

Surveying I

Con. 2641-08.

(REVISED COURSE)

CO-9475

(3 Hours)

[Total Marks : 100]

MAJIDEN

- N.B. :** (1) Question No. 1 is **compulsory**.
 (2) Solve any **four** questions from the remaining **six** questions.
 (3) **Figures** to the **right** indicate **full** marks.

1. Write short notes on any **four** :- 20
- Obstacles in chaining.
 - Difference between Prismatic and Surveyor's Compass.
 - Uses of Contour maps.
 - Problems in levelling.
 - Area of zero circle.
 - Gales traverse table.
2. (a) Define Base Line, Tie Line and Check Line with sketches. What is ranging ? Explain the different methods of ranging out the Survey Line. 12
- (b) A 30 meter chain was tested before starting the days work and was found to be 20 cm too short. After measuring a length of 1250 meter, the chain was tested again and found to be 10 cm too long. At the end of days work the chain was tested again and was found to be 30 cm too long. Find the true length of line if the total length measured was 2648 meter. 8
3. (a) What is bearing of a line ? Explain different types of bearings. Differentiate with neat sketch the difference between W.C.B. system and Q. B. system. 10
- (b) The following bearings were observed while traversing with compass and tape. Check the bearings for local attraction and correct the bearings by the method of included angle. 10

Line	F. B.	B. B.
AB	188° 45'	7° 45'
BC	118° 15'	298° 15'
CD	346° 35'	166° 30'
DE	337° 05'	158° 10'
EA	293° 30'	113° 00'

4. (a) Define Contour and explain the characteristics of contours along with neat sketches. 10
- (b) The following readings refer to the reciprocal levelling taken between two stations P and Q. Find the true difference in elevation between P and Q if the instrument had a collimation error of 0.003/150 meter, and the distance between the station was 1150 meter. Find the error due to refraction. 10

Inst at	Staff readings at	
	P	Q
P	1.425	2.724
Q	1.429	2.504

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S. E. C. O. ~~18~~ ² Surveying - I

9/1/08

5. (a) Explain in brief the different temporary adjustments of a dumpy level and define : 10
- (i) Line of collimation
 - (ii) Axis of telescope
 - (iii) Axis of bubble tube
 - (iv) Bench Mark
 - (v) Reduced Level.

- (b) The staff readings taken along a levelling operations are given below. The instrument was shifted after taking 5th, 10th, 14th and 19th readings. Arrange the data in tabular form and find the R.L. of all the points by Rise and Fall method if the 12th reading was taken to a B.M. of R.L. 185.635.
 1.355, 1.605, 2.125, 0.685, 1.365, 2.015, 1.355, -1.385, 0.685, 2.105, 1.685, 1.155, 1.105, 2.015, 1.085, 1.345, 1.355, -2.015, 1.305, 1.655, 1.685, and 1.455.

6. (a) Enlist and mention the function of each of the instrument required for plane table surveying also explain the advantages and disadvantage of plane table surveying. 10

- (b) The offsets (in mt.) taken from a chain line to a curved boundary are given below :- 10

Ch.	0	5	10	15	20	25	35	45	55	65
Offsets (mt.)	2.5	3.8	8.4	7.5	10.5	9.3	5.8	7.8	6.9	8.4

Find the area between the chain line, the 1st and last ordinate and the boundary by

- (i) Trapezoidal Rule
- (ii) Simpson's Rule
- (iii) Co-ordinates Rule.

7. (a) Explain the method of measuring horizontal angle between the points A and B by the method of Repititation and how readings are recorded. 8

- (b) Due to some problems with equipment, the bearing of two sides were not taken for a closed traverse ABCDEA. From the available data, compute the bearings of two sides DE and EA. 12

Line	Length (mt)	Bearings
AB	230.5	S 36° 45' E
BC	250.2	S 82° 48' E
CD	210.8	S 10° 15' E
DE	240.3	X(?)
EA	265.4	X(?)

Laboratory

S.E. (CIVIL) Sem III (Rev.)

30/5/08

Construction Materials & Testing.

17-May-08-45

Con. 2864-08.

(REVISED COURSE)

CO-9490

(3 Hours)

[Total Marks : 100

MAJ R P

N.B. : (1) Question No. 1 is compulsory.

