R11

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
(AUTONOMOUS)
B.Tech I Year Regular Examinations, May/June 2012
ENGINEERING PHYSICS
(Common to All Branches)
(For students admitted in 2011-12)

Time: 3 hours   Max Marks: 70

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Answer any FIVE of the following
All questions carry equal marks

1. a) Mention necessary conditions to obtain Interference of light.   3M

    b) Describe the theory and the experimental procedure to determine the wave length of light source by forming Newton's rings.   7M

    c) In Newton's rings experiment the diameter of 5the ring is reduced to three fourths of its initial value after introducing a liquid below the convex surface. Calculate the refractive index of the liquid.   4M

2. a) Describe the seven crystal systems based on the lattice parameters.   7M

    b) Show that, FCC is the most closely packed of three basic cubic structures by working out the packing factors.   7M

3. a) State and explain deBroglie's hypothesis of matter Waves.   3M

    b) Discuss the motion of an electron in a periodic potential field using Kronig-Penney Model.   7M

    c) An electron is bound in one dimensional potential box of width 1×10^{-10} m. Find its energy in the ground state.
    Given planck's constant = 6.626×10^{-34} J – sec^{-1}
    and   mass of electron = 9.1×10^{-31} kg.   4M

4. a) Explain drift and diffusion in a semiconductor.   5M

    b) Derive Einstein's relation for charge carriers in a semiconductor.   5M

    c) Explain diode current equation.   4M

5. a) Show that ionic polarization of a dielectric is independent of temperature.   4M

    b) Explain the origin of orbital magnetic moment in an atom.   6M

    c) Explain the ferroelectric behavior of Barium Titanate ($BaTiO_3$)   4M

6.   a) State and explain Meissner effect in super conductors.   4M

      b) Describe the construction and working principle of He-Ne laser.   7M

      c) Mention the important applications of super conductors.   3M

7.   a) Explain the various types of optical fibers based on their refractive index profiles and light propagation.   4M

      b) Describe the working of optical fiber communication system with a neat diagram.   6M

      c) Explain the construction and reconstruction of hologram.   4M

8.   a) Explain the basic fabrication methods of nano materials   4M

      b) What is carbon nano tubes? Describe the various types of carbon nano tubes along with its properties.   10M

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Code : 1GC11

R11

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
(AUTONOMOUS)
B.Tech I Year Regular Examinations, May/June 2012
ENGLISH
(Common to All Branches)
(For students admitted in 2011-12)

Time: 3 hours   Max Marks: 70

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Answer any FIVE of the following
All questions carry equal marks

1. "Inevitably, Ladakh is something of a test case of what good as well as bad can be brought by travelers". Elaborate.

2. a) Write about the early hood and education of Visvesvaraya.

   b) Why did Mother Teresa shifted her service from God to the poor and the needy?

3. a) Did Miss. Krishna make a good Guest? Give reasons for your answer.

   b) Why was the day when Raman walked into the IACS a historic moment?

4. a) According to Satyajit Ray, what are the three factors that should guide a director when he/she chooses a story for a film?

   b) How does Ray describe the films that are commonly made in India?

5. a) How did Vikram Sarabhai setup physical research Laboratary?

   b) What is the unique feature of new communication network systems developed by Sam Pitroda?

6. How did Anand become a great chess champion? What are the distinctions that Anand achieved?

7. a) Imagine that you are the assistant Medical officer, District Health Center, Chittoor (Dt). It has been noticed that dengue fever has spread over the district recently. Around 40 dengue cases have been found out of which 6 were died. Hence, you have been directed by the Chief Medical officer of the same district to conduct a survey to get accurate data and to suggest some ways and means to control the dengue virus. Write a report stating all the above mentioned and submit it for its kind perusal.

   b) Write a letter to the Principal of your college to arrange for a reading room in the library and also sports and games.

