

English*(Common to All Branches)***Time: 3 hours****Max Marks: 70**

*Answer any FIVE of the following
All questions carry equal marks (14 Marks each)*

* * * * *

1. Give an account of Raman's discovery during his voyage across the Mediterranean Sea and how did it prove to be important? 14M
2. 'The heat made me sweat, but the laughter made me shake.' What does the author mean this statement? 14M
3. a) Visvesvaraya can be called the Mahatma of technologically independent India. Illustrate. 07M
b) What is the bold initiative that Vikram Sarabhai took? 07M
4. "She is the United Nations. She is peace in the World." Explain this statement in the context of Mother Teresa's life. 14M
5. a) Describe the various steps involved in the making of a film. 07M
b) What do you think the writer means when he says, 'I saw faces that spoke of Lhasa, Heart, even Samarkand'? 07M
6. a) How did Chaplin become world famous? 07M
b) Miss Krishna never opened her black trunks till she was alive. How were they opened after her death and what did they reveal? What is it the narrator picks up from the trunk? 07M
7. a) Write a short letter to Doordarshan whether it would be possible to repeat at some future time some of the episodes of 'Malgudi Days' which you have enjoyed seeing. 07M
b) You are the General Secretary of the college union. Write a formal letter to the principal of your college requesting him to have a telephone installed in the hostel for the use of the residents. 07M
8. a) Provide One word Substitutes 07
 - i) Killing of human beings _____
 - ii) Something that becomes outdated _____
 - iii) A person who eats too much _____
 - iv) One who walks in sleep _____
 - v) Study of the earth _____
 - vi) Handwriting that cannot be read is _____
 - vii) One who believes in God _____
- b) Fill in the blanks with suitable prepositions:
 - i) There was an accident _____ the crossroads this morning
 - ii) Don't wait _____ me. I'll join you later.
 - iii) In India we drive _____ the left.
 - iv) The school provides all its students _____ books.
 - v) Have you ever been bitten _____ a dog?
 - vi) I had lost my key but I managed to climb _____ the house through a window. 07
 - vii) We had a discussion _____ what we should do.

* * *

Code : 1GC12

R13/R11

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
(AUTONOMOUS)

I Year B.Tech. Supplementary Examinations December, 2014

Engineering Physics
(Common to All Branches)

Time: 3 hours

Max Marks: 70

Answer any FIVE of the following
All questions carry equal marks (14 Marks each)

1. a) State and define the polarization. 4M
b) What is the Nicol prism. 4M
c) Derive the theory of circular and elliptical polarized light. 6M
2. a) Describe the powder X-ray diffraction method for estimation of NaCl unit cell parameters. 6M
b) Write a note on Bravais lattices. 4M
c) Draw the F.F.C Crystal Structure. 4M
3. a) Describe the particle in a one dimensional potential box. 8M
b) Explain the de-Broglie's hypothesis. 6M
4. a) Distinguish between intrinsic and extrinsic semiconductors. 6M
b) What are the law of mass action? 4M
c) Explain the working principles of LED with examples. 4M
5. a) Derive the Clausius –Mossotti equation. 6M
b) Write note on ferroelectric of BaTiO₃. 4M
c) Write note on dielectric constant. 4M
6. a) What is the population inversion? 4M
b) Write the characteristic of laser. 6M
c) Describe the working principles of Helium-Neon laser. 4M
7. a) Discuss the construction and reconstruction of hologram. 6M
b) Write the application of optical fibers. 4M
c) Explain the acceptance angle and acceptance cone. 4M
8. a) Explain the fabrication of nanomaterials. 6M
b) What the carbon nanotubes. 4M
c) Write a note on properties and application of Carbon nanotubes. 4M

Mathematics-I
(Common to All Branches)

Time: 3 hours

Max Marks: 70

Answer any FIVE of the following
All questions carry equal marks (14 Marks each)