(2) Attempt any four questions out of remaining six questions.

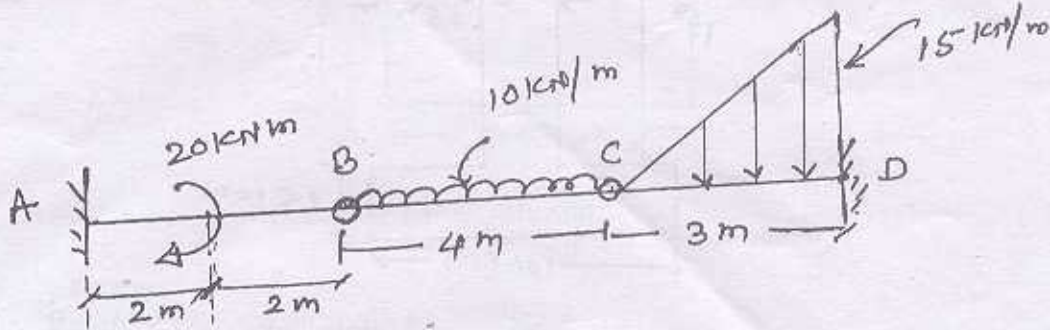
1. (a) What are the characteristics of good building stone? What are their suitability in building and paving work. 10
(b) Enlist various laboratory tests on cement. Explain soundness test on cement with neat sketch. 10
2. (a) What are the various defects in timber? 10
(b) How is decay in timber caused? Describe a preservation treatment of wooden railway sleepers. 10
3. (a) Describe water absorption test and compressive strength test in detail on bricks. 10
(b) 'Plastics are environmental friendly'. Do you agree this statement? Justify your answer. 10
4. (a) Discuss different types of paints and their utility in building construction. 10
(b) What is object of painting or varnishing a surface and where will you prefer a paint to varnish and vice versa? 10
5. (a) Describe in detail manufacturing process of bricks. 10
(b) What is plywood? Describe how it is manufactured. Where it is used with advantage? 10
6. (a) What is glass? Give its types and uses. 10
(b) Explain any three types of mortar. Write uses of asbestos. 10
7. Write short notes on any four :- 20
 - (a) Plaster of Paris
 - (b) Defects in Timber
 - (c) Anticorrosive Treatment
 - (d) Composite Materials
 - (e) R.M.C.

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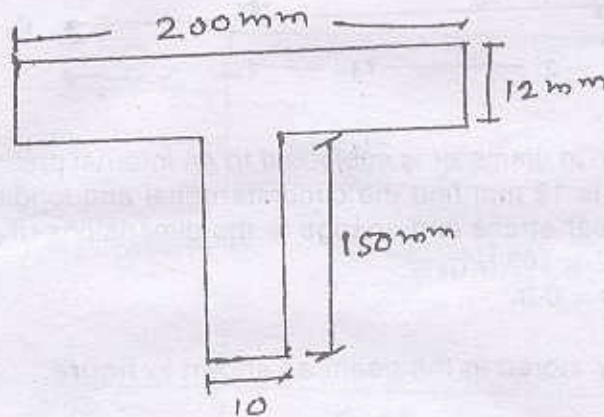
- N.B. (1) Question No. 1 is compulsory.
 (2) Attempt any four questions out of the remaining six questions.
 (3) Figures to the right indicate full marks.
 (4) Assume suitable data if required and state the same clearly.

1. (a) Derive relation between S.F., BM and load. 4
 (b) Draw shear force and Bending moment diagram for the beam as shown in figure. 16

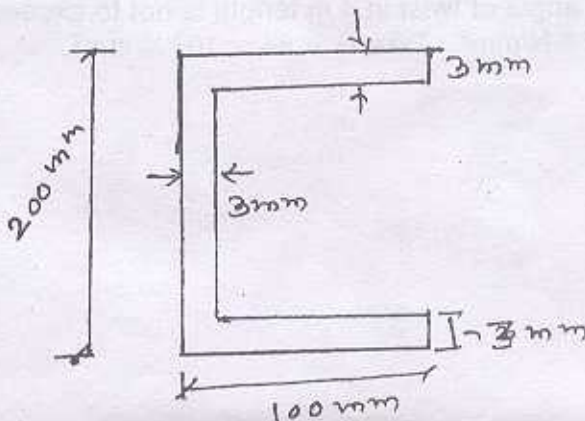


Note : B and C are internal hinge.

