

Code : 1GC12

B.Tech. I Year Supplementary Examinations December 2015

Engineering Physics
(Common to All Branches)

Max. Marks: 70

Time: 03 Hours

Answer *any five* questions

All Questions carry equal marks (14 Marks each)

1. a) Distinguish between interference and diffraction of light. 3M
b) Describe the formation of circular and elliptical polarized light with necessary theory. 8M
c) Explain the formation of spectrum by grating. 3M
2. a) What is space lattice, unit cell and lattice parameters 3M
b) Describe the basic crystal systems. 7M
c) The Bragg's angle for reflection from (111) plane in BCC crystal is 30° for an X-ray of wavelength 1.5\AA . Find the cube edge of the unit cell 4M
3. a) State and explain de-Broglie's hypothesis of matter waves. 3M
b) Derive Schrodinger's one dimensional time independent wave equation for a free particle. 7M
c) Explain various sources of electrical resistance in the case of metals. 4M
4. a) Define law of mass action. 2M
b) Describe Hall Effect in a semiconductor with necessary expressions. 7M
c) Explain the construction and working principle of Photo diode. 5M
5. a) What is hysteresis? 2M
b) Derive Clausius-Mosotti relation for a polarized dielectric. 8M
c) A magnetic material has a magnetization of 3300 Am^{-1} and flux density of 0.0044 Wbm^{-2} . Calculate the magnetizing force and the relative Permeability of the material. 4M
6. a) Explain the role of population inversion in laser emission. 4M
b) Explain Messiner effect in superconductor. 4M
c) Derive the relation between the various Einstein's Coefficients of absorption and emission of radiations. 6M
7. a) Explain the basic principle of an optical fiber. 4M
b) What is the acceptance angle of an optical fiber and derive an expression for it. 7M
c) Mention the applications of holography. 3M
8. a) Describe the basic principles of nanomaterials causing the change in its properties. 4M
b) Describe Chemical Vapour Deposition method of synthesis of nanomaterials. 6M
c) Mention the application of nanomaterials. 4M

Hall Ticket Number :										
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Code : 1G112

R-11 / R-13

B.Tech. I Year Supplementary Examinations December 2015

C Programming and Introduction to Data Structures

(Common to CE, EEE, ME & ECE)

Max. Marks: 70

Time: 03 Hours

Answer *any five* questions

All Questions carry equal marks (14 Marks each)

1. a) Define an algorithm. Write an algorithm to find biggest of two numbers 4M
b) What is Flowchart? Draw flowchart to find sum of first n numbers. 4M
c) Write in detail about Software Development Method. 6M
2. a) Explain in detail about data types in C. 7M
b) Write a C program to find whether the given number is palindrome or not. 7M
3. a) What is an array? How to declare and initialize a one dimensional arrays. 7M
b) Write a C program to find factorial of a given number using recursive function. 7M
4. a) What is a string? Explain any four String handling functions with examples. 8M
b) What is a pointer? What are the features of pointers? Write a C program to print address of a variable. 6M
5. a) How to declare and initialize a structure with examples? 7M
b) Explain structure within structure using an example? 7M
6. Discuss with examples the following File I/O handling function. 14M
(a) fputc()
(b) fgetc()
(c) fprintf().
7. Discuss insertion and deletion operation in a queue using arrays? 14M
8. a) Write a C program to sort given list of elements using Bubble sort. 7M
b) Explain linear search technique with an example. 7M

Code : 1G511

B.Tech. I Year Supplementary Examinations December 2015

Engineering Mechanics
(Common to Civil & Mechanical)

Max. Marks: 70

Time: 03 Hours

Answer any five questions

All Questions carry equal marks (14 Marks each)

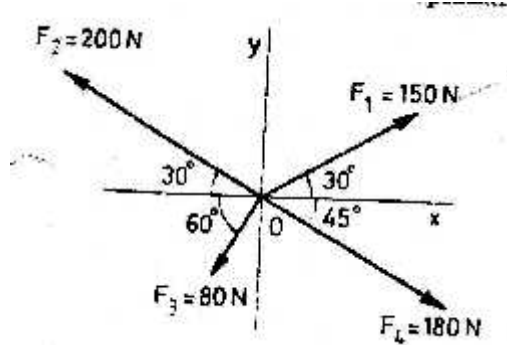
1. a) Define

(i) parallelogram law of forces

(ii) Transmissibility of a force

4M

b) Determine the resultant of coplanar concurrent forces acting at point O shown in fig1.



10M

2. a) What are various types of supports for beams, briefly explain degrees of freedom at different supports with neat sketches

4M

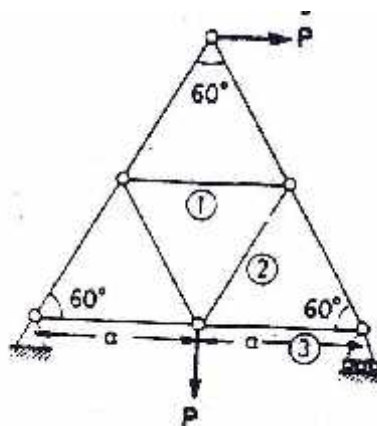
b) A simply supported beam of length 2 meters carries a point load of magnitude 80 KN at a distance of 0.5 meters from its left support. It also carries a uniformly varying load whose magnitude varies from 0KN to 50KN over a span of 0.5 meters starting from its right support. The beam also carries a clockwise moment of magnitude 100 KN-M at its midspan. Determine its support reactions.