1. a) Solve $(x^7y^2 + 3y)dx + (3x^8y - x)dy = 0$ 5M
 b) Solve $(1+y^2)dx = (\tan^{-1}y - x)dy$ 9M
2. a) Solve $(D^2 + 3D + 2)y = x e^x \sin x$ 7M
 b) Solve $(4x^2D^2 + 1)y = 19 \cos(\log x) + 22 \sin(\log x)$ 7M
3. a) Define Lagrange's Mean value theorem.
 Verify Lagrange Mean value theorem for the function $f(x) = \log x$ in $[1, e]$ 7M
 b) Using Cauchy's Mean value theorem, Prove that there exists a number c such that
 $0 < a < c < b$ and $f(b) - f(a) = c f'(c) \log\left(\frac{b}{a}\right)$. By putting $f(x) = x^{1/n}$,
 deduce that $\lim_{n \rightarrow \infty} n(b^{1/n} - 1) = \log b$ 7M
4. a) Trace $x^3 + y^3 = 3ax^2, a > 0$ 7M
 b) Find the volume of the solid formed by the revolution of the curve $xy^2 = a^2(a - x)$ through the four right angles about the y-axis 7M
5. a) Find the area of the crescent bounded by the circles $r = \sqrt{3}$ and $r = 2 \cos \theta$ 7M
 b) Find the volume of the wedge intercepted between the cylinder $x^2 + y^2 = 2ax$ and the planes $z = mx, z = nx$ where $n > m$ 7M
6. a) Find Laplace transformation of (i) $t\sqrt{1 + \sin t}$ (ii) $e^{-4t} \sin ht \sin t$ 7M
 b) Evaluate $\int_0^\infty e^{-2t} \sin^3 t dt$ (ii) Find Laplace transformation $t^2 u(t - 2)$ 7M
7. Solve the Differential equation by using Laplace transformations
 $(D^2 + 2D + 5)y = e^{-t} \sin t, y(0) = 0, y'(0) = -1$ 14M
8. a) Prove that $\nabla r^n = nr^{n-2} \bar{r}$, where $\bar{r} = xi + yj + zk$ and $r = |\bar{r}|$ 5M
 b) Verify Green's theorem for $\oint_c (x - y)dx + 3xydy$, where c is the boundary of the region bounded by the parabola $x^2 = 4y$ and $y^2 = 4x$ 9M

4 Year B.Tech. Supplementary Examinations December, 2014

Mathematical Methods
(Common to CSE & IT)

Time: 3 hours

Max Marks: 70

Answer any FIVE of the following
All questions carry equal marks (14 Marks each)

* * * * *

1. a) Reduce the Matrix $\begin{pmatrix} 5 & 3 & 14 & 4 \\ 0 & 1 & 2 & 1 \\ 1 & -1 & 2 & 0 \end{pmatrix}$ into Echelon form and hence find its Rank.
- b) Determine the values of λ for which the following set of equations may possess non-trivial solution. $3x + y - \lambda z = 0$, $4x - 2y - 3z = 0$, $2\lambda x + 4y + \lambda z = 0$. For each permissible value of λ , determine the general solution.
2. a) Show that if λ is a characteristic root of the matrix A, then $\lambda + k$ is a characteristic root of the matrix $A + kI$.
- b) Find the Eigen values & Eigen Vectors of the matrix $A = \begin{bmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{bmatrix}$
3. Reduce the following quadratic form to canonical form and find its rank and signature.
- $$x^2 + 4y^2 + 9z^2 + t^2 - 12yz + 6zx - 4xy - 2xt - 6zt.$$
4. a) Find the real root of the Equation $xe^x = \cos x = 0$, correct to three decimal places by Regula-Falsi method.
- b) Assuming that the following values of y belong to a polynomial of degree 4, compute the next three values:

x	0	1	2	3	4	5	6	7
y	1	-1	1	-1	1	-	-	-

5. a) Growth of bacteria (N) in a culture after t hours is given in the following table:


t	0	1	2	3	4	5	6
N	32	47	65	92	132	190	275

Fit a curve of the form $N = ab^t$ and estimate N when $t = 7$.

