Hall Ticket Number :

Code : 1G113

B.Tech. I Year Supplementary Examinations May 2017
C Programming and introduction to Data Structures
(Common to Civil, EEE, ME and ECE)

Max. Marks: 70   **Time: 03 Hours**

Answer *any* ***five*** questions
All Questions carry equal marks (**14 Marks** each)
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1. a) Define algorithm. Write an algorithm to find product of two integers using repetitive addition.
    b) List and explain the various symbols used in flowchart with figures.

2. a) There are four coins a, b, c, d out of which three coins are of equal weight and one coin is heavier. Write a C program to find the heavier coin.
    b) Write about while and for loops and write suitable examples.

3. a) What is an array? What are advantages of arrays over ordinary variables? How arrays are declared and initialized?
    b) Write a program for finding the largest number in an array.

4. a) Write a program to count the number of digits, alphabets, white spaces and other characters in a sentence.
    b) Give a detailed note on pointers.

5. a) Define structure and give the general syntax for structure. Write suitable example program.
    b) Compare structures and unions.

6. Describe various types of files and operations on files with an example.

7. What are the advantages and disadvantages of stack? Write a program to illustrate stack operations.

8. a) Write binary search program in c for finding given element is in the list or not.
    b) Write a c program to sort given list using selection sort.

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*B.Tech. I Year Supplementary Examinations May 2017*
Engineering Graphics
(Common to CE & ME)

Max. Marks: 70　　　　　　　　　　　　　　　　　　Time: 3 Hours
Answer any *five* questions
All Questions carry equal marks (**14 Marks** each)
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1.　The major and minor axes of an ellipse are 125 mm and 100 mm respectively. Draw the curve by concentric circles method and locate its foci. Also, draw a tangent and normal to the curve through a point P, when it is situated at a distance of 30mm from axis and lying on the curve.　14M

2.　The distance between the projectors of two points A and B is 70 mm. Point A is 10 mm above HP and 15 mm in front of VP. Point B is 50 mm above HP and 40 mm infront of VP. Find the shortest distance between A and B. Measure the true inclinations of the line AB with VP and HP.　14M

3. a)　A regular pentagon of 25 mm side has one side on the ground. Its plane is inclined at 45^0 to the H. P. and perpendicular to the V. P. Draw its projections and show its traces.　7M

　 b)　An equilateral triangle of 50 mm side has its V. T. parallel to and 2.5 cm above xy. It has no H. T. Draw its projections when one of its sides is inclined at 45^0 to the V. P.　7M

4.　A pentagonal pyramid, having a base with a 30 mm side and a 70 mm long axis, has one of the corners on the ground with its axis inclined at 45^0 to the H.P. A vertical plane containing the axis and that corner is inclined at 30^0 to the V.P. Draw its projections.　14M

5.　A hollow cylinder of 40 mm out side diameter and 30 mm inside diameter is resting on a point on the rim in VP with axis inclined at 30^0 to VP and parallel to HP. The axis length of the cylinder is 60 mm. It is cut by a vertical section plane inclined at 60^0 to VP and bisecting the axis. Draw the sectional front view, top view and true shape of the section.　14M

6.　Draw the isometric view of the object whose orthographic projections are given in the Figure below. All dimensions are in mm.


14M
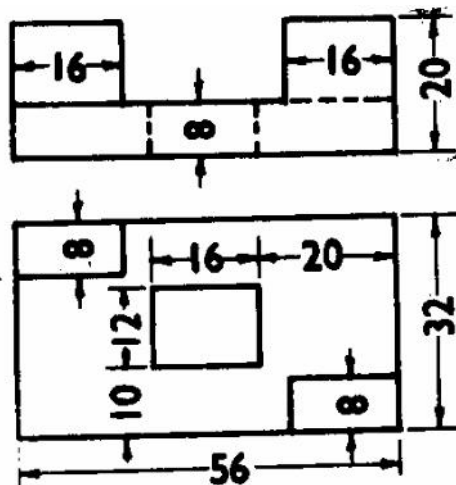
7.　A cylinder resting on its base on the H.P. is penetrated by another cylinder with their axes bisecting at right angles. Draw the projections of the combination and show the curves of intersection. Consider the vertical cylinder having a 60 mm base diameter while the penetrating cylinder has a 50 mm diameter.　14M

8.　A pentagonal lamina of 30 mm sides stands vertically on the ground plane with one of its corners on the ground such that the side opposite to this corner is parallel to the ground plane. The lamina is inclined at 30^0 to the picture plane. The corner nearest to the picture plane is 20 mm behind it. The station point is 40 mm in front of the picture plane, 55 mm above the ground plane and passes through the centre of the lamina. Draw the perspective view.　14M

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Hall Ticket Number :

Code : 1G511

B.Tech. I Year Supplementary Examinations May 2017
Engineering Mechanics
(Common to CE &ME)

Max. Marks: 70

Time: 03 Hours

Answer *any* **five** questions
All Questions carry equal marks (**14 Marks** each)
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1. a) What is system of forces? Explain the various system of forces, their characteristic with suitable example of each. 7M

   b) Explain how to convert a single force acting on a body into a force and moment system. 7M

