

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

Hall Ticket Number :

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Code : 1G311

R-11 / R-13

B.Tech. I Year Supplementary Examinations December 2015

Electronic Devices and Circuits

(Common to EEE & ECE)

Max. Marks: 70

Time: 03 Hours

Answer any five questions

All Questions carry equal marks (14 Marks each)

1. a) Briefly explain about Fermi level in intrinsic and extrinsic semiconductors. 8M
b) Define Hall effect? And explain the experimental determination of mobility. 6M
2. a) Give the comparison of zener breakdown and avalanche breakdown. 5M
b) The current flow through a PN-junction diode is 0.75 mA at forward-biased voltage 350 mV and 20 mA at forward-biased voltage 500 mV. Determine the value of η if the junction operates at 295 K. 4M
c) Explain the diffusion capacitance in a PN-junction diode. 5M
3. a) What are the advantages of bridge rectifier over the full-wave rectifier? 4M
b) A half-wave rectifier circuit is coupled to a 230 V, 50 Hz source, through a transformer of turn ratio of 10:1. The rectifier circuit is connected to a 500 Ω / 1 watt resistor and diode forward resistance is 100 Ω . Calculate the efficiency of rectification. 6M
c) Define filter. Why are filters used in a dc power supply? 4M
4. a) Explain the principle of operation of NPN and PNP transistor. 8M
b) A transistor has $I_C = 5.255$ mA; $I_B = 100$ μ A and $I_{CBO} = 5$ μ A. Calculate (i) I_{dc} (ii) I_{dc} (iii) I_E 6M
5. a) What is self-bias? Draw a self-bias circuit and derive the stability factor. 10M
b) Explain the need for stabilization. 4M
6. a) Describe the construction and working principle of an N-channel enhancement type MOSFET with diagrams and draw the device characteristics. 10M
b) List the advantages and disadvantages of JFET and MOSFET. 4M
7. a) Draw the small signal hybrid model of CE amplifier and derive the expressions for its A_i , A_v , R_i and R_o 10M
b) State Miller's theorem. 4M
8. a) Draw and explain the V-I characteristics of phototransistor. 6M
b) Explain the construction and working principle of TRIAC. 8M

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

B.Tech. I Year Supplementary Examinations December 2015

Engineering Drawing
(Common to EEE, ECE, CSE & IT)

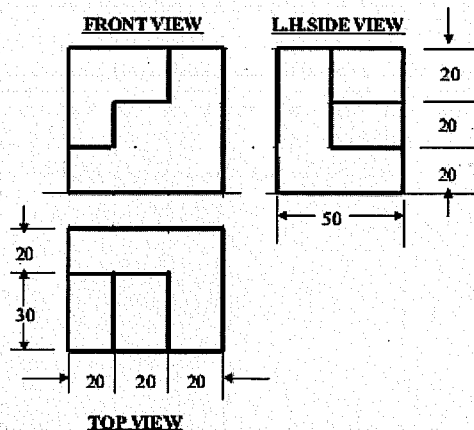
Max. Marks: 70

Time: 03 Hours

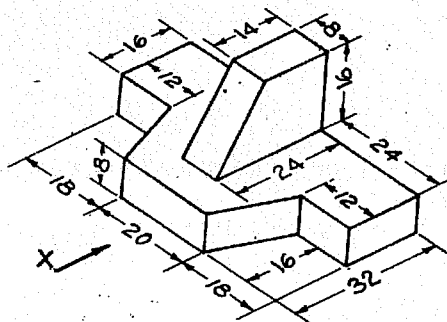
Answer any five questions

All Questions carry equal marks (14 Marks each)