- b) Fit a straight line to the following data:

Year x	1911	1921	1931	1941	1951
Production y (In Thousand tons)	8	10	12	10	16

and find the expected production in 1956.


4400 ASD

6. a) Using the following data, find x for which y is minimum and find this value of y .

x	0.6	0.65	0.7	0.75
y	0.6221	0.6155	0.6138	0.6170

- b) A body is in the form of a solid of revolution. The diameter D in cms of its sections at distances x cm. from one end are give below. Estimate the volume of the solid by

Simpsons rule.

x	0	2.5	5.0	7.5	10.0	12.5	15.0
D	5	5.5	6.0	6.75	6.25	5.5	4.0

7. a) Solve $y' = 2x - y$, $y(1) = 3$ up to 3rd approximation and find $y(1.5)$ by Picard's method.
 b) Using Runge - Kutta 4th order method, find $y(0.2)$ given that $y' = y - \frac{2x}{y}$, $y(0) = 1$.
8. a) Expand $x \sin x$ in $(0, \pi)$ as a Fourier cosine series and deduce that

$$1 + \frac{2}{1.3} - \frac{2}{3.5} + \frac{2}{5.7} - \frac{2}{7.9} + \dots = \frac{\pi}{2}$$

- b) If

$$f(x) = \begin{cases} -1 + x, & -\pi < x < 0 \\ 1 + x, & 0 < x < \pi \end{cases} \text{ with period } 2\pi, \text{ find the Fourier series for } f(x).$$

Programming in C and Data Structures
(Common to CSE & IT)

Time: 3 hours

Max Marks: 70

Answer any FIVE of the following
All questions carry equal marks (14 Marks each)

1. a) Define Flowchart and Algorithm. Explain the different symbols in flowchart.
b) Discuss any two Number Systems used in computers.
2. a) Discuss general form of a C program with example
b) Illustrate any two loop statements of a C language.
3. a) Write a program to perform matrix multiplication using Arrays.
b) Discuss about pre-processor statements. Illustrate with examples.
4. a) Write a C Program to compare two strings without using string functions
b) Explain Dynamic Memory allocation functions.
5. a) Explain structure with in structure with example.
b) Explain file manipulations functions
6. a) Explain representation of Stack and Queue
b) Explain conversion of an infix expression to postfix.
7. a) Explain operations on doubly linked lists
b) Define Tree and Graph. Illustrate with example.
8. a) Explain Quick Sort
b) Explain Binary Search method

4 Year B.Tech. Supplementary Examinations December, 2014

Engineering Chemistry*(Common to All Branches)***Time: 3 hours****Max Marks: 70**

*Answer any FIVE of the following
All questions carry equal marks (14 Marks each)*

* * * * *

1. a) Write a brief note on
(i) Priming and Foaming (ii) Caustic embrittlement 8M
- b) Explain any two methods for internal treatment of water 6M
2. a) Define and write the units of the following
(i) specific conductance (ii) Equivalent conductance 6M
- b) Discuss conductometric titrations with suitable examples 8M
3. a) Discuss various factors which influence corrosion. 4M
- b) Explain the mechanism of hydrogen evolution and oxygen absorption in electrochemical corrosion 10M
4. a) What is polymerization? Differentiate condensation and additional polymerization with suitable examples. 7M
- b) Discuss preparation, properties and applications of Teflon and Bakelite. 7M
5. a) Write a short notes on
(i) aniline point (ii) Neutralization number (iii) flash and fire points 3x3=9M
- b) Explain the classification of propellants. 5M
6. a) What is condensed phase rule? Discuss the phase diagram of two component (Lead-Silver) system 9M
- b) Write one important application of Phase rule. 5M
7. a) What are fuels? How are they classified? 6M
- b) Explain the following terms
(i) Octane number (ii) Cetane number (iii) Cracking (iv) Synthetic petrol 8M
8. a) Write the chemical composition of port land cement and discuss the manufacture of port land cement 8M
- b) Write the causes for the failure of a refractory materials 6M

