R09

I Year B.Tech(R09) Supplementary Examinations, December 2010.
MATHEMATICS - I
(Common to All Branches)

Time: 3 hours
Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
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1. (a) Solve : $(x^2 - 1)\frac{dy}{dx} + 2xy = 1$.

   (b) Solve : $x\frac{dy}{dx} + y = \log x$.

2. (a) Solve : $\frac{d^2y}{dx^2} + 4\frac{dy}{dx} + 5y = -2\cosh x$. Given y (0) = 0, y'(0) = 1.

   (b) Solve : $(D^3 - 5D^2 + 7D - 3)y = e^{2x} \cosh x$.

3. (a) Find c of Lagrange's mean value theorem for
       f(x) = x(x - 1) (x - 2) in $\lfloor 0, 1/2 \rfloor$.

   (b) Verify Lagrange's mean value theorem for
       f(x) = logx in [1, e].

4. (a) Find the volume of the solid generated by revolving the ellips $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$.

   (b) Find the volume of the reel shaped solid formed by the revolution about the y - axis of
       the part of the parabola $y^2 = 4ax$ cut off by the latusrectum.

5. (a) Evaluate $\int_0^1 \int_0^{\sqrt{1+x^2}} \frac{dx\,dy}{1+x^2+y^2}$.

   (b) Change the order of integration in $\int_0^4 \int_y^4 \frac{x\,dx\,dy}{x^2+y^2}$ and evaluate.

6. (a) Find the Laplace Transform of $\left\{ \left(\sqrt{t} - \frac{1}{\sqrt{t}} \right)^3 \right\}$.

   (b) Find $L^{-1} \left\{ \frac{1}{2} \log \left(\frac{s^2+b^2}{s^2+a^2} \right) \right\}$.

7. (a) Find $L\{sin\sqrt{t}\}$ and Hence Evaluate $L\{\frac{cos\sqrt{t}}{\sqrt{t}}\}$.

   (b) Solve the D.E. y'' + 2y' + 5y = e^{-t}, y(0) = 1, y'(0) = 1 Using L.T.

8. (a) If θ is the acute angle between the surfaces x^2 yz = 3x + z^2 and $3x^2$ - y^2 + 2z = 1 At the
       point (1,-2,1),show that cos $\theta = \frac{3}{7\sqrt{6}}$.

   (b) Compute the line integral $\int_c (y^2 dx - x^2 dx)$ about the triangle whose vertices are (1,0),
       (0,1) and (-1,0).

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R09

I Year B.Tech(R09) Supplementary Examinations, December 2010.
MATHEMATICAL METHODS
(Common to Computer Science & Engineering, Electronics & Communication Engineering,
Electrical & Electronics Engineering, Electronics & Control Engineering, Electronics &
Computer Engineering, Electronics & Instrumentation Engineering, Information Technology,
Computer Science & Systems Engineering,)

Time: 3 hours   Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
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1. (a) Reduce the matrix to Echelon form and find its rank.
$$\begin{pmatrix} -1 & -3 & 3 & -1 \\ 1 & 1 & -1 & 0 \\ 2 & -5 & 2 & -3 \\ -1 & 1 & 0 & 1 \end{pmatrix}$$

   (b) Test for consistency and if consistent solve the system.
   $5x + 3y + 7t = 4$; $3x + 26y + 2t = 9$; $7x + 2y + 10t = 5$

2. Reduce the following quadratic form by orthogonal reduction and obtain the corresponding transformation. Find the index, signature and nature of the quadratic form
$q = 25x_1^2 + 34x_2^2 + 41x_3^2 - 24x_2x_3$.

3. (a) Find a root of the equation $x^3 - 4x - 9 = 0$ using bisection method in four stages.

   (b) Explain the iterative method approach in solving the problems.

4. Fit the second degree polynomial to the following data by the method of least squares.

x:	10	12	15	23	20
y:	14	17	23	25	21

5. Using modified Euler's method, find an approximate value of y when x=1.3, given that $\frac{dy}{dx} + \frac{y}{x} = \frac{1}{x^2}$, y(1)=1.

6. (a) Express f(x)=x as a half-range cosine series in the interval $0 < x < 2$.

   (b) Find the Fourier cosine transform of $\frac{e^{-ax}}{x}$, (a>0)

7. (a) Form the PDE by eliminating the arbitrary functions from
   z = f(x+it) + g(x-it), where i = $\sqrt{-1}$.

   (b) Obtain the solution of the wave equation $\frac{d^2y}{dt^2} = c^2\frac{d^2u}{dx^2}$ by the method of separation of variables.