1. The major axis of an ellipse is 150 mm long and the minor axis is 100 mm long. Draw the ellipse by 'Concentric Circles' method. Draw a tangent to the ellipse at a point on it 25 mm above the major axis. 14M
2. A circle of 50 mm diameter rolls on the circumference of another circle of 175 mm diameter and outside it. Trace the locus of a point on the circumference of the rolling circle for one complete revolution. Name the curve. Draw a tangent and a normal to the curve at a point 125 mm from the center of the directing circle. 14M
3. A line AB is in the first quadrant, its ends A and B are 20 mm and 60 mm in front of the V.P respectively. The distance between the end projectors is 75 mm. The line is inclined at 30° to the H.P and its H.T is 10 mm above xy. Draw the projections of AB and determine its true length and the V.T. 14M
4. A circular plate of negligible thickness and 50 mm diameter appears as an ellipse in the front view, having its major axis 50 mm long and minor axis 30 mm long. Draw its top view when the major axis of the ellipse is horizontal. 14M
5. A pentagonal pyramid, base 25 mm side and axis 50 mm long has one of its triangular faces in the V.P and edge of the base contained by that face makes an angle of 30° with the H.P. Draw its projections. 14M
6. Draw the isometric projection of a sphere of 60 mm diameter resting centrally on the top of a square prism having side of the base as 30 mm and axis height as 50 mm. 14M
7. Draw the isometric view of the object, the orthographic views of which are shown in figure below. All dimensions are in mm. 14M



8. Draw the following views of the block shown in figure below.
a) Front view b) Top view c) both side views
All dimensions are in mm.