10M

3. a) Distinguish between truss and frame. What is the mathematical condition for a perfect truss?

4M

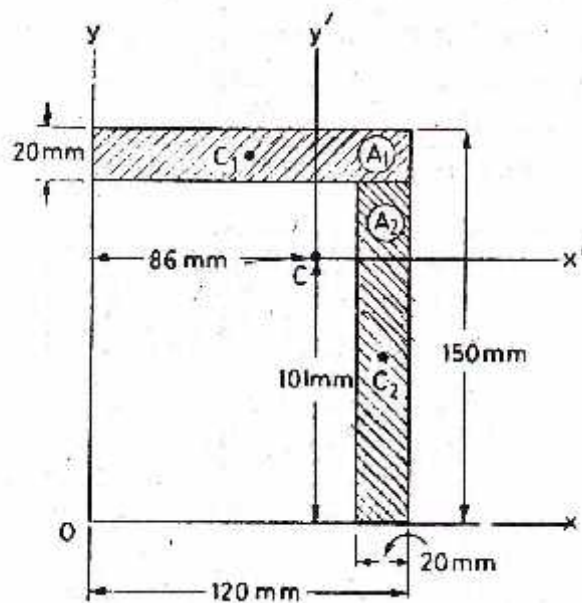
b) Find the axial forces in the members' 1, 2 and 3 of the truss shown in fig2. In terms of force P.



10M

Code : 1G511

4. a) Define angle of friction. Explain the laws of friction. 4M
- b) A uniform ladder AB of length 20 meters and weight W is supported by a horizontal floor at point A and by a vertical wall at point B. The ladder makes an angle of 45 degrees with the floor. If a man whose weight is one half of that of ladder starts climbing the ladder, to what distance 'x' along the length of the ladder can he climb starting from point A before the ladder starts slipping. The coefficient of friction between wall and ladder is 0.33 and that between ladder and floor is 0.5. 10M
5. a) Define centroid and centre of gravity 4M
- b) Find the centroid of a uniform wire bent in the form of a quadrant of the arc of a circle of radius r . Find also the centroid of a uniform straight wire of length L . 10M
6. a) Define (1) Polar moment of inertia (2) Radius of gyration 4M
- b) Find the moment of inertia of L section shown in fig 3 about its centroidal axes.



- 10M
7. a) Explain D'Alemberts principle of dynamic equilibrium 2M
- b) The motion of a particle along a straight line is given by $a=t^2-2t+2$. Where a is acceleration in m/s^2 and t is time in seconds. After 1 second, the velocity and distance travelled by the particle were found to be 6.33 m/s and 14.75 m. Find the distance travelled, velocity and acceleration of the particle after 2 seconds. 12M
8. A car of mass 1500 kg is uniformly accelerated. Its speed increases from 50 kms/hr to 75 kms/hr after travelling a distance of 200m. The resistance to motion of the car is 0.2 % of the weight of the car. Determine (i) The maximum power required (ii) The power required to maintain a constant speed of 75 kms/hr. 14M

Code : 1GC13

B.Tech. I Year Supplementary Examinations December 2015

Engineering Chemistry*(Common to All Branches)*

Max. Marks: 70

Time: 03 Hours

Answer *any five* questions

All Questions carry equal marks (14 Marks each)

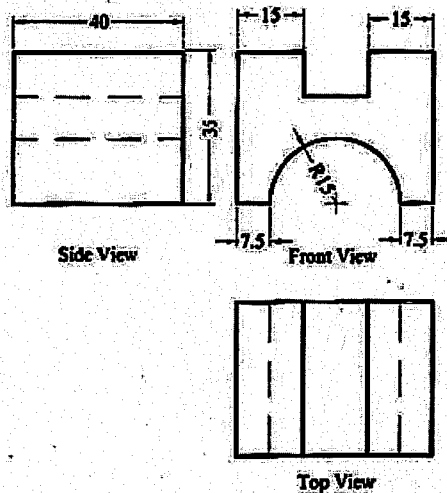
1. a) Explain boiler troubles in detail and how to prevent boiler corrosion. 6M
- b) A water sample has 50mg/L Ca^{+2} , 150mg/L Mg^{+2} , 50mg/L Na^{+} , 20mg/L Cl^{-} and 100mg/L glucose. Calculate its total hardness, carbonate and non-carbonate hardness? 5M
- c) What is dissolved oxygen why is it important? 3M
2. a) Explain the following conductometric titration curves. 6M
 - i) Strong acid with strong base
 - ii) weak acid with strong base
- b) Write the properties and characteristics of insulating materials. 4M
- c) Using standard reduction potential, predict and justify which of the following metals react with a solution of Sn(II) ion: zinc, iron, copper and sodium.
 $\text{Zn}^{+2}/\text{Zn} = -0.76\text{V}$, $\text{Fe}^{+2}/\text{Fe} = -0.44\text{V}$, $\text{Cu}^{+2}/\text{Cu} = 0.34\text{V}$, $\text{Na}^{+}/\text{Na} = -2.71\text{V}$ and $\text{Sn}^{+2}/\text{Sn} = -0.13$ 4M
3. a) The nature of the metal oxide effects the corrosion of the metal justify! 5M
- b) How can you prevent the corrosion of the metal by using cathodic protection principle? 5M
- c) Explain the role of inhibitors in preventing the corrosion. 4M
4. a) Explain the following. 6M
 - i) Thermosetting resins
 - ii) Thermoplastics resins
- b) Write the preparation and uses of the following. 5M
 - i) Bakelite
 - ii) Nylon 6,6
- c) Explain the following with examples. 3M
 - i) Monomer
 - ii) Polymer
5. a) Define high explosives and low explosives? Write the properties of explosives. 6M
- b) Explain the following terms. 8M
 - i) Viscosity
 - ii) cloud and pour point
 - iii) neutralization number
 - iv) aniline point
6. a) What are degrees of freedom? Explain any two component systems. 7M
- b) Explain the terms involved in phase rule and write phase rule equation. 7M
7. a) Write any four characteristics of good fuel. 3M
- b) How can you determine calorific value of fuel by using bomb calorimeter? 6M
- c) Explain Fisher-Tropsch method in detail for the synthesis of gasoline. 5M
8. a) Explain setting and hardening of cement with their chemical reactions. 6M
- b) How can you justify the quality of the cement? 4M
- c) Write the criteria for good refractories. 4M