8. (a) Show that Z $\left(\frac{1}{n!}\right)$ = e$^(1/z)$. Hence evaluate Z $\left(\frac{1}{n!+1}\right)$ and Z $\left(\frac{1}{n!+2}\right)$.

   (b) Using Z- transform, solve the difference equation $u_{n+2} + 4u_{n+1} + 3u_n = 3^n$, given that $u_0 = 0$, $u_1 = 1$.

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I Year B.Tech(R09) Supplementary Examinations, December 2010.
**ENGINEERING MECHANICS**
(Common to Aeronautical Engineering, Biotechnology, Civil Engineering and Mechanical Engineering)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
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1. An electric light fixture is held with the arrangement shown in figure. If the weight of the fixture is 20kg and the hinge is an ideal one, determine the axial forces in the bar and the string.
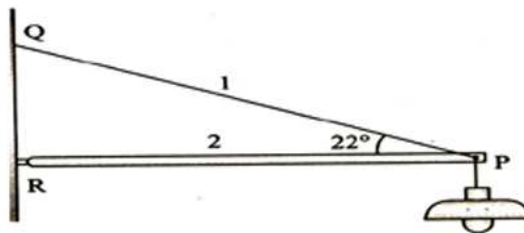
2. What is the difference between a truss and frame? write down the basic assumptions for frame analysis. And discuss two methods for analyzing the frame for different forces.

3. Find the minimum value of horizontal force P applied to the lower block shown in figure to hold the system in equilibrium and co-efficient of friction is 0.25 at the floor and 0.30 at the wall and 0.20 is between the blocks.
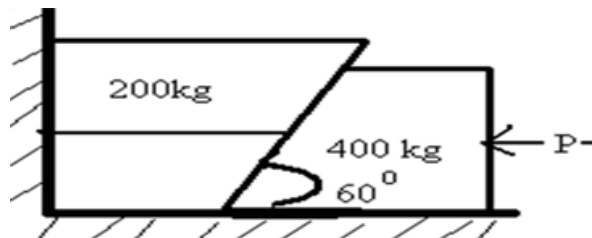
4. (a) Determine the centroid of the quarter circle whose radius is R.

   (b) Determine centroid of semicircle whose radius is R.

5. Derive the expression for mass moment of inertia of a homogeneous sphere of radius 'r' and mass density 'w', with reference to its diameter.

6. An enemy ship was located at a distance of 25 km in north - west direction by a warship. If the enemy ship is moving with a velocity of 18 kmph N 30^0 E, in which direction the warship must move with a velocity of 36 kmph to strike at its earliest. Assume the fire range of warship is 5 km. When is the shell to be fired?

7. A solid cylinder of weight 'w' and radius 'r' rolls, down an inclined plane which makes an angle θ with the horizontal axis. Determine the minimum coefficient of friction and the acceleration of the mass center for rolling, without slipping.

8. A vertical shaft 100 mm in diameter and 1 m in length has its end fixed to the ceiling. At the other end, it carries a disc of mass 500 kg having a radius of gyration of 450 mm. The modulus of rigidity for the material of shaft is 80 GPa. Determine the frequency of torsional vibrations.

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$\boxed{\textbf{R09}}$

I Year B.Tech(R09) Supplementary Examinations, December 2010.
ENGINEERING DRAWING
(Common to Aeronautical Engineering, Biotechnology, Civil Engineering, Electrical &
Electronics Engineering, Electronics & Instrumentation Engineering)

Time: 3 hours   **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks

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1. A circle of 60 mm diameter rolls on a horizontal line for a half revolution and then on a vertical line for another half revolution. Draw the curve traced out by a point p on the circumference of the circle.

2. Two pegs fixed on a wall are 4.5metres apart. The distance between the pegs measured parallel to the floor is 3.6 meters. If one peg is 1.5 meters above the floor, find the height of the second peg and the inclination of the line joining the two pegs, with the floor.

3. (a) A circular plate is parallel to H.P Its radius is 30 mm and center is 50 mm above and 20 mm in front of V.P. Draw its projections of planes.

   (b) A regular pentagon of 25 mm side has one of its edge on V.P its plane is inclined at 45^0 to V.P. Draw its projections..

4. (a) Draw the projections of hexagonal pyramid with side of base 30 mm and axis 70 mm long resting with slant face on H.P. such that axis parallel to V.P.

   (b) Draw the projections of a right circular cone of base 40 mm diameter and height 60 mm when resting with its base on H.P.