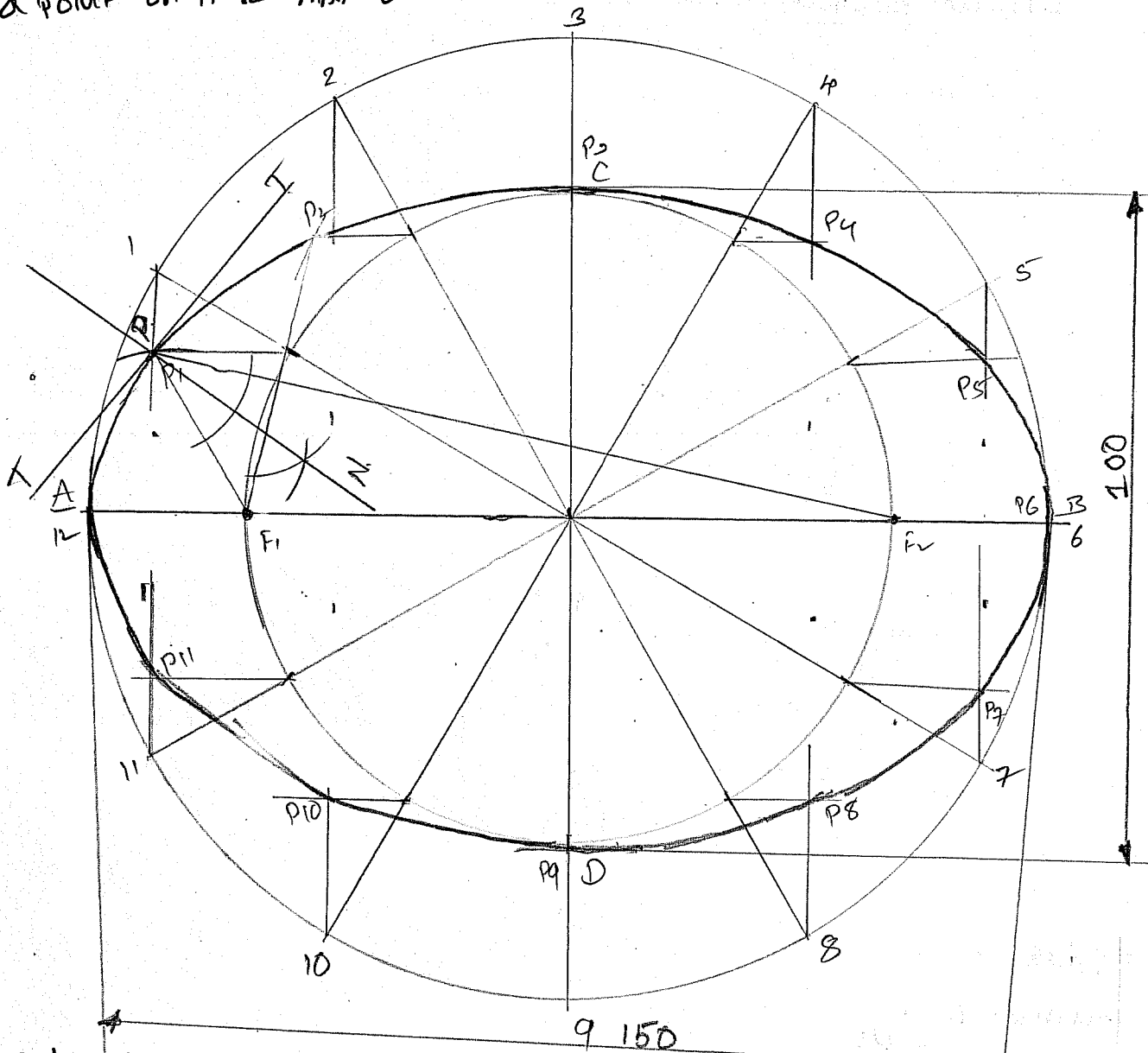
14M

EXAMINATION: ~~EN~~ I B-Tech Supplementary Examination DEC 2015

SUBJECT TITLE: Engineering Drawing

BRANCH: (EEE, ECE, CSE & IT)

1. The major axis of an ellipse is 150mm and the minor axis is 100mm long. Draw the ellipse by 'concentric circles' method. Draw a tangent to the ellipse at a point on it 25 mm above the major axis.



FBI drawing

major axis - 1M

minor axis - 1M

drawing major & minor circles - 2M.

dividing of ~~the~~ circles into 12 equal parts - 2M

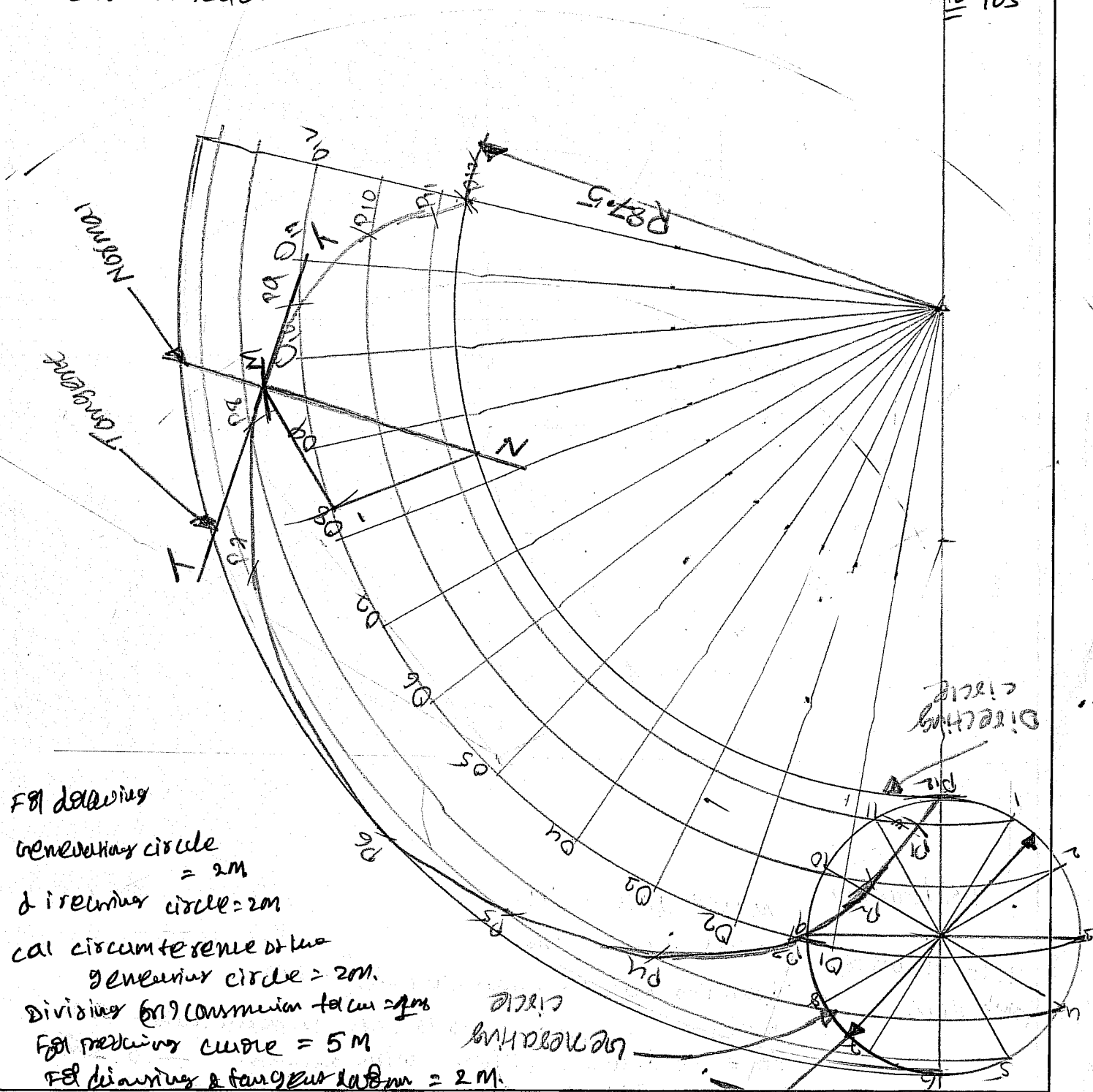
~~From~~ FBI drawing ellipse with dimensions - 6+2M