Max. Marks: 70

Time: 03 Hours

Answer any five questions
All Questions carry equal marks (14 Marks each)

1. a) A line of 1 centimeter represents an actual length of 4 decimeters. Draw a plain scale and mark on it a distance of 6.7 meters. 7M
- b) Inscribe an ellipse in a parallelogram having sides 150 mm and 100 mm long and an included angle of 120° . 7M
2. A line PQ inclined at 30° to the HP, has the end P at 20 mm above the HP and 10 mm in front of the VP. The front view of the line is 70 mm long and inclined at 60° to the reference line. Draw the projections of the line and determine its true length and inclinations with the principal planes. Also, locate its traces. 14M
3. a) A square plane with a 40 mm side is situated in the VP with all the sides equally inclined to the HP. Draw its projections. 7M
- b) A cylinder with 50 mm base diameter and 65 mm long axis has its axis 40 mm above the HP and perpendicular to the VP. Draw its projections when one of its base is 10 mm in front of the VP. 7M
4. A square prism base 40mm side and height 65mm has its axis inclined at 45° to the HP and has an edge on its base, on the HP and inclined at 30° to the VP. Draw its projections. 14M
5. A cube of 50mm long edges is resting on the HP with a vertical face is inclined 30° to the VP. It is cut by a section plane, perpendicular to the VP, inclined at 30° to the HP and passing through a point on the axis 38 mm above the HP. Draw the sectional top view, true shape of the section and development of the surfaces of the remaining portion of the cube. 14M
6. Draw the isometric view of the given views. 14M



7. A vertical cone diameter of base 75 mm and axis 100mm long is completely penetrated by a cylinder of 45 mm diameter. The axis of the cylinder is parallel to the HP and the VP and intersects the axis of the cone at a point 28 mm above the base. Draw the projections of the solids showing curves of intersection. 14M
8. A rectangle plane with 60 mm and 40 mm sides lying in the GP with longer side parallel to and 15 mm behind the PP. The station point is 50 mm in front of the PP, 60 mm above the GP and lies in the CP passing through the center of the object. Draw its perspective view. 14M

CODE: 161512

REGULATIONS: R11/R13

EXAMINATION: B-Tech I Year Supplementary Examinations

SUBJECT TITLE: Engineering Graphics

BRANCH: Mechanical Engineering & Civil Engineering.

1

1

a)

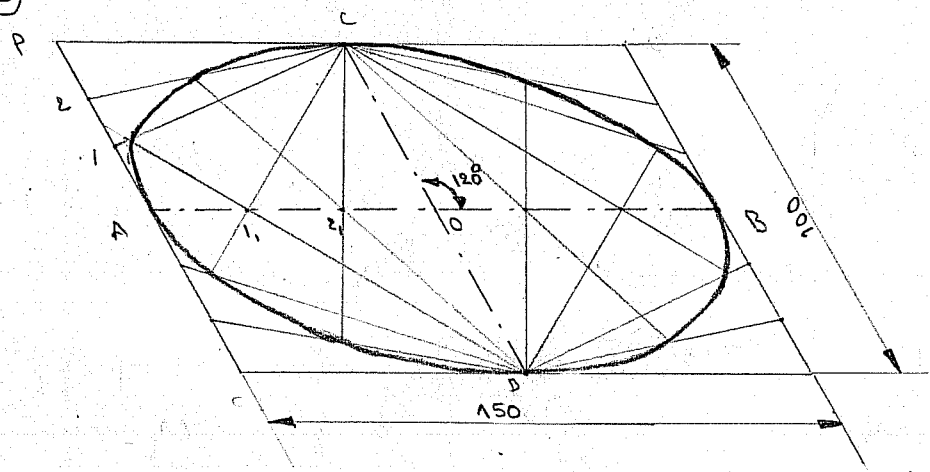
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~~out of syllabus~~ and ^{at} ~~least~~ ~~years~~ ~~to~~ 1 1/2

1 (a) is out of syllabus and evaluate 1 (b) for 14 MARKS.