5. A hollow square prism, base 50 mm side (outside), length 75mm and thickness 9 mm is lying on the h.P. on one of its rectangular faces, with the axis inclined at 30^0 to the V.P. A section plane, parallel to the V.P. cuts the prism, intersecting the axis at a point 25 mm from one of its ends. Draw the top view and sectional front view of the prism.

6. A hexagonal prism , side of base 25 mm and height 50 mm rests on H.P. and one of the edges of its base is parallel to V.P .A section plane perpendicular to V.P. and inclined at 50^0 to H.P. bisects the axis of the prism . Draw the isometric projection of the truncated prism.

7. A vertical square prism, base 50 mm side has its faces equally inclined to the V.P. It is completely penetrated by another square prism of base 30 mm side, the axis of which is parallel to both the planes and is 6 mm away from the axis of the vertical prism. The faces of the horizontal prism also are equally inclined to the V.P. Draw the projections of the solids showing lines of intersection.

8. A man stands at a distance of 5 m from a flight of four stone steps having a width of 2m, treat 0.3m and rise 0.2m. The flight makes an angle of 30^0 with the picture plane and touches the same at a distance of 2 m to the right of the center of vision. Take horizon level to be 1.5m above the ground level. Draw the perspective projection of the flight.

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I Year B.Tech(R09) Supplementary Examinations, December 2010.
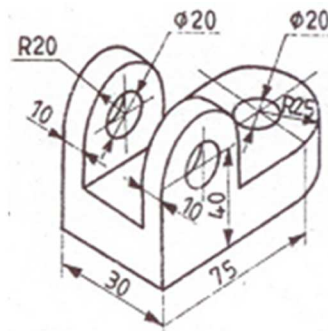**ENGINEERING DRAWING**
(Common to Mechanical Engineering, Electronics & Communications Engineering,
Electronics & Control Engineering, Computer Science & Systems Engineering)
Time: 3 hours   Max Marks: 70
Answer any FIVE questions
All questions carry equal marks
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1. (a) The asymptotes of a hyperbola are inclined at 70^0 to each other. Construct the curve when a point p on it is at a distance of 20 and 30 from the two asymptotes.

   (b) Draw one turn of the involutes of a hexagon whose inscribed circle is 30mm in diameters.

2. The mid-point of straight line AB is 60 mm above HP and in front of VP. The line measures 80 mm long and inclined at an angle of 300 to HP and 450 VP. Draw its projections.

3. (a) A square lamina ABCD of 50 mm side is perpendicular to V.P and parallel to H.P.It is 20 mm above H.P and 30 mm in front of V.P. Draw its projections

   (b) A square lamina of 40 mm side has a corner on H.P. and 20 mm In front of V.P. All sides are equally inclines to H.P and parallel to V.P.

4. (a) Draw the projections of a pentagonal pyramid, base 30 mm edge and axis 50 mm long, having its base on the H.P. and an edge of the base parallel to the V.P.

   (b) Draw the projections of cone of base 50 mm diameter, axis 60mm long, resting on ground on its base.

5. (a) A hexagonal prism of side of side of base 25 mm axis 60 long is freely suspended from a corner of the base. Draw the projections.

   (b) A square pyramid of base 35 mm side and axis 50 mm long, is resting on one of its triangular faces on HP, with the edges of the base containing that faces inclined at 45^0 to VP. Draw the projections of the pyramid. Follow the auxiliary plane method.

6. Draw the elevation, plan and left and right side views of the bracket shown in the picture below (dimensions in mm)

7. A vertical cylinder of diameter 80 mm intersects a horizontal cylinder of diameter 40 mm. The shortest distance between their axes is 40 mm. Draw the projections showing the intersection profile.

8. A square plane with a 60 mm side lies on the GP with the edge nearer to the observer lying in the PP. The station point is 50 mm in front of pp, 60 mm above GP and lies in a CP which is 50 mm towards right of the centre of the object. Draw its perspective view.

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I Year B.Tech(R09) Supplementary Examinations, December 2010.
**ENGINEERING DRAWING**
(Common to Computer Science & Engineering, Electronics & Computer Engineering,
Information Technology)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
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1. A circle of 60 mm diameter rolls without slipping on the outside of another circle of diameter 150 mm. Show the path of a point on the periphery of the (generating)rolling circle, diametrically opposite to the initial point of contact between the circle

2. Draw the projections of a 75 mm long straight line, in the following positions:

   (a) Parallel to the both the H.P. and the V.P. and 25 mm from each.