Drawing tangent & normal - 2M.

1+1+2+1+6+1+2
TOTAL = 14M

2. A circle of 50mm diameter rolls on the circumference of another circle of 175mm diameter & outside it. Trace the locus of a point on the circumference of the rolling circle for one complete revolution. Name the curve. Draw a tangent & a normal to the curve at a point 125mm from the centre of the directing circle.

Ans. Generating circle = 50mm, Directing circle = 175mm.
 Circumference of the generating circle = $360 \times \frac{50}{175} = 102.85^\circ \approx 103^\circ$



For drawing
 generating circle = 2m
 directing circle = 2m
 cal circumference of the generating circle = 2m.
 Dividing for construction taken = 12
 For plotting curve = 5m
 For drawing & tangent & normal = 2m.

$[2 + 2 + 2 + 1 + 5 + 2 = 14m]$

50

3. A line AB is in the first quadrant, its end A & B are 20mm and 60mm in front of the V.P. respectively. The distance between the end projections is 75mm. The line is inclined at 30° to the H.P. & its H.T is 10mm above XY. Draw the projections of AB and determine its true length and true V.T.

This question is out of syllabus, the traces are out of syllabus of R11 & R13 books.

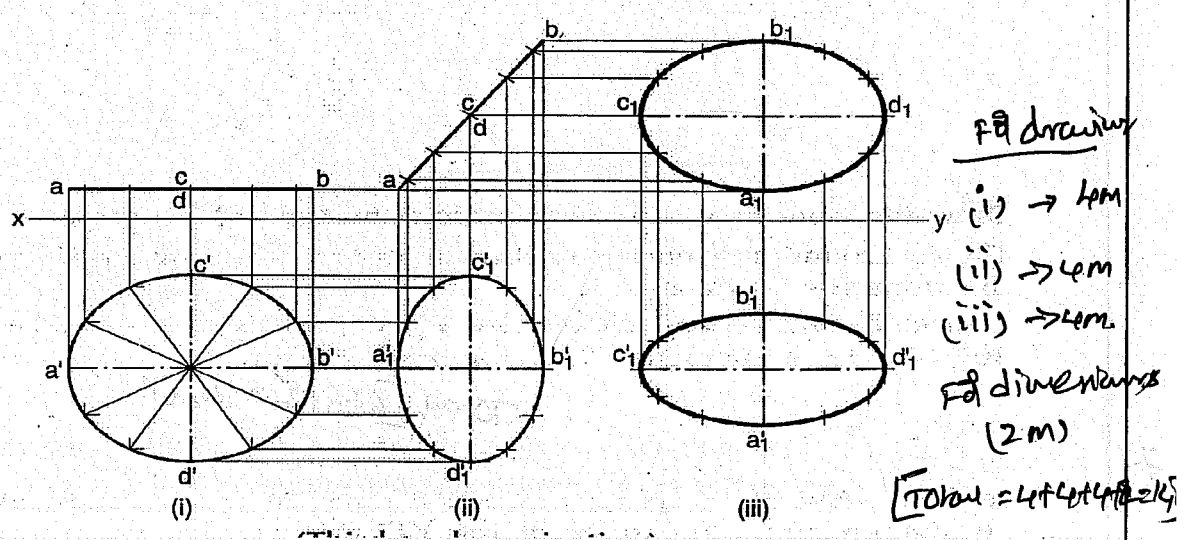
This question is from traces.