2. Compute the reactions R_a and R_b for the beam loaded as shown in figure. Neglect the weight of the beam.


14M
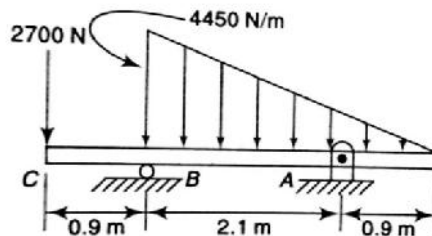
3. a) What is limiting friction? Why static friction is more than kinetic friction? Explain. 7M

   b) Define the following i) friction angle ii) coulomb dry laws of friction iii) friction cone 7M

4. Using method of section, find the axial force in each of bars 1, 2, 3 of the plane truss shown in figure.

14M
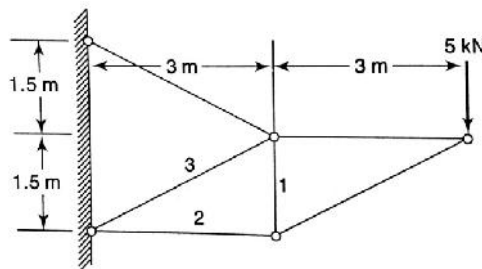
5. a) Explain Pappus theorem I and II. 5M

   b) Determine the coordinates x_c and y_c of the center of a 100mm diameter, circular hole cut in a thin plate as shown in figure, so that this point will be the centroid of the remaining shaded area.
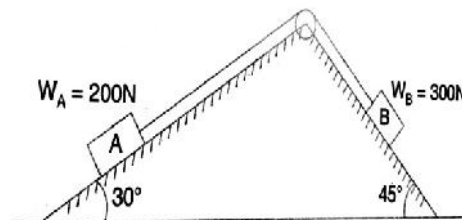

9M
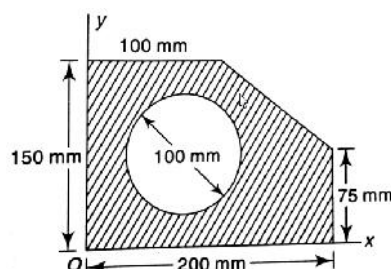
6. a) Define : Perpendicular axis theorem; Parallel axis theorem; Radius of gyration   6M

   b) Find the moment of inertia of an inverted 'T' section about its 15 m base:
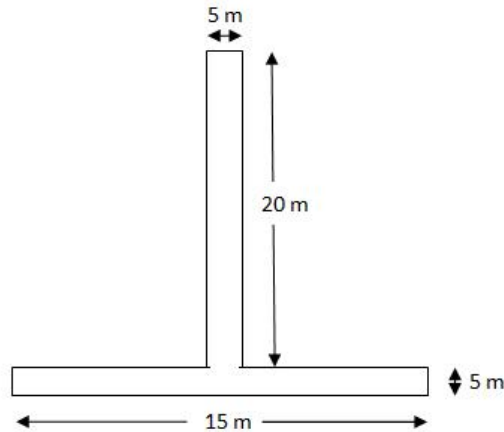
8M

7.   In what distance will body 'A' shown in figure attain a velocity of 3 m/sec starting from rest? Take coefficient of friction between the blocks and the plane 0.2. Assume the pulley is smooth.

14M

8.   A bullet weighing 0.3 N is fired horizontally into a body weighing 100 N which is suspended by a string 0.8 m long. Due to this impact the swings through an angle of 30^0. Find the velocity of the bullet and the loss in the energy of the system.
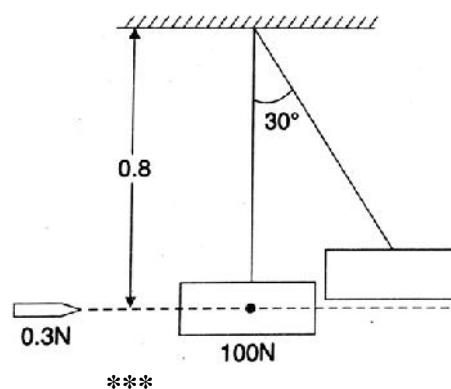
14M

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Code: 1GC13

R-11 / R-13

B.Tech. I Year Supplementary Examinations May 2017
Engineering Chemistry
(Common to All Branches)

Max. Marks: 70

Time: 3 Hours

Answer any **Five** questions
All Questions carry equal marks (**14 Marks** each)
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1. a) Estimate the amount of hardness present in the water samples by EDTA method?   6M

    b) What are scales? How are they formed? Give their disadvantages and prevention methods.   8M

2. a) Explain the chemical reactions involved in the working of a Methanol-Oxygen fuel cell?   7M

    b) Discuss the general properties of insulating materials?   7M

3. a) Explain electrochemical theory of corrosion with necessary equations?   8M

    b) Write in brief on sacrificial anodic protection method to control corrosion   6M