   (b) parallel to 30 mm above H.P. and in the V.P.

   (c) parallel to 40 mm in front of V.P. and in theH.P

3. A rectangular plane of size 60x30 has its shorter side on H.P and inclined at 30^0 to V.P. Draw the projections of the plane. If its surface is inclined at 45^0 to the H.P.

4. A right-circular cone, with a 50 mm base diameter and a 60 mm long axis ,is freely suspended from the mid-point of a generator. Draw its projections, when the top view of that generator is inclined at 45^0 to the reference line and apex is nearer to the observer.

5. A pentagonal pyramid, side of base 36 mm and height 64 mm, rests on its base on HP with one of its base sides parallel to VP. A section plane perpendicular to VP and inclined at 30^0 to HP cuts the pyramid, bisecting its axis. Draw the development of the truncated pyramid.

6. Draw the front view, top view and left side view of the object shown below (dimensions in mm).
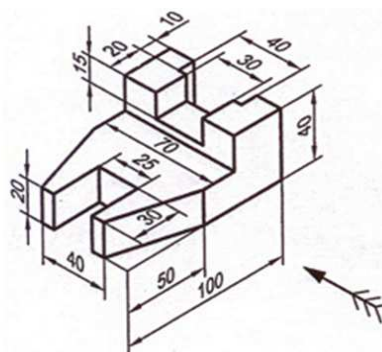
7. A square prism, having base with a 50 mm side and a 90 mm long axis, rests on its base on the ground with a face inclined at 30^0 to the V.P. It is penetrated by a horizontal cylinder with a 40 mm diameter. Their axes bisect each other at right angles. Draw three views of the combination and show the curves of intersection.

8. A rectangular plane with 60 mm and 40 mm sides is lying in the GP with the longer side parallel to and 15 mm behind the PP. The station point is 50 mm in front of the PP, 60 mm above GP and lies in the CP passing through the centre of the object. Draw its perspective view.

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I Year B.Tech(R09) Supplementary Examinations, December 2010.
PROGRAMMING IN C AND DATA STRUCTURES
(Common to All Branches)

Time: 3 hours   **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks
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1. (a) Explain the advantages and disadvantages of using high level languages over machine level languages.

   (b) What is in Integrated Development Environment(IDE).Explain its features.

2. (a) What is the difference between '=' and '=='. Explain with examples.

   (b) What is loop? Why it is necessary in the program? Explain with example.

3. (a) Write a program to read the elements in an array and print the same in reverse order.

   (b) How are multidimensional arrays declared and initialized?

4. (a) What is pointer to a pointer? What is a void pointer? Explain with example.

   (b) Write a program to add two matrices using pointers.

5. Write a program in C that defines a structure employee containing the details such as empno, empname, department name and salary. The structure has to store 20 employees in an organization. Use the appropriate method to define the above details and define a function in a structure that will display the contents?

6. Discuss with examples the following file I/O handling functions.

   (a) fgets()

   (b) fputs()

   (c) getw()

7. (a) Discuss the various ways how deletions can be done in singly linked list. Give an example for each.

   (b) Discuss the various ways how insertions can be done in singly linked list. Give an example for each.

8. Explain merge insertion sort and sort the following numbers using the same.
   31 28 17 65 35 42 86 25 45 52

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I Year B.Tech(R09) Supplementary Examinations, December 2010.
ENGLISH
(Common to all branches)

Time: 3 hours   Max Marks: 70

Answer FIVE questions in total with at least ONE question from Part-B
All questions carry equal marks

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PART-A

1. (a) The construction of a water project is hampered and delayed due to various reasons in the present scenario. In this context, how did Visvesvaraya complete the multi-purpose project like Krishnaraja Sagar Dam with in a short period of time?

   (b) "Industrialize or perish" is the clarion call given by Visvesvaraya. Obviously it was the need of the hour. What did Visvesvaraya do to industrialize Mysore state?

2. Give a detailed account of the services rendered by Mother Teresa.

3. Amartya Sen is known in India as the Mother Teresa of Economics. He spent his life time fighting poverty with analysis rather than activism -elaborate this statement by comparing his work with that of the Mother.

4. Do you think the administration of Cuddalore has done a commendable job in reacting to the disaster? Illustrate?

5. (a) How was Anand initiated into the preliminaries of chess during his childhood?

   (b) Describe the role of Anand as sports ambassador.