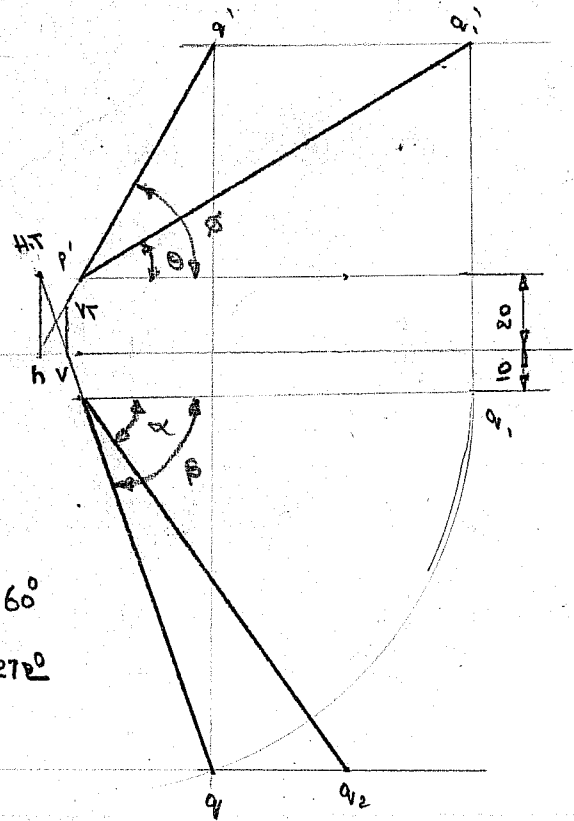
b)

1



2

2



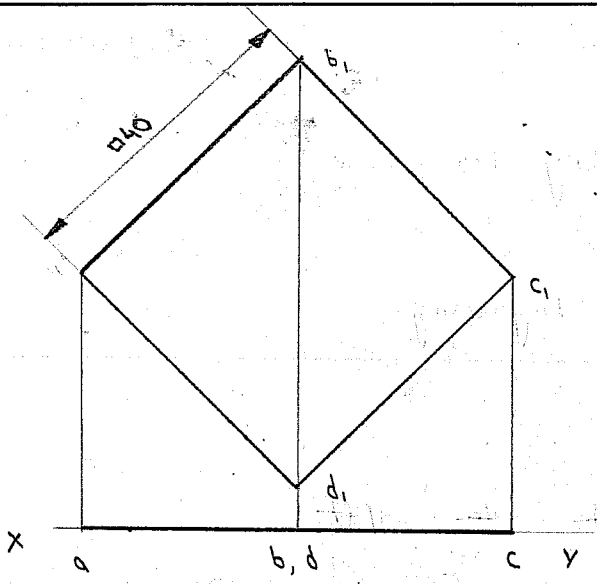
TRUE LENGTH ≈ 120 mm

$\theta = 30^\circ, \alpha = 60^\circ$

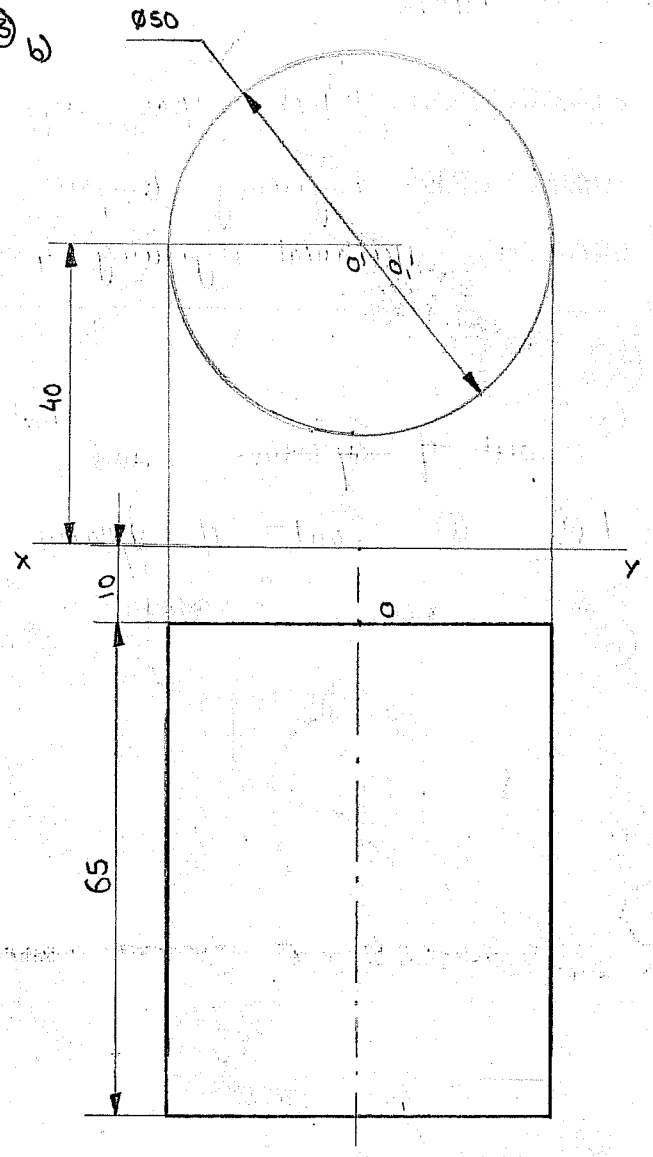
$\phi = 56^\circ, \beta = 72^\circ$

5)

