank & show that difference between the forces equals the unbalanced force necessary to accelerate the liquid mass in the tank.

(8 marks)