6. Write about Chaplin's married life.

PART-B

7. In modern times, working women are facing problems like eve teasing, sexual harassment, gender discrimination at the time of promotion, salary fixation,etc. You, as the Head of the Women Welfare Association, have been asked to write a report on gender discrimination at work places and submit to the minister for women welfare.

8. Fill in the blanks with the most appropriate form of the verbs in brackets

   (a) The sun_____(set) by the time we _____(leave) for home.

   (b) I _____(see) the charminar earlier and _____(go) only to keep Ram happy.

   (c) Abu just _____(post)the letter that he _____(write) two weeks ago.

   (d) Before we _____(get) to the bridge, the water_____(rise) above the danger mark.

   (e) By the time they_____(think) of a solution, the situation _____(worsen)

   (f) I _____(see) twenty films this year.

   (g) My brother is a writer. He _____(write) novels..He _____(write) since 1990 and _____(write)15 novels so far.

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R09

I Year B.Tech(R09) Supplementary Examinations, December 2010.
ENGINEERING PHYSICS
(Common to Aeronautical Engineering, Biotechnology, Civil Engineering, Mechanical
Engineering, Computer Science & Engineering, Electronics & Communication Engineering,
Electrical & Electronics Engineering, Electronics & Control Engineering, Electronics &
Computer Engineering, Electronics & Instrumentation Engineering, Information Technology,
Computer Science & Systems Engineering,)

Time: 3 hours   Max Marks: 70
Answer any FIVE questions
All questions carry equal marks
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1. (a) What is meant by diffraction of light? Explain it on the basis of Huygen's wave theory.

   (b) Explain with necessary theory how wavelength of spectral line is determined using plane diffraction grating.

2. (a) Define packing fraction and Show that FCC crystals are closely packed than BCC crystals.

   (b) Explain the crystal structures of BCC and FCC crystals.

3. (a) Explain the origin of energy bands in solids.

   (b) On the basis of band theory explain how the crystalline solids are classified into metals, semiconductors and insulators.

4. (a) Derive the diode equation.

   (b) Write notes on LED and LCD.

5. (a) What are antiferromagnetic materials? Explain the variation of its susceptibility with temperature.

   (b) 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.

6. (a) Describe the important characteristics of laser beam.

   (b) Explain the process of stimulated absorption of radiation along with its importance.

7. (a) Discuss the minimization of modal dispersion in the graded index optical fiber.

   (b) An optical fiber has a numerical aperture of 0.20 and cladding refractive index of 1.59. Determine the refractive index of core and the acceptance angle for the fiber in water which has a refractive index of 1.33.

8. (a) Mention the important applications of carbon nanotubes in information technology.

   (b) Mention the important applications of carbon nanotubes in biomedical fields.

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R09

I Year B.Tech(R09) Supplementary Examinations, December 2010.
ENGINEERING CHEMISTRY
(Common to Aeronautical Engineering, Biotechnology, Civil Engineering, Mechanical
Engineering, Computer Science & Engineering, Electronics & Communication Engineering,
Electrical & Electronics Engineering, Electronics & Control Engineering, Electronics &
Computer Engineering, Electronics & Instrumentation Engineering, Information Technology,
Computer Science & Systems Engineering,)

Time: 3 hours
Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
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1. (a) What are the reactions takes place in the estimation of chlorine present in water?
   (b) Explain the procedure involved in the determination of chlorine present in water.

2. Explain the following:
   (a) Nickel electroplating
   (b) Copper electro less plating

3. (a) Explain the condensation polymerization with suitable examples.
   (b) Discuss the functions of various ingredients used in the compounding of rubber.

4. Write a short note on:
   (a) Saponification number.
   (b) Neutralization number.
   (c) Aniline point.

5. (a) The equivalent conductance of a 0.005N NaOH solution is 240 mho/cm^2. What is the
   specific conductance and electrical resistance if the electrodes are 1 cm apart and each
   have a surface area of 1 cm^2?
   (b) On what factors does the conductance of a solution depend? How would you proceed to
   determine the conductivity of a solution.

6. (a) Explain with valid reasons for the following statements with suitable example.
      i. Vapour pressure contribute to the composition in a two component system
      ii. Eutectic point and triple point are the same.
   (b) Identify the number of phases and components involved in each of the following systems:
      i. Decomposition of CaCO$_3$.
      ii. Decomposition of PCl$_5$.

7. (a) Explain higher calorific value and lower calorific value and distinguish between the HCV
   & LCV.
   (b) What are the characteristics of a good fuel?

8. (a) Outline the importance of refractories and their applications.
   (b) Discuss the criteria of a good refractory material?

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