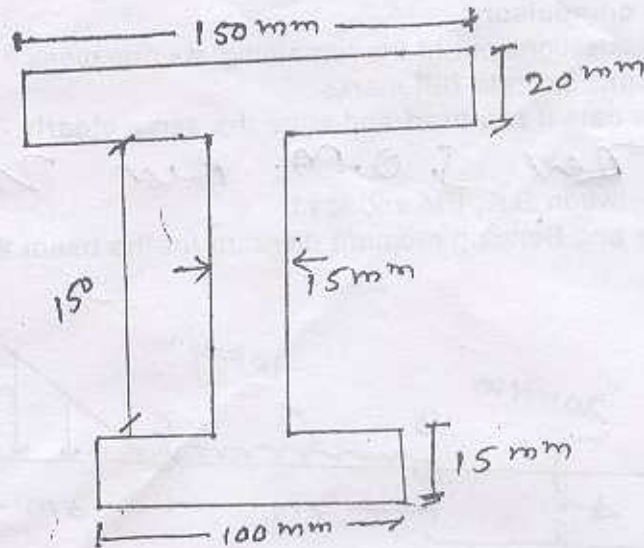
2. (a) The section of the beam shown in figure is 5 m long and is simply supported at the ends. Find the maximum u.d.l the beam can carry if the compressive and tensile stresses shall not exceed 60 N/mm^2 and 40 N/mm^2 respectively. 12



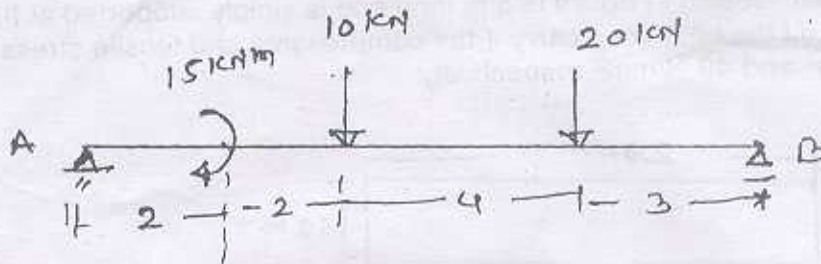
- (b) A flitched beam consists of wooden joist 150 mm wide and 300 mm deep strengthened by a steel plate 10 mm thick and 300 mm deep one on either side of the joist. If the maximum stress in the wooden joist is 8 N/mm^2 . Find the maximum stress attained in steel. Find also the moment of resistance of the beam section. Take $E_S = 20 E_W$. 8
3. (a) Explain the term 'shear centre' and hence locate the shear centre for the channel section given below in figure. 8



- (b) Plot the variation of shear stress across the section. The shear force at the section is 50 kN. 12



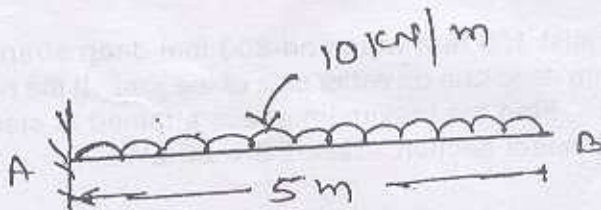
4. (a) Determine maximum deflection and slope at A and B, for the beam as shown in figure. 12



- (b) A shell 3.0 m long, 1 m in diameter is subjected to an internal pressure of 2 N/mm², if the thickness of the shell is 12 mm find the circumferential and longitudinal stresses. Find also the maximum shear stress and change in the dimensions of the shell. 8

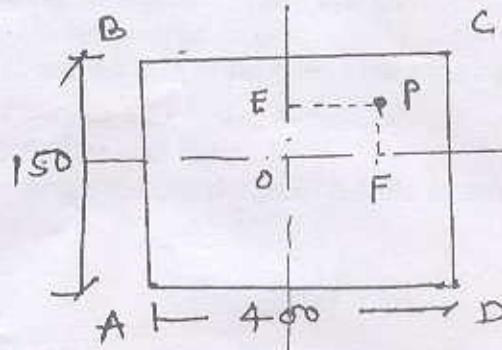
Take $E = 2 \times 10^5 \text{ N/mm}^2$
 $\nu = 0.3$.