I Year B.Tech. Supplementary Examinations December, 2014

C Programming and Introduction to Data Structures
(Common to CIVIL, EEE, ME & ECE)

Time: 3 hours

Max Marks: 70

Answer any FIVE of the following
All questions carry equal marks (14 Marks each)

* * * * *

1. a) List and explain the steps that a programmer follows in a writing a program. 7M
- b) Write an Algorithm to find roots of a Quadratic Equation. 7M
2. a) Describe Conditional Statements used in C Language. 7M
- b) Write a C program that determines a student's grade. It reads test score between 0 to 100.
 - a) If the score is more than 60% it displays "First Division".
 - b) If the score is between 50% to 60% range displays "Second Division".
 - c) If the score is below 50% and above 40% it displays "Third Division".
 - d) If the score is below 40% it displays "Fail". 7M
3. a) Explain all Storage classes available in C Language. 7M
- b) Write a C program to reverse the list of integers using Arrays. 7M
4. a) Explain pointer arithmetic in C Language. 6M
- b) Write a C Program to count number of characters, words, lines in the given text. 8M
5. a) Differentiate Structures and Unions 6M
- b) Explain the following with example
 - i. Array of structures
 - ii. Array in structures 8M
6. a) Explain different modes to open a file. 6M
- b) A file named data.txt contains a series of integers, write a program to read these numbers, write all odd numbers to a file odd.txt and all even numbers to a file even.txt. 8M
7. Define stack and implement all stack operations using Linked lists. 14
8. a) Write an algorithm to sort the given list of elements using Merge Sort. 7M
- b) Distinguish between Linear and Binary Search Methods. 7M

Engineering Drawing

(Common to EEE, ECE, CSE & IT)

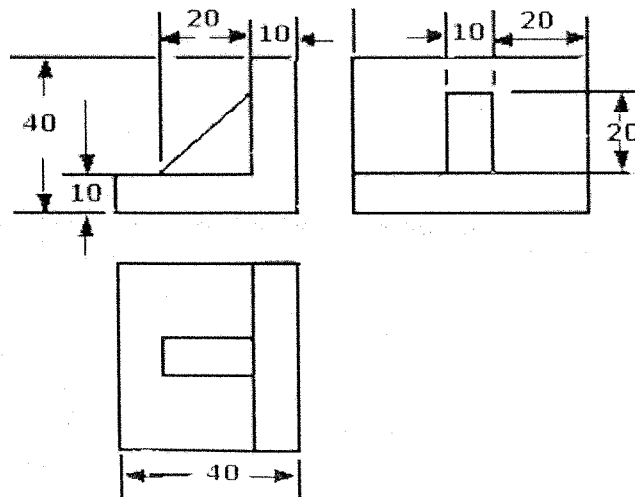
Time: 3 hours

Max Marks: 70

Answer any FIVE of the following
All questions carry equal marks (14 Marks each)