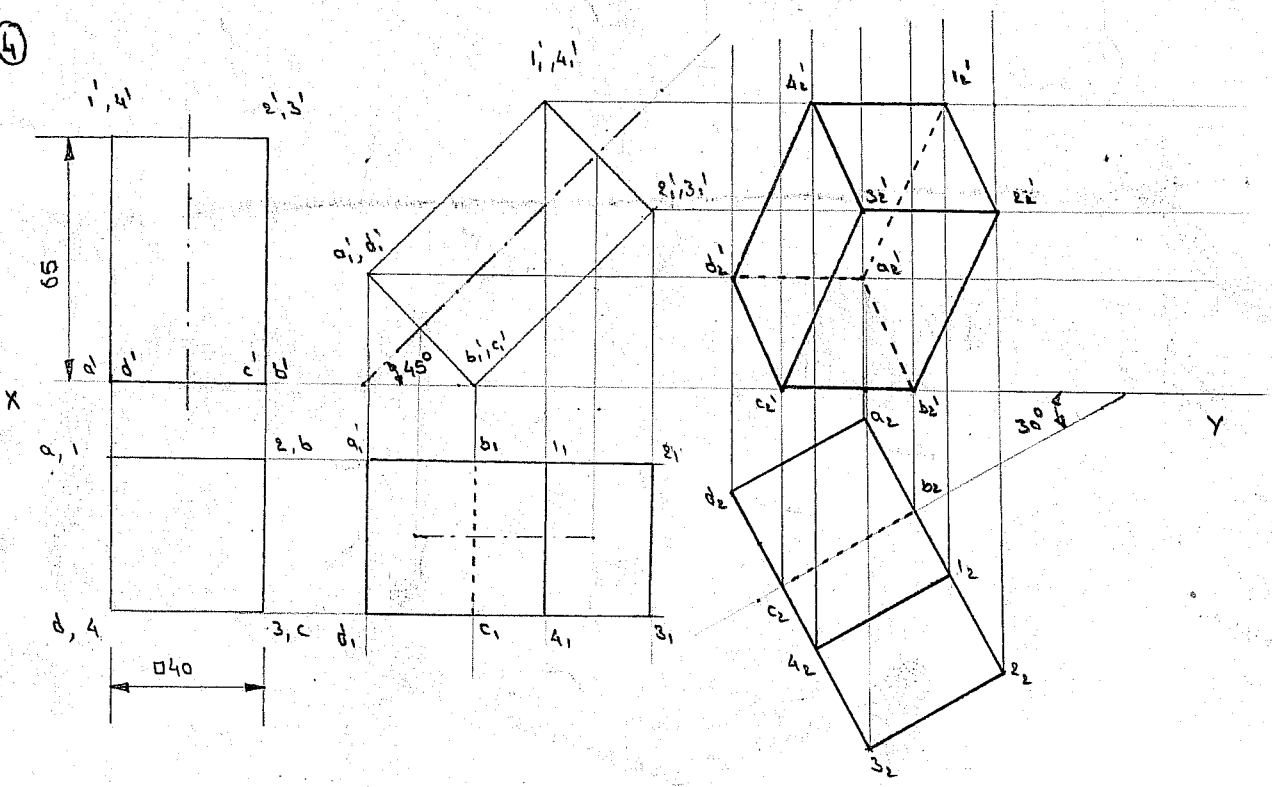
2) 9)