5. (a) Find the Strain Energy stored in the beam as shown in figure. 8



- (b) A hollow circular steel shaft 5 m long is to transmit 150 kW power at 100 r.p.m. Determine external and internal dia if the total angle of twist in 4 m length is not to exceed 3 degree and maximum stress is limited to 50 N/mm². Take $G = 84 \times 10^3 \text{ N/mm}^2$. 12

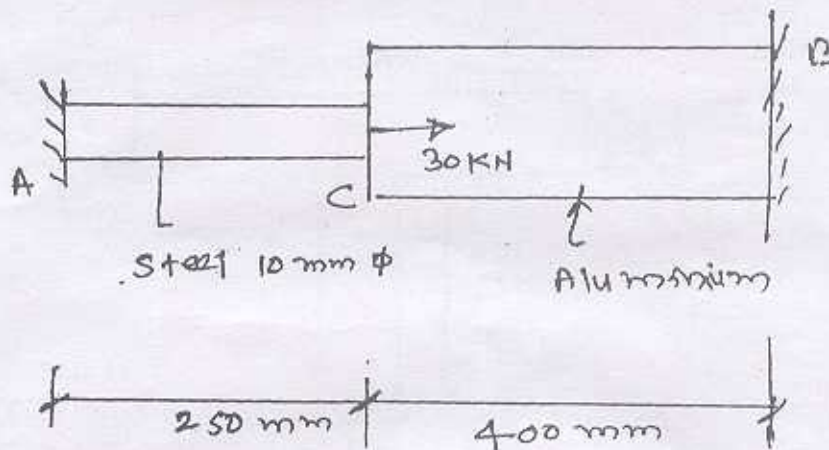
6. (a) Determine the core of the hollow circular section, having external diameter D and internal diameter d . 6
 (b) In the rectangular section shown in figure the compressive load $p = 80 \text{ kN}$ is applied as shown in figure. Find the stresses at each corner. 10



Distance EP = 700 mm
 FP = 25 mm

- (c) Define the terms : 4
 (i) Beam of uniform strength
 (ii) Kern of a section.

7. (a) A steel rod, 10 mm dia and an aluminium rod, 20 mm dia are joined together fixed between supports as shown in figure. E for steel $2 \times 10^5 \text{ N/mm}^2$ and E for aluminium $= 70 \times 10^3 \text{ N/mm}^2$. Find the reactions at the supports and the stresses in the metals. 10



- (b) At a certain point in a strained material the principal stresses are 150 N/mm^2 and 50 N/mm^2 both tensile. Find the normal, tangential and resultant stress across a plane through the point at 45° to the major principle plane. 10

- N.B. :** (1) Question No. 1 is **compulsory**.
 (2) Attempt any **four** questions from the remaining **six** questions.
 (3) Assume **suitable** data if **necessary**.

1. Write short notes on the following :-

- | | |
|---|---|
| (a) False Ceiling | 5 |
| (b) Use of fly ash in concrete | 5 |
| (c) Placing concrete under-water | 5 |
| (d) Difference between load bearing and framed structure. | 5 |

- | | |
|--|----|
| 2. (a) Explain water cement ratio and bulking of sand. | 10 |
| (b) Draw Queen Post Roof Truss for a clear span of 10 m. in Sectional Elevation. | 10 |

- | | |
|--|----|
| 3. (a) Draw the plan and sectional elevation for Dog-legged staircase for floor to floor Ht. of 3.3 m. Show the calculation part also. | 10 |
| (b) Write short notes on :- | |
| (i) Isolated Footing | 5 |
| (ii) Roof Drainage. | 5 |

- | | |
|---|----|
| 4. (a) Explain single joint, double joint and triple joint timber floor. | 10 |
| (b) Draw the plan, elevation and important elements for collapsible door for a size of 2.0 m x 4.0 m in a shop. | 10 |

- | | |
|---|----|
| 5. (a) Good quality of formwork and concrete for high rise structures. | 10 |
| (b) Discuss five resisting capacity of various building materials like Stone, Brick, Steel Timber and Concrete. | 10 |

6. Write short notes on the following :-

- | | |
|-------------------------|---|
| (a) Air-Conditioning | 5 |
| (b) Sound Insulation | 5 |
| (c) Damp Proofing | 5 |
| (d) Shoring Dewatering. | 5 |

- | | |
|---|----|
| 7. (a) Discuss various types of staircases used in residential building with neat sketches. | 10 |
| (b) Discuss the procedure of laying Marble flooring for room size of 3.6 m x 4.5 m using slabs of 1 m x 0.5 m size. | 10 |

Lecturer

S.E. (CIVIL) III (REV)

13/6/08

Fluid Mechanics,

MASTER

670 : E-1stHF08.