8. a) Correct the following sentences :

   i) She went out without some money.

   ii) I am suffering with fever now.

   iii) Sarala has seen a movie last week.

   iv) Speak fluently English.

   v) Bread and butter are my food.

   b) Write meanings for the following idioms :

   i) flash on pan.

   ii) once in a blue moon.

   iii) a bolt from the blue.

   iv) in leaps and bounds.

   v) by hook or by crook.

   c) Give one word substitute for the following :

   i) belief that there is no god.

   ii) person who is expert in taste.

   iii) a doctor who treats the ailments of heart.

   iv) Fear of animals.

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Code : 1GC14

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
(AUTONOMOUS)
B.Tech I Year Regular Examinations, May/June 2012
MATHEMATICS-I
(Common to All Branches)
(For students admitted in 2011-12)

Time: 3 hours   Max Marks: 70

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Answer any FIVE of the following
All questions carry equal marks

1. a) Solve $\left(1 + e^{\frac{x}{y}}\right) dx + e^{\frac{x}{y}}\left(1 - \frac{x}{y}\right) dy = 0$

    b) Find the orthogonal Trajectories of the family of cardioids $r = a(1 - \cos\theta)$ where a is the parameter.

    c) A body is kept in air with temperature 25^0 C cools from 140^0 to 80^0 C in 20 minutes. Find when the body cools down to 35^0 C.

2. a) Solve $(D^2 + 3D + 2)y = e^{-x} + x^2 + \cos x$

    b) Solve by method of variation of parameters $(D^2 + 1)y = x \cos x$

3. a) Verify Rolle's theorem for $f(x) = 2x^3 + x^2 - 4x - 2 \ in \left[-\sqrt{2}, \sqrt{2}\right]$.

    b) Find the extreme values of $f(x, y) = x^2y^2 - 5x^2 - 8xy - 5y^2$

4. a) Trace the curve $y^2(a + x) = x^2(3a - x)$

    b) The part of the parabola cut off by the latus rectum is rotated (i) about the latus rectum (ii) about the axis. Show that the volumes generated are in the ratio 16:15

5. a) Evaluate $\int_0^1 \int_0^{1-z} \int_0^{1-y-z} xyz \, dxdydz$

    b) Evaluate the integral by changing the order of integration
    $\int_0^a \int_{x/a}^{\sqrt{x/a}} (x^2 + y^2)dxdy$

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

    b) Find $L^{-1}\left[\frac{s}{(s^2+1)(s^2+9)(s^2+25)}\right]$

7. Solve the differential equation $y^{ii} + y = t, y(0) = 1, y'(0) = 2$ using Laplace transform.

8. Verify Stokes theorem for $F = (x^2 - y^2)i + 2xyj$ over the box bounded by the planes x=0, x=a, y=0, y=b.

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ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
(AUTONOMOUS)
B.Tech I Year Regular Examinations, May/June 2012
C PROGRAMMING AND INTRODUCTION TO DATA STRUCTURES
(Common to EEE, ME and ECE branches)
(For students admitted in 2011-12)

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

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Answer any FIVE of the following
All questions carry equal marks

1. Explain the following with an example.

    a) Algorithm.

    b) Flowchart.

2. Write a C Program to calculate the factorial of a given number. Draw the flow chart for the same.

3. Explain different storage classes with examples.

4. Write a C program for calculate the number of occurrences of a given character in a given string.

5. Explain the differences between structure and Union with an example. How to declare structure within a structure.

6. Write a C program to count number of characters in a file.

7. Explain the operations of Queues with an example.

8. Explain Binary search method with an example.

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Code : 1G512

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
(AUTONOMOUS)
B.Tech I Year Regular Examinations, May/June 2012
ENGINEERING GRAPHICS
(Mechanical Engineering)
(For students admitted in 2011-12)

Time: 3 hours   Max Marks: 70

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Answer any FIVE of the following
All questions carry equal marks

1. a) Inscribe an ellipse in a parallelogram having sides 150 mm and 100 mm
        long and an included angle of 120^0.   7M

    b) A point P is 30 mm and 50 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   7M