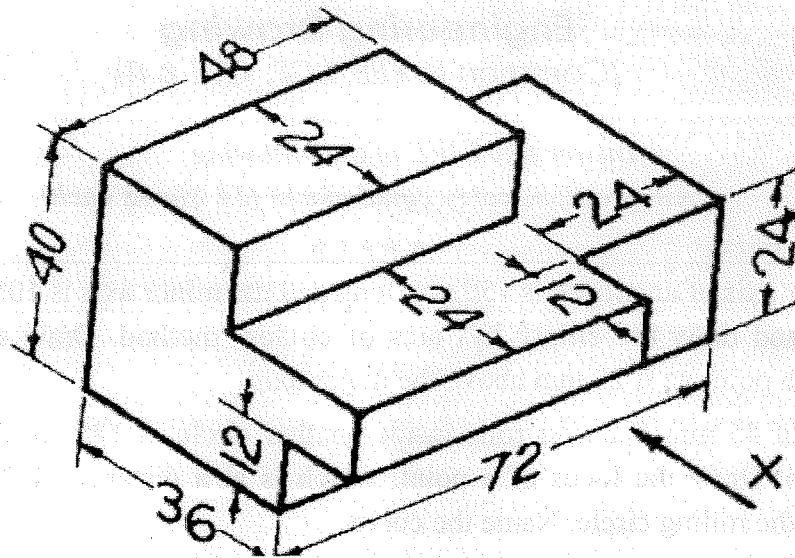
* * * * *

- The major axis of an ellipse is 150 mm long and the minor axis is 100 mm long. Find the foci and draw the ellipse by 'arcs of circles' method. Draw a tangent to the ellipse at a point on it 25 mm above the major axis. 14M
- A circle of 45 mm diameter rolls inside another circle of 180mm diameter for one revolution. Draw the locus of a point, which is at a distance of 20 mm from the center of the rolling circle. Name the curve. 14M
- The front view of a line AB, 80 mm long, measures 55 mm while its top view measures 70 mm. End A is in both HP and VP. Draw the projections of the line and find its inclinations with the reference planes. Also locate the traces. $\theta = 46.5^\circ$
 $\phi = 29^\circ$ 14M
- A regular hexagon of 40 mm side has a corner in the H.P. Its surface is inclined at 45 degrees to the H.P. and the diagonal through the corner which is in the H.P. makes an angle of 30 degrees with the V.P. Draw its projections. 14M
- A pentagonal pyramid, base 25 mm side and axis 50 mm long has one of triangular faces in the V.P. and the edge of the base contained by that face makes an angle of 30 degrees with the H.P. Draw its projections. 14M
- Draw the isometric projection of a cylinder of base diameter 50mm and axis 60mm. The axis of the cylinder is perpendicular to the (a) H.P. (b) V.P. 14M
- Draw the isometric view of the ribbed angle plate shown in figure below.
(All dimensions are in mm)



14M

8. Draw Front view, Top view and Side view of the isometric view given in figure below according to first angle projection method. (All dimensions are in mm)



14M

Electronic Devices and Circuits

(Common to EEE & ECE)

Time: 3 hours**Max Marks: 70***Answer any FIVE of the following**All questions carry equal marks (14 Marks each)*

1. a) Discuss the differences between Insulator, Conductor and Semi conductor 7M
 b) Define Hall Effect. Derive the expressions for Hall voltage & Hall Coefficient 7M
2. a) Draw the forward & reverse characteristics of a P-N junction diode and explain them qualitatively. 7M
 b) Summarize the effect of temperature on diode's V-I characteristics. 7M
3. a) A voltage $V_i = 100 \cos 100t$ is applied to half wave rectifier, with $R_L = 5K\Omega$ & $R_F = 0$. Calculate i) I_m ii) AC power iii) Efficiency iv) Ripple factor 8M
 b) Explain the operation of full wave rectifier with inductor filter and derive the expression for ripple factor 6M
4. a) Define and discuss the early effect consequences on the input & output characteristics of transistor configuration. 9M
 b) The leakage currents of the transistor are $I_{CEO} = 410\mu A$, $I_{CBO} = 5\mu A$ & $I_B = 30\mu A$. Calculate I_C 5M
5. a) Explain collector to base bias and derive an expression for its stability factor(S). 7M
 b) A transistor with $\beta = 110$ is used in CE configuration with collector to base bias. The collector circuit resistance is $R_C = 2K\Omega$ and $V_{CC} = 12V$. assume $V_{BE} = 0$ Find i) R_B so that the quiescent collector to emitter voltage is 5V ii) stability factor 7M
6. a) Discuss the operation of JFET with neat sketches 7M
 b) Explain the transfer & drain characteristics of JFET with neat sketch. 7M
7. a) Draw the low frequency h-parameter equivalent of a CE amplifier and derive expressions for Z_i , A_i , A_v and Z_o . 7M
 b) In a single stage CE amplifier, having $R_S = 1K\Omega$, $R_1 = 100K\Omega$, $R_2 = 10K\Omega$, $R_C = 5K\Omega$. Transistor having h-parameters $h_{ie} = 1.1K\Omega$, $h_{fe} = 50$, $h_{re} = 2.5 \times 10^{-4}$ and $h_{oe} = 25\mu A/V$. Calculate A_i , A_v , R_i , R_o , A_{vs} , and A_{is} . 7M
8. a) Sketch basic construction of UJT and explain its operation with equivalent circuit. 8M
 b) Discuss the applications of Tunnel diodes and Varactor diodes 6M

