Code : 1G112   R-11

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

B.Tech I Year Regular&Supplementary Examinations May/June– 2013
C Programming and Introduction to Data Structures
(Common to CIVIL, EEE , ME & ECE)

Max. Marks: 70   Time: 03 Hours

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

1. a) What is a flowchart? List and explain various symbols used in the flowchart. Draw
      the flowchart to find the factorial of a given number.   7M

   b) Discuss about the application of software development method.   7M

2. a) Give a brief note on the following:
      i. operator precedence and associatively
      ii. Type conversions   6M

   b) With examples, explain how while, do while and for loops function.   8M

3. a) Write the syntax for declaring two - dimensional array and explain how to access
      and print the array elements.   7M

   b) Give a note on storage classes in C.   7M

4. a) Explain the concept of pointer to pointers with examples.   6M

   b) Explain any four string handling functions with examples.   8M

5. a) Give a brief notes bit fields and enumerated data types.   7M

   b) How to use arrays as structure members. Illustrate with example?   7M

6.   Write a C program to read a text file and to count
      (a) Number of characters,
      (b) Number of words and
      (c) Number of sentences and write in an output file.   ·   14M

7. a) What is a stack? Explain two different representations of a stack. List the
      operations performed on a stack and write functions for implementing these
      operations.   10M

   b) Mention the advantages of doubly linked list over singly linked list.   4M

8. a) By hand, trace through the steps of selection sort for the following lists.
      i. The following seven numbers to be sorted into increasing order:
            12 20 34 27 30 36 23
      ii. The following list of 14 names to be sorted into alphabetical order.
            Tim Dom Eva Roy Tom Kim Guy Amy Jon Ann Jim Kay Ron Jan   12M

   b) Why binary search is efficient compared to sequential search.   2M

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B.Tech I Year Regular&Supplementary Examinations May/June– 2013

Engineering Chemistry
(Common to All Branches)

Max. Marks: 70   Time: 03 Hours

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

1. a) Describe any two methods of internal conditioning of boiler feed water.   4M

   b) Write notes on the following

   (i) Disinfection   3M

   (ii) Caustic embrittlement   4M

   (iii) Scale and sludge   3M

2. a) What is standard electrode potential? What is the significance of Nernst equation?   7M

   b) Write the characteristics of thermal insulators.   7M

3. a) What is electrochemical theory (wet) of corrosion? Explain the mechanism of it.   8M

   b) What is galvanic series and give its significance.   6M

4. a) What is functionality?. Distinguish between additional and condensation polymerization with examples.   5M

   b) Give the manufacture and uses of the following

   (i) Bakelite   3M

   (ii) Nylons   3M

   (iii) Silicone rubber   3M

5. Write short notes on the following

   (i) Viscosity index   4M

   (ii) Flash and fire points   3M

   (iii) Aniline point   3M

   (iv) Propellants   4M

6. a) What is phase rule and explain the terms with suitable examples.   7M

   b) Discuss the phase diagram of two-component, lead-silver system.   7M

7. a) What is metallurgical coke? Describe the process of the manufacture of metallurgical coke   7M

   b) A fuel found to contain C-75%, H-5.2%, O-12.8%, S-1.2%, N-3.7% and rest is ash. Calculate the amount of air required for the complete combustion of 1 kg of fuel, if 20% excess air is used for combustion. Calculate the amount of dry products in the flue gas.   7M

8. Write short notes on the following.

   (i) Refractoriness-under-load   4M

   (ii) Thermal spalling   3M

   (iii) Dimensional stability of refractory.   3M

   (iv) Setting and hardening of cement   4M

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ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
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B.Tech I Year Regular&Supplementary Examinations May/June– 2013

Engineering Graphics
(Common to Civil and Mechanical Engineering)

Max. Marks: 70

Time: 03 Hours

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

1. a) Construct an ellipse when its major axis is equal to 100mm and minor axis is equal to 65mm. Find its foci, directrix and eccentricity. 7M

   b) A fountain jet discharges water from ground level at an angle of inclination of 50° to the ground. The jet travels a horizontal distance of 9m from the point of discharge and falls on the ground. Trace the path of jet. 7M

2. A line AB measuring 85mm has its end A 25mm above HP and 20mm in front of VP. The front and top views of the line measure 70mm and 55mm respectively. Draw the projections of the line and determine its true inclinations. 14M