2. a) A line PQ, 9 cm long is in the H.P. and makes an angle of 30^0 with the V.P.
        Its end P is 2.5 cm in front of the V.P. Draw its projections.   6M

    b) A 100 mm long line is parallel to and 40 mm above the H.P. Its two ends are
        25 mm and 50 mm in front of the V.P. respectively. Draw the projections of
        the line and determine its inclination with the V.P.   8M

3. A thin rectangular plate of sides 60 mm X 30 mm has its shorter side in the V.P.
    and inclined at 30^0 to the H.P. Project its top view if its front view is a square of
    30 mm long sides.   14M

4. a) Draw the projections of a triangular prism base 40 mm side and axis 50 mm
        long, resting on one of its bases on the H.P with a vertical face perpendicular to
        the V.P.   7M

    b) Draw the projections of a pentagonal pyramid axis 60 mm long, base 30mm
        side having base on the ground and one of edges of base inclined at 45^0 to V.P.   7M

5. A cylinder with a 50 mm base diameter and a 70 mm long axis is resting on
    ground with its axis vertical. A section plane inclined at 45^0 to H.P cuts the
    cylinder such that plane passes through the top of one of the generators and cuts
    all the remaining generators. Draw the development of its lateral surface.   14M

6. Two views of a casting are shown below. Draw the isometric view of the casting. (dimensions are in mm)
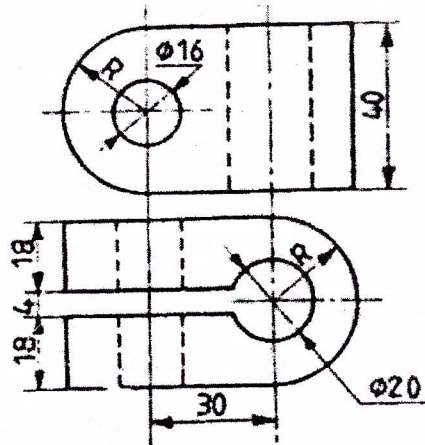
14M

7. A hexagonal prism of side of base 30 mm is resting on one of its bases on HP with a face parallel to VP. The prism contains a square hole of 20 mm side. The axis of the hole is parallel to VP and inclined at an angle of 30^0 to the HP intersecting the axis of the prism. The faces of the hole are equally inclined to VP. Draw the lines of intersection.

14M

8. A rectangle 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 center of the object. Draw its perspective view.

14M

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Code : 1GC13

R11

Time: 3 hours

Max Marks: 70

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Answer any FIVE of the following
All questions carry equal marks

1. a) Two liters of water obtain from well near Tirupati showed the following analysis per liter : $MgSO_4$= 24mg ; $Ca(HCo_3)_2$ = 32.4 mg; $Mg(HCo_3)_2$=29.2 mg; $CaSO_4$ =27.2mg ; suspended matter = 36mg. calculate the temporary, permanent and total hardness of water in ppm units.   8M

    b) Describe the scale and sludge formations in boiler? Explain its drawbacks.   6M

2. a) The resistance of N/2 solution of an electrolyte in a cell was found to be 50 ohm. Calculate the equivalent conductance of the solution, if the electrodes in a cell are 2.2 cm apart with an area of 3.8 sq cm.   7M

    b) What is meant by fuel cell? Explain the Hydrogen-Oxygen fuel cell.   7M

3. a) Explain how heterogeneity of metal increases the rate of corrosion?   6M

    b) Give reasons for the following   8M

      i) Pin holes on tin coated Iron are more prone to corrosion of Iron than those of Zinc coated Iron.

      ii) Iron corrode faster than aluminium though 'Al' is above Iron in emf series.

      iii) Use of dissimilar metals should be avoided.

      iv) Corrosion of specimen can be controlled by using impressed current.