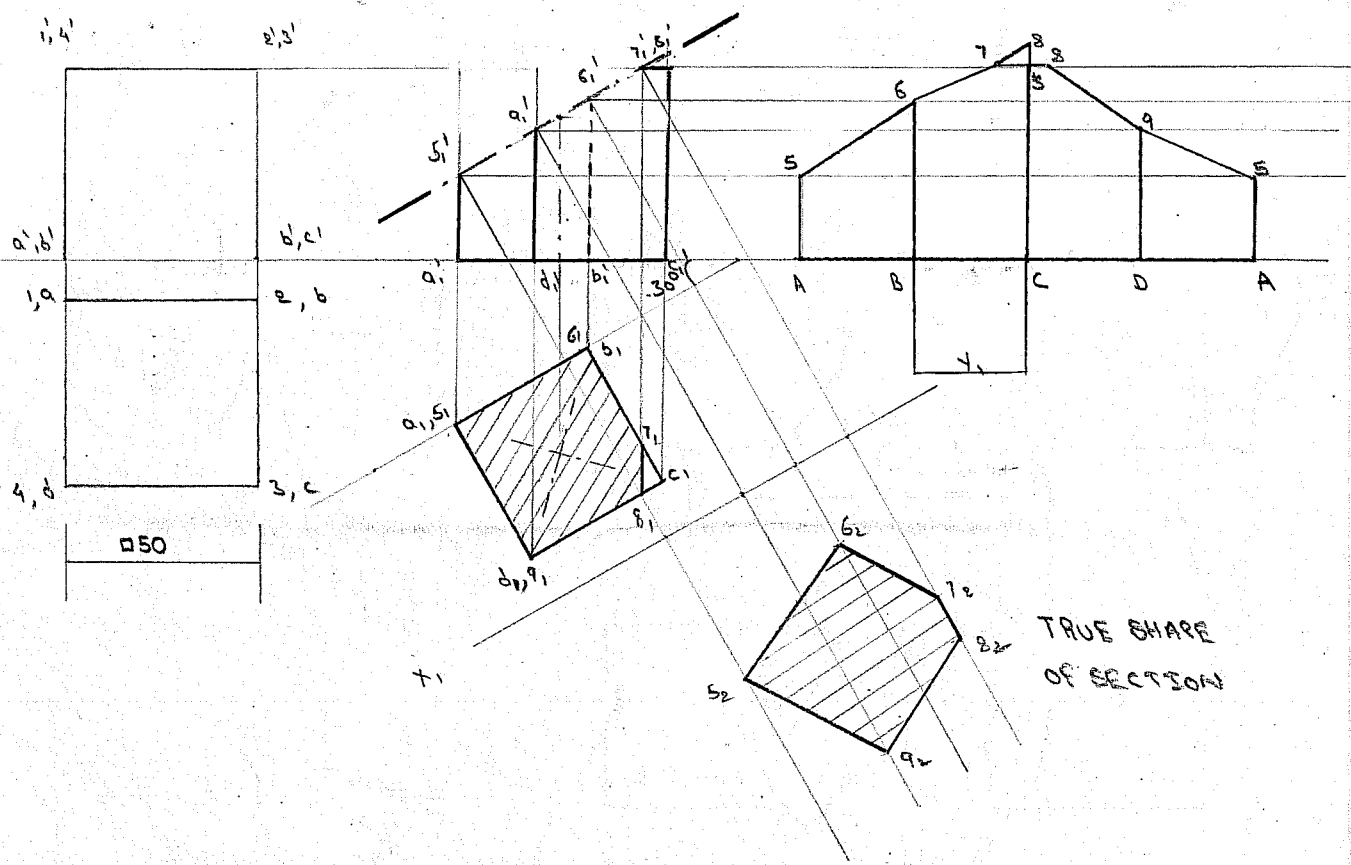
3) 6)



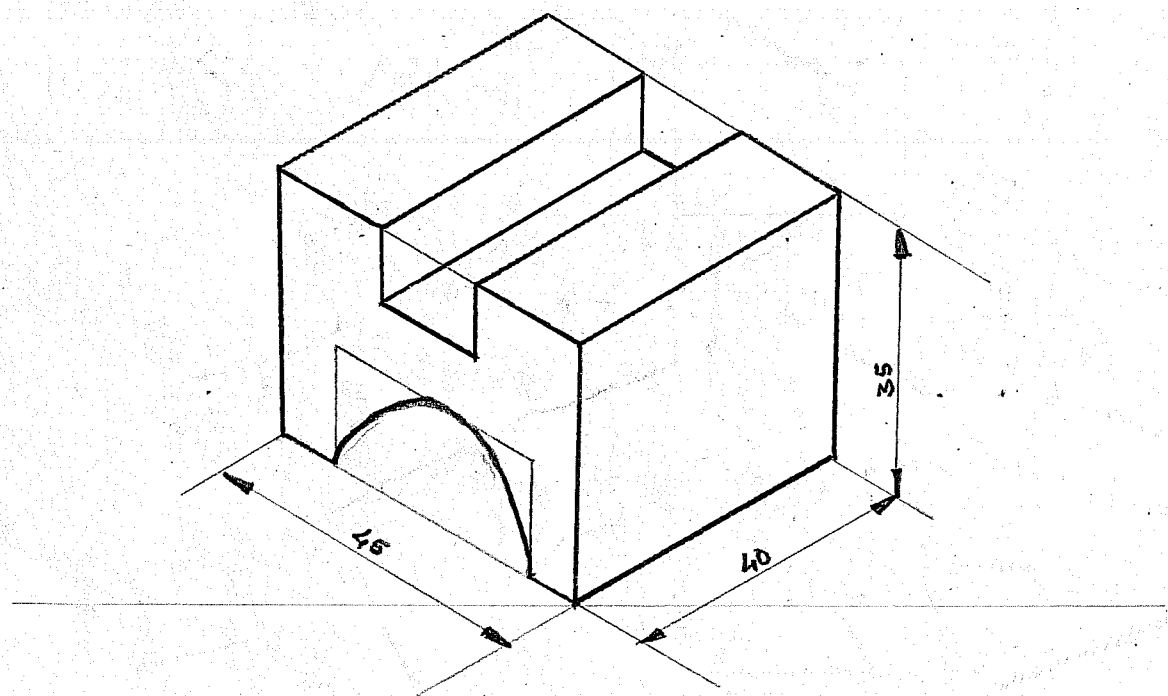
4)