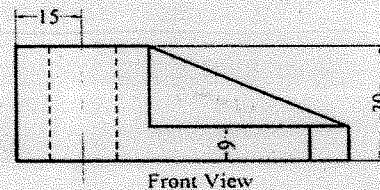
I Year B.Tech. Supplementary Examinations December, 2014

Engineering Graphics

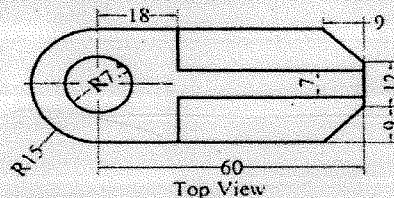
(Common to Civil & Mechanical Engineering)

Time: 3 hours**Max Marks: 70***Answer any FIVE of the following**All questions carry equal marks (14 Marks each)*

1. A point P is 25 mm and 45 mm respectively from two straight lines which are at right angles to each other. Draw the rectangular hyperbola from P within 10 mm distance from each line. Draw a normal and tangent to the curve at any point on the curve. 14M
2. A line AB 70 mm long has its end A at 10 mm above HP and 15 mm in front of VP. Its front view and top view measures 50mm and 60 mm respectively. Draw the projections of the line and determine its inclinations with HP and VP 14M
3. A regular pentagon of 30 mm side has an edge in the HP, which is inclined at 30° to the VP. The plane of the pentagon is inclined at 60° to the HP. Draw its projections. 14M
4. Draw the projections of a regular hexagonal prism side of base 25 mm and axis 60 mm long resting with its base on HP such that one of its edges of the base is inclined at an angle of 25° to VP. 14M
5. A cone of base 55 mm diameter and axis 65 mm long rests with its base on HP. A section plane perpendicular to both HP and VP cuts the cone at a distance of 8 mm from its axis. Draw its top view, front view and sectional side view. 14M
6. Draw the Isometric view of an object using the details furnished in the following figure:



Front View



Top View

7. A Vertical square prism of base 50 mm side is penetrated by a horizontal square prism of base 40 mm side such that the axes intersect. The axis of horizontal prism is parallel to VP and the faces of both the prisms are equally inclined to VP. Draw the projections of two prisms having the lines of intersections. 14M
8. A rectangle ABCD with 45 mm x 35 mm sides is lying in ground plane (GP) with the longer side parallel to and 15 mm behind the Picture plane (PP). The station point is 55 mm in front of PP, 50 mm above GP and lies in the central plane (CP) passing through the centre of the object. Draw its perspective view 14M

Engineering Mechanics

(Common to Civil Engineering & Mechanical Engineering)