4. a) Distinguish between thermoplastic and thermosetting resins.   6M

    b) Write the preparation, properties and uses of BUNA-S and Silicone rubber   8M

5. a) What are explosives? How are they classified?   7M

    b) Discuss the significance of flash& fire point of a good lubricant?   7M

6. a) Explain the terms involved in Phase rule equation?   7M

    b) Discuss the application of phase rule to water system?   7M

7. a) What is calorific value of a fuel? How calorific value of a solid fuel is determined using bomb calorimeter?   8M

    b) Mention the characteristics of a good fuel.   6M

8. a) Define setting and hardening of cement. Explain the process using chemical reactions involved?   8M

    b) What are the reasons for the failure of a refractory?   6M

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Code: 1GC12

B.Tech. I Year Supplementary Examinations May 2017
Engineering Physics
(Common to All branches)

Max. Marks: 70   Time: 3 Hours

Answer any **Five** questions
All Questions carry equal marks (**14 Marks** each)
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1. a) Define interference and explain the formation of Newton rings with necessary theory.   8M
    b) Give the construction and working of Nicol prism   6M

2. a) What is a Bravais lattice? What are the different space lattices in cubic system? Show that the packing factor of simple cubic is 52%.   8M
    b) Describe Laue's method of determining crystal structure.   6M

3. a) Give the salient features of Kronig-Penny model.   7M
    b) Show that the energies of a particle in a one dimensional potential box are quantized.   5M
    c) Find the lowest energy of an electron confined in a one dimensional potential box of side 0.1nm. (h=6.62×10^{-34}Js and mass of electron= 9.1×10^{-31}kg)   2M

4. a) Obtain Einstein's relation between diffusion coefficient and mobility of charge carriers.   6M
    b) Define Hall effect and give its applications.   5M
    c) A silicon plate of thickness 1mm, breadth 10mm and length 100mm is placed in a magnetic field of 0.5wb/m^2 acting perpendicular to its thickness. If 10^{-2} A current flows along its length, calculate the Hall voltage developed if the Hall coefficient is 3.66×10^{-4} m^3/coulomb.   3M

5. a) Distinguish between Dia, Para and Ferro magnetic materials.   6M
    b) Derive the expression for local field by Lorentz method and express Claussius-Mosotti equation   8M

6. a) Explain AC and DC Josephson effects.   6M
    b) Give the construction and working of Ruby Laser.   8M

7. a) Derive the expression for numerical aperture of an optical fiber.   7M
    b) Estimate the numerical aperture and acceptance angle of a fiber with core index of 1.54 and a cladding index of 1.50 when the fiber is inside water of refractive index 1.33   3M
    c) Give some applications of Holography.   4M

8. a) Describe briefly (i) Chemical vapour deposition and (ii) Ball milling techniques used in fabricating nanomaterials.   8M
    b) Define Carbon Nanotubes and give any four applications of nanomaterials.   6M

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B.Tech. I Year Supplementary Examinations May 2017
Mathematics-I
(Common to All Branches)

Max. Marks: 70   Time: 3 Hours

Answer any *five* questions
All Questions carry equal marks (**14 Marks** each)
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1. a) Solve $x\dfrac{dy}{dx} - y = x^2$ 6M

   b) Find the orthogonal trajectories of $r^n = b^n \sin n_n$, where b is parameter   8M

2. a) Solve $(D^2 + 25)y = \tan 5x$, using the method of variation of parameters.   9M

   b) Solve $(D^2 + 6D + 9)y = e^{-3x}$ 5M

3. a) Verify Rolle's theorem for $g(x) = 4 + x^{\frac{1}{3}}$ in [-2, 2].   4M

   b) Discuss maxima and minima of $f(x) = \sin x \sin y \sin(x + y)$ 10M

4. a) Find the length of the arc of the parabola $y^2 = 4ax$ cut off by the straight line $y = x$.   7M

   b) Trace the curve $x^3 + y^3 = 3axy$, 'a' is a constant   7M

5. a) Change of order of integration and evaluate $\displaystyle\int_{0}^{4a}\int_{\frac{x^2}{4a}}^{2\sqrt{xa}} 10 \, dx \, dy$ 7M

   b) Evaluate $\displaystyle\int_{1}^{e}\int_{1}^{\log y}\int_{1}^{e^x} \dfrac{\log z}{6} \, dz \, dx \, dy$.   7M

6. a) Find the Laplace transform of a triangular function $f(t) = \begin{cases} t & if\ 0 < t < 1 \\ 2 - t & if\ 1 < t < 2 \end{cases}$ and

    $f(t + 2) = f(t)$ 7M

   b) Using convolution theorem, evaluate $L^{-1}\left[\dfrac{s^2}{(s^2 + a^2)(s^2 + b^2)}\right]$ 7M

7.   Using Laplace transform solve $y''(t) + 3y'(t) + 2y(t) = e^{-t}$, given $y(0) = 0,\ y'(0) = 1$ 14M

8.   Verify Green's theorem for $\overline{F} = xy\ \bar{i} + x^2 y^3\ \bar{j}$ over a region C, where C is a triangle
      formed by vertices (0, 0), (1, 0) and (1, 2).   14M

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