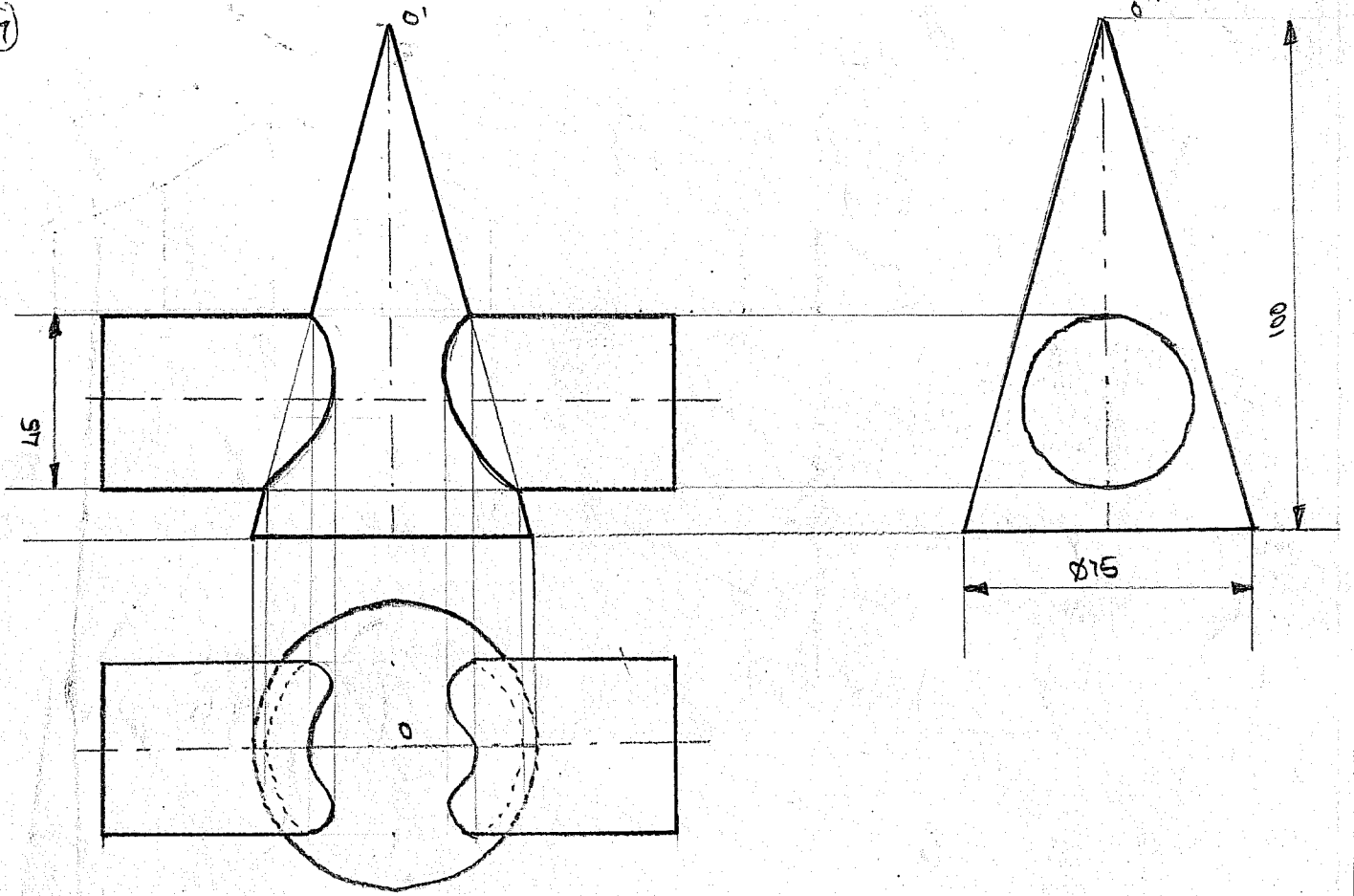
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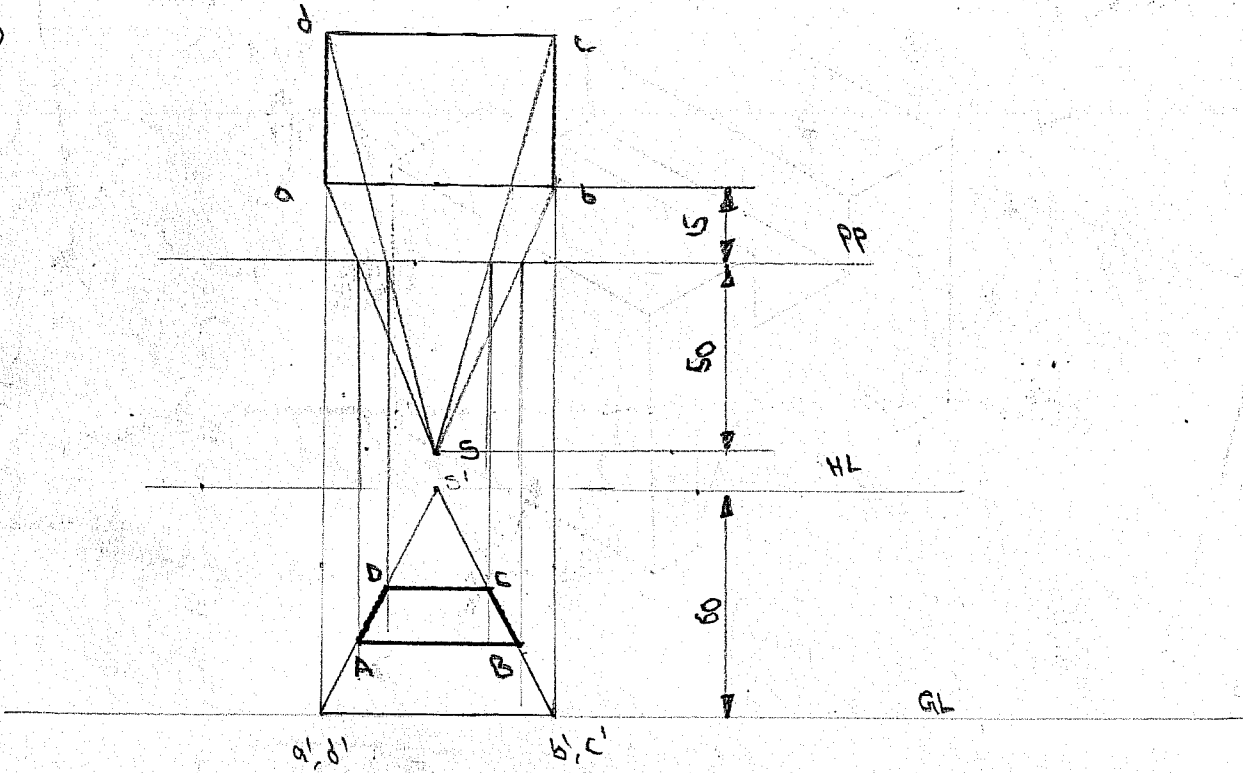
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7