3. The end A of a line AB is 100mm above HP and 150mm in front of VP. The end B is 225mm above HP and 225mm in front of VP. The distance between the end projectors is 300mm. Draw the projections of the line. Find its true length and true inclinations by auxiliary plane method. 14M

4. A square pyramid, base 32mm side and axis 60mm long is freely suspended from one of the corners of its base with the axis parallel to VP. Draw its projections. 14M

5. A hexagonal pyramid, side of base 25mm and axis 55mm long rests with its base on HP such that one of its edges of its base is perpendicular to VP. It is cut by a section plane perpendicular to HP, inclined at 45° to VP and passing through pyramid at a distance of 10mm from the axis. Draw the sectional front view and the true shape of the section. 14M

6. A combination of solids is formed as follows: A frustum of a cone has its top and bottom diameters 35mmand50mm respectively and altitude 53mm. it rests on the top face of a frustum of a square pyramid. Sides of top and bottom faces of the pyramid are 58mm and70mm respectively. Height is 22mm. Draw the isometric projection of the combination of solids. 14M

7. A square prism of side of base 55mm and 100mm height rests with its base on HP having its faces equally inclined to VP. It is pierced by a horizontal cylinder of diameter 40mm and 100mm long. The axis of cylinder is parallel to VP and 8mm away from the axis of prism. Draw the projections showing the curves of intersection. 14M

8. A rectangular prism, sides of base 50mm x 30mm and height 55mm, rests with its base on the ground plane. A vertical edge is in the picture plane and one of the longer edges of its base is inclined at 45° to PP and behind it. The station point is 50mm in front of PP, 75mm above the ground plane and lies in a central plane which passes through the centre of the prism. Draw the perspective projection of the solid. 14M

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ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
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B.Tech I Year Regular&Supplementary Examinations May/June– 2013

Engineering Mechanics
(Common to Civil and Mechanical Engineering)
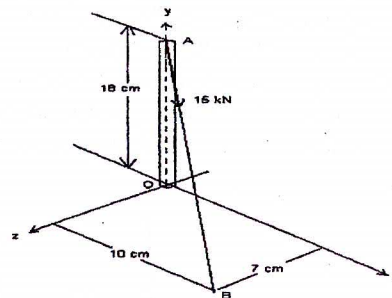
Max. Marks: 70   Time: 03 Hours

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

1. a) Explain various force systems.

   b) A tension T of magnitude 15 kN is applied to the cable attached to the top A of rigid mast and secured to the ground at B as shown in Figure. Determine moment of the tension T about the Z-axis passing through the base O.   (M)

2. a) Explain the free body diagram with suitable examples.

   b) For a system of levers shown in fig, find the load P required to maintain the system in equilibrium position with the bar AB in horizontal.
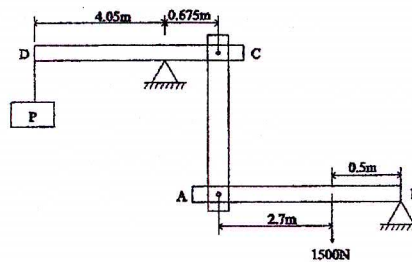

3. a) From first principles deduce an expression to determine the centre of gravity of a given hemisphere about its diametral base ' b' of radius R and is symmetric about y axis

   b) Locate the centroid of the wire bent as shown in fig.
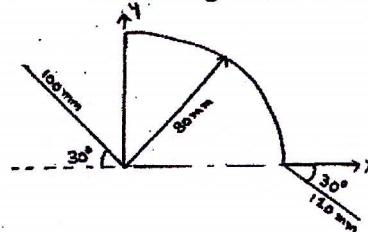
4. a) Determine the mass moment of inertia of right circular solid cone about its generating axes of base radius 'R' and altitude 'h'

   b) Find the moment of inertia about the indicated Y axis for the shaded area as shown in the fig.
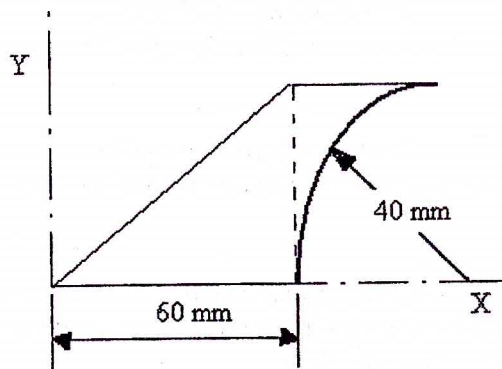
5. a) Two equal bodies A and B of weight 'W' each are placed on a rough inclined plane. The bodies are connected by a light string. If $\Box_A = 1/2$ and $\Box_B = 1/3$, show that the bodies will be both on the point of motion when the plane is inclined at $\tan^{-1} (5/12)$