5 A pentagonal pyramid, base 25mm side & axis 50mm long has one of its triangular face in the V.P & edge of the base contained by that face makes an angle 30° with the H.P. Draw its projections.



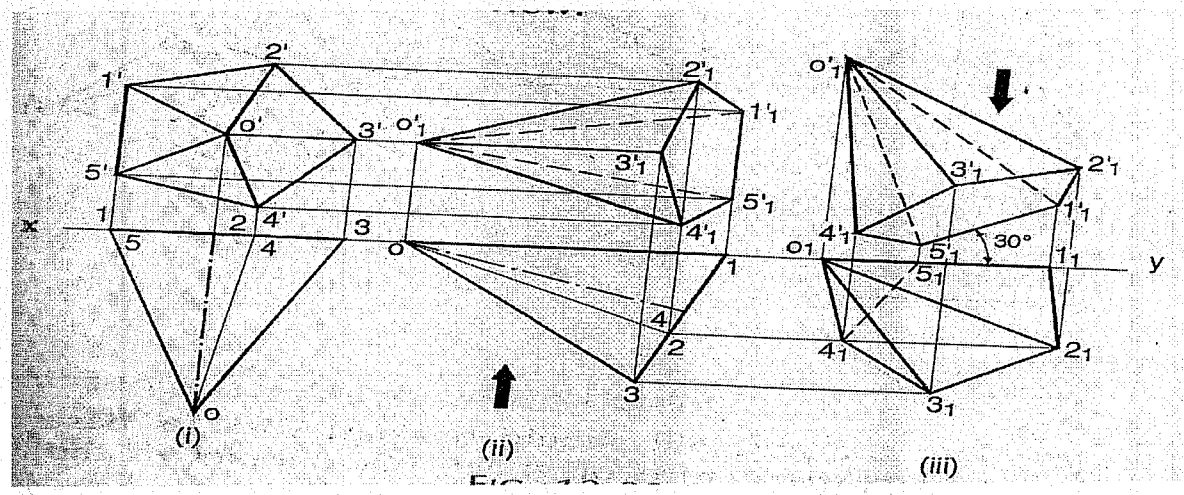
4.

A circular plate of negligible thickness and 50 mm diameter appears as an ellipse in the front view, having its major axis 50 mm long and minor axis 30 mm long. Draw its top view when the major axis of the ellipse is horizontal.



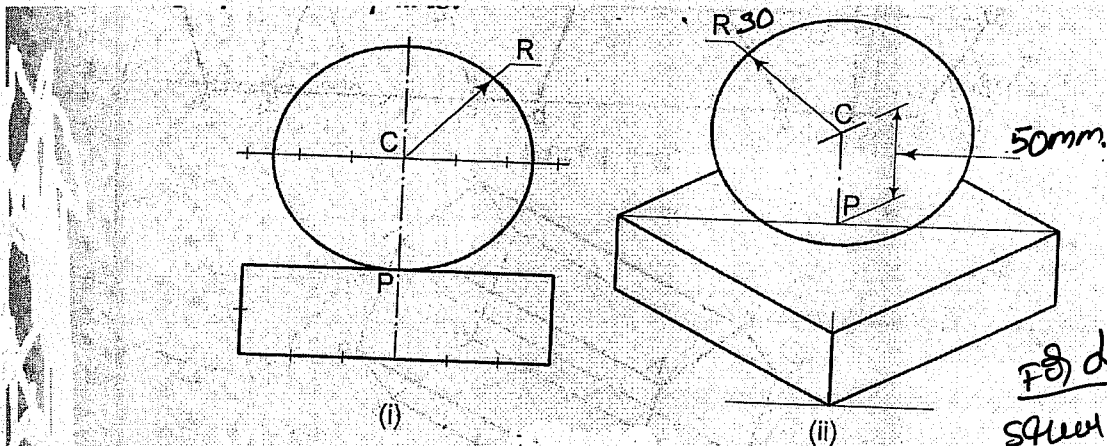
5.