8



Mathematics-I
(Common to All Branches)

Max. Marks: 70

Time: 03 Hours

Answer any five questions

All Questions carry equal marks (14 Marks each)

1. a) Solve $\frac{dz}{dx} + \left(\frac{z}{x}\right) \log z = \frac{z}{x} (\log z)^2$. 7M
- b) Find the orthogonal trajectories of the families of the curve $(x - c)^2 + y^2 = c^2$ where c is arbitrary constant. 7M
2. a) Solve $(D^2 + 2) y = x^2 e^{3x} + e^x \cos 2x$, where $D = \frac{d}{dx}$. 7M
- b) Solve Non-Homogeneous ODE by Method of variation of parameters
 $(D^2 + 2D + 1)y = e^{-x} \log x$, where $D = \frac{d}{dx}$. 7M
3. a) Determine whether the following functions are functionally dependent or not. If functionally dependent, find the functional relation between them:
 $u = x^2 + y^2 + 2xy + 2x + 2y$, $v = e^x e^y$. 7M
- b) Find the maximum and minimum distances of the point $(3, 4, 12)$ from the sphere $x^2 + y^2 + z^2 = 4$. 7M
4. a) Trace the curve $y^2 (a - x) = x^2 (a + x)$. 7M
- b) Find the entire length of the cardioids $r = a(1 + \cos \theta)$. Also show that the upper half is bisected by $\theta = \frac{\pi}{3}$. 7M
5. a) Evaluate $\int_0^1 \int_0^{\sqrt{1-x^2}} \int_0^{\sqrt{1-x^2-y^2}} xyz \, dx \, dy \, dz$. 7M
- b) Evaluate the integral by changing the order of integration
 $\int_0^a \int_{\frac{x}{a}}^{\sqrt{\frac{x}{a}}} (x^2 + y^2) \, dx \, dy$. 7M
6. a) (i) Find $L \left\{ \frac{\cos at - \cos bt}{t} \right\}$.
(ii) Find $L^{-1} \left\{ \frac{1}{(s-2)(s+2)^2} \right\}$ Using Convolution theorem. 8M
- b) (i) Find the Laplace Transform of Unit step function.
(ii) State and prove second shifting property of Laplace Transform. 6M
7. a) (i) Find the Laplace Transform of the first derivative of $f(t)$.
(ii) Find $L \left\{ \int_0^t \int_0^t \int_0^t \cos au \, du \, du \, du \right\}$. 8M
- b) Use transform method to solve the differential equation
 $\frac{d^2 x}{dt^2} - 2 \frac{dx}{dt} + x = e^t$ with $x = 2$, $\frac{dx}{dt} = -1$ at $t = 0$. 6M
8. a) Evaluate Curl of $\vec{V} = e^{xyz} (i + j + k)$ at the point $(1, 2, 3)$. 4M
- b) State Green's theorem and Verify Green's theorem for $\oint_C [(xy + y^2) dx + x^2 dy]$,
Where C is bounded by $y = x$ and $y = x^2$. 10M