   b) A block overlying a 10° wedge on a horizontal floor and leaning against a vertical wall and weighing 1500N is to be raised by applying a horizontal force to the wedge. Assuming the coefficient of friction to be 0.3, determine the minimum horizontal force to be applied to raise the block.
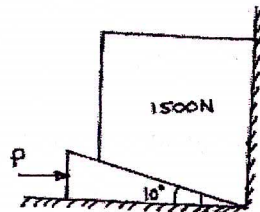
6. a) A shell bursts on contact with the ground and pieces fly off in all directions with speeds up to 25 m/s. A person is standing 35 m away. What is the time duration over which he can be hit by a piece?

   b) The maximum horizontal range of a gun is Rmax. Determine the firing angle which should be used to hit a target located at a distance $R_{max} / 2$ on the same level

7. a) The linear, helical spring shown in figure is initially in static equilibrium when acted on by a force $F_1 = 50N$. The magnitude of this force is now increased until the end of the spring moves to pint 2.
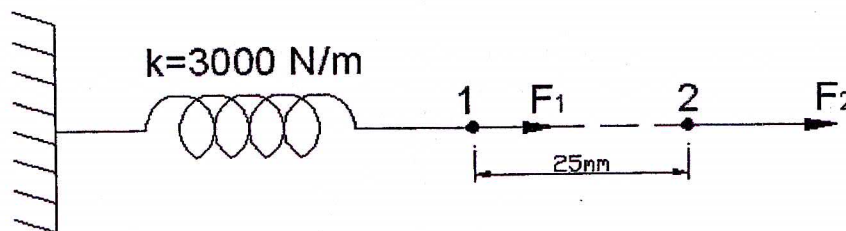
   i) Find the change the potential energy stored as the end is stretched from 1 to 2.

   ii) Find total potential energy stored in the spring when the end of the spring is at position 2.

   b) A 70kg sprinter starts from rest and accelerate uniformly for 5.8s over a distance of 34.5m. Neglecting air resistance, determine the average power developed by the sprinter.

8. a) What is simple pendulum? Deduce an expression to compute time period of a simple pendulum.

   b) The amplitude of a particle moving with simple harmonic motion is 500 mm. When the particle is 250 mm from the extreme left position, its acceleration is 4 m/sec^2. What is its velocity at that position? How many seconds are required to move 250 mm from extreme left position.

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B.Tech I Year Regular&Supplementary Examinations May/June– 2013

Engineering Physics
(Common to All Branches)

Max. Marks: 70

Time: 03 Hours

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Answer *any five* questions
All Questions carry equal marks (12 Marks each)

1. a) Explain the formation along with its features of the grating spectrum.   4M

   b) Describe the working principle of Nicol prism with neat diagram.   6M

   c) Find the minimum thickness of half and quarter wave plates for a light of wavelength 589nm , if μ_o = 1.658 and μ_e = 1.486.   4M

2. a) Show that FCC crystal is closely packed than BCC crystal based on the packing fractions of the corresponding crystals.   4M

   b) Describe Powder method for determination of crystal structure along with its merits.   7M

   c) For a simple cubic lattice find the ratios of interplannar separation $d_{111} : d_{110} : d_{100}$ 3M

3. a) Explain the origin of energy bands in solids   4M

   b) Describe the behavior of a particle in one dimensional potential box in terms of normalization of wave function and possible Eigen energy values.   7M

   c) Find the wavelength of an electron moving with a velocity of 500 m s $^{-1}$
   Given h=6.626x 10^{-34} J-s, m=9.1x10^{-31} Kg   3M

4. a) Distinguish between the drift and diffusion process of charge carriers in a semiconductor.   4M

   b) State and explain Hall effect in semiconductors.   6M

   c) Mention the important applications of Photo diode.   4M

5. a) Distinguish between soft and hard magnetic materials.   4M

   b) Derive Clausius-Mossotti equation for a dielectric.   6M

   c) Explain the dependence of dielectric polarisability on the frequency of the applied alternating field.   4M