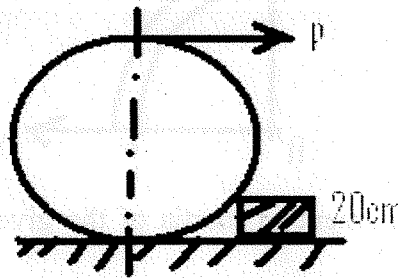
Time: 3 hours

Max Marks: 70

Answer any FIVE of the following, Assume suitable data if necessary

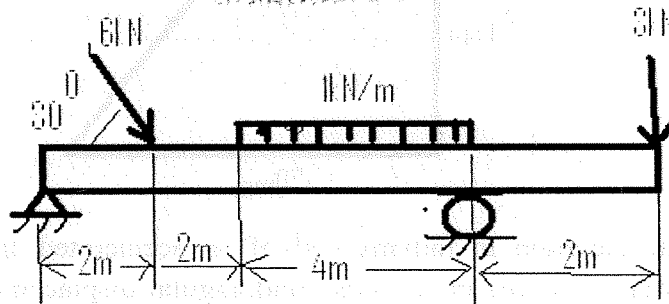
All questions carry equal marks (14 Marks each)

1. a) Distinguish between coplanar and non coplanar forces 4M
- b) A Roller of radius 40cm , weighing 3kN is to be pulled over a rectangular block of height 20cm as shown in figure given below by a horizontal force P applied at the end of a string wound round the circumference of the roller. Find magnitude of P and reaction force between block and roller.



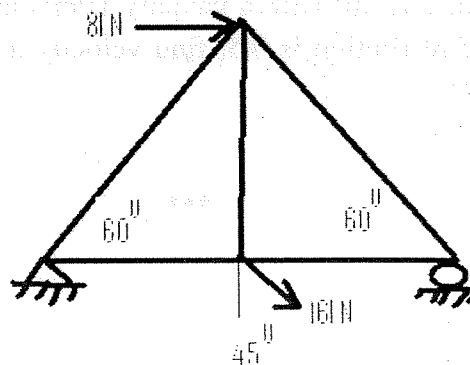
10M

2. a) What is the main advantage of roller support in case of the steel trusses of bridges? 4M
- b) Determine reactions at both ends of loaded beam shown below:



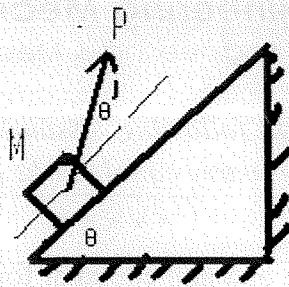
10M

3. a) What is the advantage of method of section over method of joints? 4M
- b) Find the forces in truss members in structure shown below: The distance between supports is 4m.



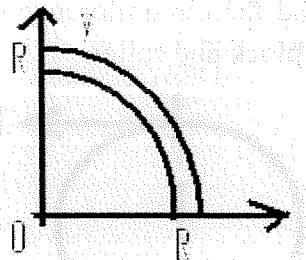
10M

4. a) State the laws of solid friction. 4M
- b). A body of mass M is placed on a rough inclined plane having angle of friction ϕ as shown below. Derive the expression for P .



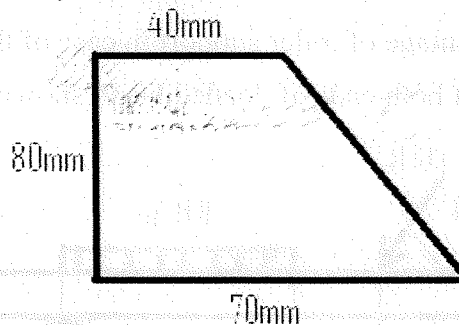
10M

5. Find the centre of gravity of a quadrant of the arc of a circle of radius R as shown in Figure.



14M

6. Determine the product moment of inertia of the given plane area shown in figure given below:



14M

7. The angular acceleration in radians / s^2 of an accelerated flywheel is given by $\alpha = 9/32 * t^3$ where t is time in seconds. Find angular displacement, angular velocity and angular acceleration when $t=1.6$ Sec. Assume initial angular speed of wheel is 2 rad/s and initial angular acceleration is zero. 14M

8. a) Explain the law of conservation of momentum 4M
- b) A ball is thrown against a wall with a velocity 10m/s making an angle 30° with the wall. If coefficient of restitution is 0.5, find velocity and direction of the ball after impact. 10M