Con. 3503-08.

(REVISED COURSE)

CO-9487

(3 Hours)

[Total Marks : 100

N.B. (1) Question No. 1 is **compulsory**.

(2) Answer any **four** questions from remaining **six** questions.

(3) Assume **suitable data** where **necessary**. State them **clearly**.

1. (a) Write a short note on classification of fluids based on viscosity. 5
(b) Define : 5
(i) Specific Volume
(ii) Specific Gravity.
(c) A flat plate of area $1.5 \times 10^6 \text{ mm}^2$ is pulled with a speed of 0.4 m/sec. relative to another plate located at a distance of 0.15 mm from it. Find the force required to maintain this speed, if the fluid separating them has viscosity of 1 Poise. 5
(d) Find the capillary rise in a glass tube of 2.5 mm diameter, when immersed vertically in water. Take surface tension of water is 0.0725 N/m. The angle of contact for water and glass is zero. 5
2. (a) Explain the terms absolute, gauge, atmospheric and vacuum pressure. 6
(b) Calculate the pressure due to a column of 0.3m of — 6
(1) water (2) an oil of sp.gr. 8 (3) mercury (sp.gravity 13.6).
(c) State and prove Pascal's Law. 8
3. (a) Determine the total pressure and center of pressure for an isosceles triangular plate of base 4 m and altitude 4 m when immersed in an oil of specific gravity 0.9 the base of the plate coincides with the free liquid surface of oil. 10
(b) A cubical tank of 1.5 m sides contains water for the lower 0.6 m depth. The upper part is filled with a liquid of sp. gr. 0.9 m. Calculate the total pressure on the vertical side and total force acting on the bottom of the cube. 10
4. (a) Explain the conditions of equilibrium of a floating and submerged body. 10
(b) Define : — 6
(i) Buoyancy
(ii) Center of buoyancy
(iii) Meta center.
(c) What are the assumptions made in deriving Bernoulli's equation ? 4
5. (a) The water is flowing through a pipe having diameters 20 cm and 10 cm at section 1 and 2 respectively the rate of flow through the pipe is 35 lit/sec. section 1 is 6 m above the datum and section 2 is 4 m above datum. If the pressure at section (1) is 39.24 N/sq.cm find the fluid pressure at section (2). 10
(b) A 30 cm * 15 cm venturimeter is proved in vertical pipe line carrying water in the vertical direction. The diff. in elevation of the throat section and entrance of the venturimeter is 30 cm. The U tube mercury manometer shows a gauge deflection of 25 cm, calculate — (1) discharge (2) pre diff. b/w entrance a throat. Cd = 0.98. 10

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6. (a) Prove that the time required to empty the tank of c/s area A which is provided with an orifice at bottom is — 10

$$T = (2A \sqrt{H}) / (C_d a \sqrt{2g})$$

 T = time, A = c/s of tank, a = c/s of orifice, C_d = coefficient of discharge.
- (b) Define :— 6
 (i) Coefficient of velocity (C_v)
 (ii) Coefficient of contraction (C_c)
 (iii) Coefficient of discharge (C_d).
- (c) Write a short note on MACH No. 4
7. (a) A sharp crested rectangular weir of 1 m height extends across a rectangular channel of 3 m width. If the head of water over the weir is 0.4 m, calculate the discharge, by — 10
 (i) Neglecting velocity of approach
 (ii) Considering velocity of approach.
- (b) Write a short note on Cipolletti weir. 4
- (c) Define :— 6
 (i) Velocity potential function
 (ii) Stream function.

Con. 3508-08.