6. a) What is population inversion? Mention its significant role in LASER emission.   4M

   b) Explain the behavior of type I and II superconductors in the presence of varying magnetic field.   6M

   c) Mention the applications of laser in medical field.   4M

7. a) Explain the basic principle of optical fiber.   4M

   b) Describe graded index optical fiber along with its refractive index profile. Mention its merits.   6M

   c) Mention the applications of holography in various fields.   4M

8. a) Describe the synthesis of nanomaterials by plasma arching method.   7M

   b) Explain the important variations in properties of nanomaterials based on surface to volume ratio and quantum confinement effects.   7M

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B.Tech I Year Regular&Supplementary Examinations May/June– 2013

English
(Common to All Branches)

Max. Marks: 70

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Time: 3 Hours

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

1. a) How do we come to know that Miss Krishna is a kleptomaniac of good taste?

   b) "Miss Krishna was an irritating guest". How did she irritate the writer?

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

3. "Keep the joy of loving the poor and share this joy with all you meet." Illustrate how Mother Teresa practiced it.

4. a) The day when Raman walked into the IACS was a historic moment. Give reasons to support this.

   b) Give an account of C.V Raman's work at the University of Calcutta.

5. Describe Sam Pitroda's accomplishments.

6. Describe the versatile genius of Visvesvaraya.

7. a) Your district collector is concerned about the rapid increase in the number of road accidents in the district. You as the Commissioner of local Municipality have been asked to submit a report investigating the causes and suggesting measures to improve the situation.

   b) Write a letter to the editor of a news paper about the condition of open drains in your locality.

8. a) **Correct the following sentences and rewrite them:**
      i) Do you know what is her name?
      ii) Have you taken your meals?
      iii) It costed me five hundred rupees.
      iv) He is better than any student.
      v) It took me an hour to fill the application.

   b) **Give one word substitutes for the following:**
      i) An award given after one's death.
      ii) One who has many talents.
      iii) A paper written by hand.
      iv) A remedy for all diseases.
      v) That which cannot be read.

   c) **Use the following idioms in your own sentences:**
      i) a feather in one's cap
      ii) black sheep
      iii) a cock and bull story
      iv) like a fish out of water

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B.Tech I Year Regular&Supplementary Examinations May/June– 2013

Mathematics-I
(Common to All Branches)

Max. Marks: 70

Time: 03 Hours

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

1. a) Solve $x\frac{dy}{dx} + y = x^3 y^6$ — 7M

   b) If the temperature of a body is changing from 100^0c to 70^0c in 15 minutes, find when the temperature will be 40^0c, if the temperature of air is 30^0c — 7M

2. a) Solve $(D^2 + 5D - 6)y = Sin\ 4x\ Sin\ x$ — 7M

   b) Solve $\frac{d^2y}{dx^2} + 9y = \tan 3x$, by the method of variation of parameters — 7M

3. a) Verify Lagrange's mean value theorem for $f(x) = \log_e x$ in $[1,e]$ — 7M

   b) If x = r sin θ cos Φ , y = r sin θ sin Φ, z = r cos θ, show that $\frac{\partial(x,y,z)}{\partial(r,\theta,\emptyset)} = r^2\ \sin\theta$ — 7M

4. a) Trace the curve $r = a + b\cos\theta$, $a > b$ — 7M

   b) Find the surface area of the solid generated by the revolution of astroid $x^{2/3} + y^{2/3} = a^{2/3}$ about the y-axis — 7M

5. a) Evaluate $\int_0^5 \int_0^{x^2} x(x^2 + y^2)\ dy\ dx$ — 7M

   b) Evaluate the integral $\int_0^a \int_{x^2/a}^{2a-x} xy^2\ dy\ dx$ by changing the order of integration — 7M

6. a) Find the Laplace transform of $\cosh^2 2t$ — 4M

   b) Find the Laplace transform of $t\ e^{-t} \sin t$ — 5M

   c) Find $L^{-1}\left[\frac{1}{(s-1)(s+3)}\right]$ — 5M

7. Solve the Differential equation by Laplace transform
   $x^{11}(t) + 4 x^1(t) + 4 x(t) = 4 e^{-2t}$, $x(0) = -1, x^1(0) = 4$ — 14M

8. Verify Green's theorem in the plane for $\oint_c (3x^2 - 8y^2)\ dx + (4y - 6xy)\ dy$, where 'c' encloses the region bounded by $y = \sqrt{x}$ and $y = x^2$ — 14M

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