A pentagonal pyramid, base 25 mm side and axis 50 mm long has one of its triangular faces in the V.P and edge of the base contained by that face makes an angle of 30° with the H.P. Draw its projections.



F8 drawing
 (i) \rightarrow 4m
 (ii) \rightarrow 4m
 (iii) \rightarrow 4m & F8 drawing dimension \rightarrow 2m
 Total = [2+4+4+2=12]

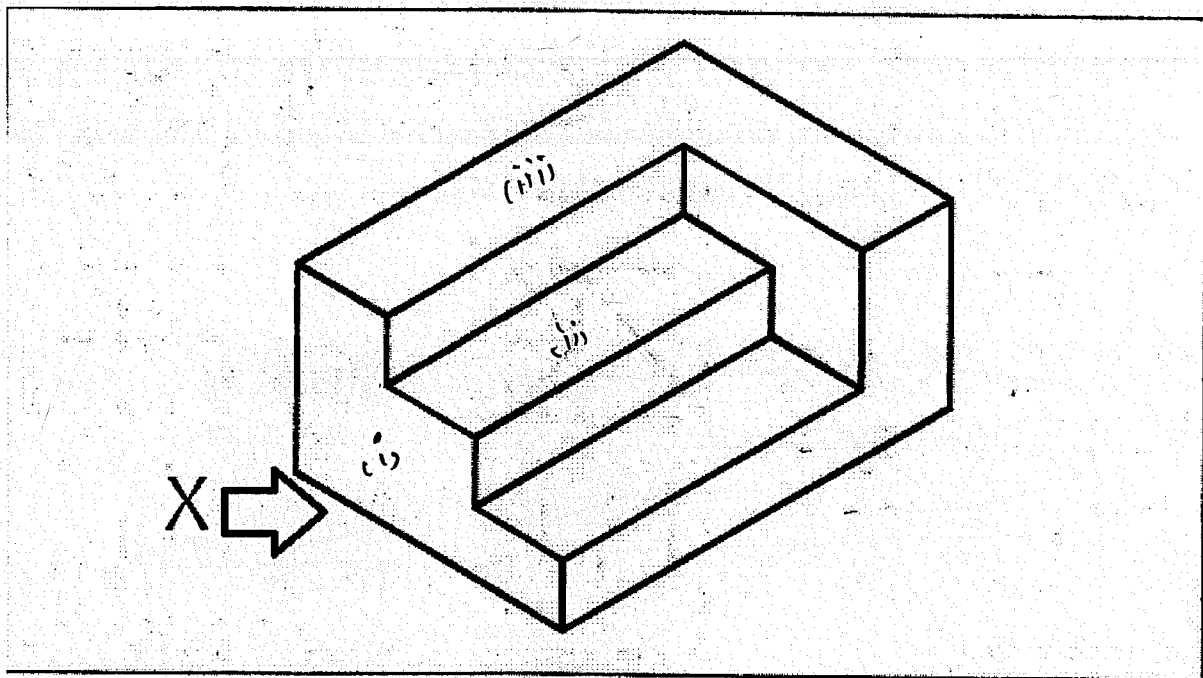
6. Draw the isometric projection of a sphere of 60 mm diameter resting centrally on the top of a square prism having side of the base as 30 mm and axis height as 50 mm.