[REVISED COURSE]

CO-9482

(3 Hours)

[Total Marks : 100]

- N.B. : (1) Question No. 1 is compulsory.
 (2) Attempt any four questions from remaining six questions.
 (3) Non-programmable calculator is allowed.

1. (a) If $f(z)$ is analytic function, prove that -

$$\left(\frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2} \right) |f(z)|^2 = 4|f'(z)|^2$$

(b) Find $\int_0^{\infty} e^{-tx^2} dx$

(c) Show that every square matrix can be uniquely expressed as the sum of symmetric and skew symmetric matrix.

(d) Obtain the complex form of Fourier Series for $f(x) = e^{ax}$ in $(0, a)$.

2. (a) Solve the following equation by using Laplace transform -

$$\frac{dy}{dt} + 2y + \int_0^t y dt = \sin t, \text{ given that } y(0) = 1$$

(b) Obtain half range Sine series to represent -

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

(c) Find non-singular matrix P and Q such that -

$$A = \begin{bmatrix} 1 & 2 & 3 & 4 \\ 2 & 1 & 4 & 3 \\ 3 & 0 & 5 & -10 \end{bmatrix}$$

is reduced to normal form. Also find its rank.

3. (a) Find half range Sine series for $x \sin x$ in $(0, \pi)$ and hence deduce that -

$$\frac{\pi^2}{8\sqrt{2}} = \frac{1}{1^2} - \frac{1}{3^2} + \frac{1}{5^2} - \frac{1}{7^2} + \dots$$

(b) Find the analytic function $f(z) = u + iv$ if $3u + 2v = y^2 - x^2 + 16xy$.

(c) Find the inverse Laplace transform of $\tan^{-1}(2/s^2)$.

4. (a) Find the bilinear transform which maps the points $z = 1, i, -1$ onto the points $w = i, 0, -i$. Hence, find the image of $|z| < 1$ onto the w -plane.

(b) Show that the following set of functions is orthonormal on $(0, \infty)$.

$$\left\{ e^{-x/2}, e^{-x/2}(1-x), \frac{1}{2}e^{-x/2}(x^2 - 4x + 2) \right\}$$

(c) If A is a non-singular square matrix of order n then show that $\text{adj} \cdot \text{adj} A = |A|^{n-2} A$.

Con. 3508-CO-9482-08.

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S.E.C.C. ~~AT~~ ~~over~~ Ann. Maths - 111 18/6/08,

5. (a) For what value of λ the equations $x + y + z = 1$, $x + 2y + 4z = \lambda$, $x + 4y + 10z = \lambda^2$. 6
have a solution and solve them completely in each case.

(b) Evaluate $\int_0^{\infty} \frac{t^2 \sin 3t}{e^{2t}} dt$ 6

- (c) Construct the analytic function whose real part is $e^{2x}(x \cos 2y - y \sin 2y)$. Also verify that v is harmonic. 6

6. (a) Obtain the Fourier series for - 8

$$f(x) = \begin{cases} x + \pi/2 & -\pi < x < 0 \\ \pi/2 - x & 0 < x < \pi \end{cases}$$

Hence, deduce that $\frac{\pi^2}{8} = \frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \dots$

Also deduce that $\frac{\pi^4}{96} = \frac{1}{1^4} + \frac{1}{3^4} + \frac{1}{5^4} + \dots$

- (b) Find Laplace transform of 6

$$f(t) = \begin{cases} a \sin pt, & 0 < t < \pi/p \\ 0 & \pi/p < t < 2\pi/p \end{cases}$$

and $f(t) = f(t + 2\pi/p)$

- (c) Prove that the matrix $A = \begin{bmatrix} \frac{1+i}{2} & \frac{-1+i}{2} \\ \frac{1+i}{2} & \frac{1-i}{2} \end{bmatrix}$ 6

is unitary and find A^{-1} .

7. (a) Find the inverse by using convolution theorem - 8

$$L^{-1} \left[\frac{s^2 + 2s + 3}{(s^2 + 2s + 2)(s^2 + 2s + 5)} \right]$$

- (b) Find the image of area between $x^2 + y^2 = 4$ and $x^2 + y^2 = 9$ in the z -plane into the w -plane under the transformation $w = \log z$. 6

- (c) Express the function $f(x) = x - x^2$, $-1 < x < 1$ as Fourier expansion. 6