Total $[6+6+2=14m]$

Fd drawing
 Square prism $\rightarrow 6m$
 Sphere $\rightarrow 6m$
 Fd dimensions $\rightarrow 2m$

7. Draw the isometric view of the object, the orthographic views of which are shown in figure below. All dimensions are in mm.

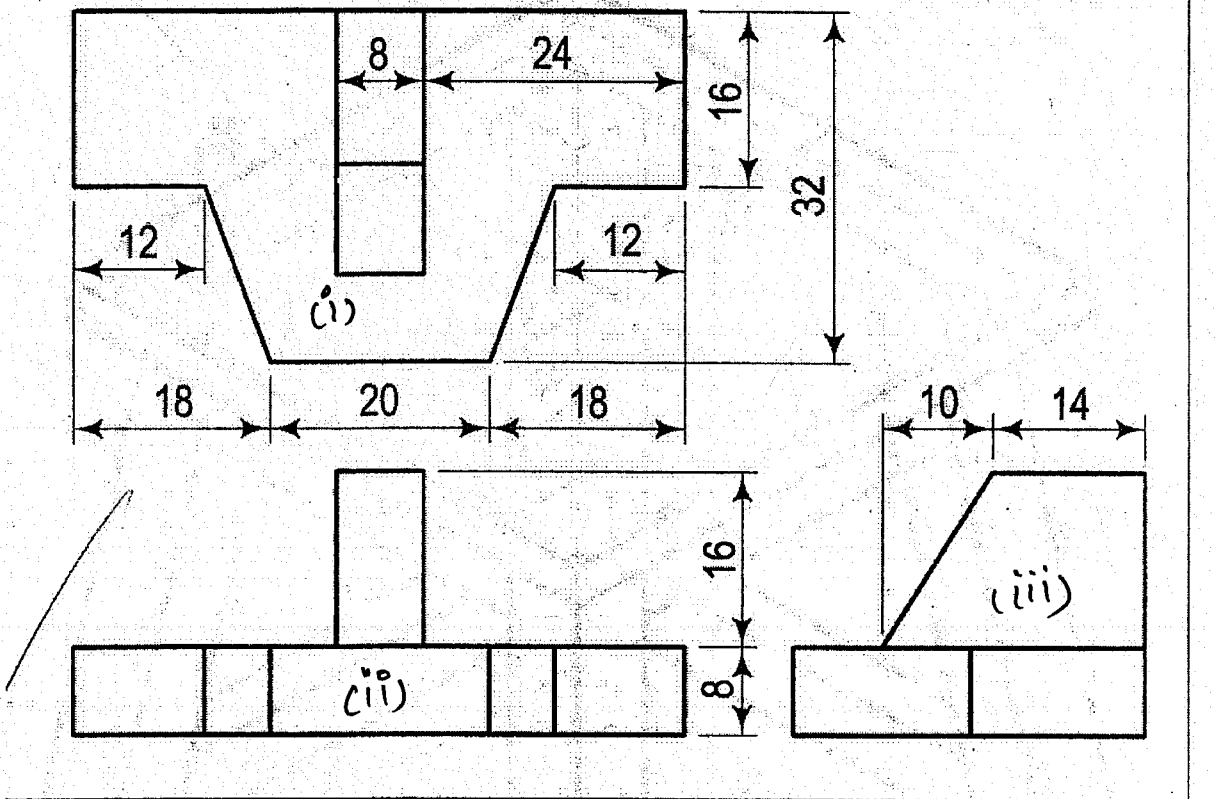


Fd drawing

(i) $\rightarrow 4m$
 (ii) $\rightarrow 4m$
 (iii) $\rightarrow 4m$
 (iv) Fd drawing dimension 2m } Fd drawing TOP, FRONT, & Side views in isometric view
 Total $[4+4+4+2=14m]$

8. Draw the following views of the block shown in figure below.

a) Front view b) Top view c) both side views
All dimensions are in mm.



(i) → Front view → 4m
 (ii) → Top view → 4m
 (iii) → Side view → 4m

FR dimension 2m

Total $[4+4+4+2 = 14m]$

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