4. a) How is Bakelite manufactured? Explain its properties and applications.   7M

    b) Distinguish between thermoplastic and thermosetting resins with suitable examples.   7M

5. a) Define an explosive? How are they classified? Criteria for a good explosive.   7M

    b) Write short notes on   7M

      i)   Dynamite

      ii)   TNT

6. a) For one component system, the triple point is an invariant system? Discuss. 7M

   b) Determine the number of phases, components and degree of freedom in the system ice, water and water vapour in equilibrium. 7M

7. a) What are chemical fuels? Give their classification with examples. 6M

   b) An oil analysis gave the following results? C:85% ; H=12% and O=3%. Find the weight required for minimum air for burning of 1 Kg of the fuel. 8M

8. a) What is meant by setting and hardening of cement? Explain with chemical reactions. 7M

   b) Write briefly causes for the failure of a refractory material. 7M

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ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
(AUTONOMOUS)
B.Tech I Year Regular Examinations, May/June 2012
ENGINEERING MECHANICS
(*Mechanical Engineering*)
(For students admitted in 2011-12)

Time: 3 hours   Max Marks: 70

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Answer any FIVE of the following
All questions carry equal marks

1. a)   Define force? What are the various characteristics of a force.

   b)   The following forces act at a point

   i) 20 N inclined at 30^0 towards North of East.

   ii) 25 N towards North.

   iii) 30 N towards North west, and

   iv) 35 N inclined at 40^0 towards south of west.

   Determine the resultant of the force system.

2. Determine the reactions at supports for the overhanging beam as shown in figure.
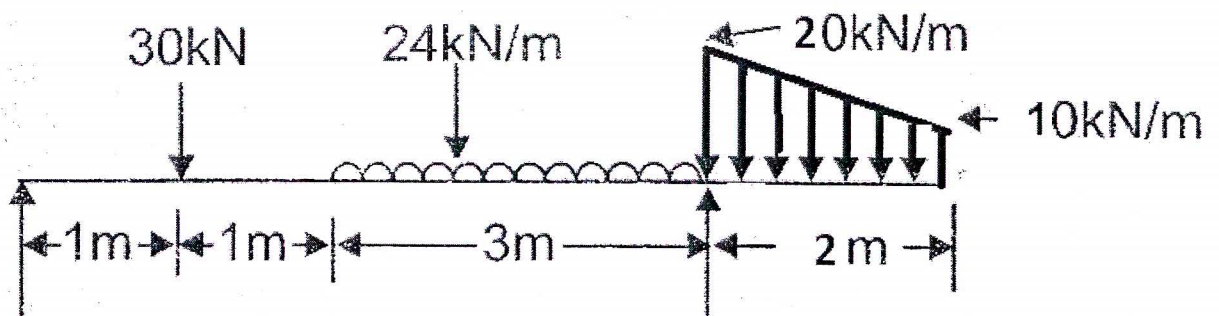
3. a)   State the laws of friction.

   b)   An effort of 200N is required just to move a certain body up an inclined plane of an angle 15^0. The force acting is parallel to the plane. If the angle of inclination of the plane is made 20^0, the effort required again applied parallel to the plane, is found to be 230N. Find the weight of the body and coefficient of friction.

4. a)   Derive an expression for centroid of semi circle of radius 'R'.

b) A uniform lamina is shown in figure. Determine the C.G. of the lamina. All dimensions are in m.m.
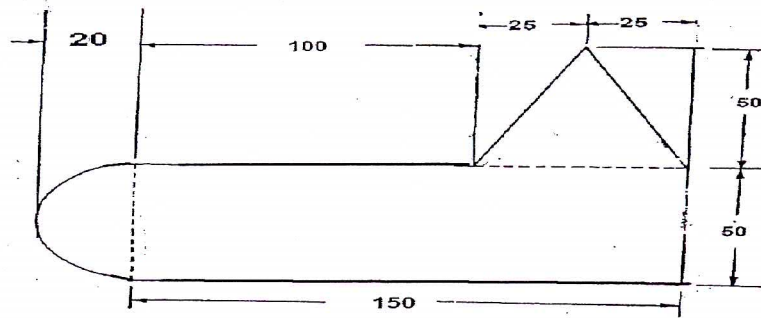
5. a) Define the following.

i) Moment of inertia.

ii) Polar moment of inertia.

iii) Radius of Gyration.

b) Determine the moment of Inertia of the 'T' Section as shown in figure, about an axis passing through C.G and parallel to the top most fibre of the section.
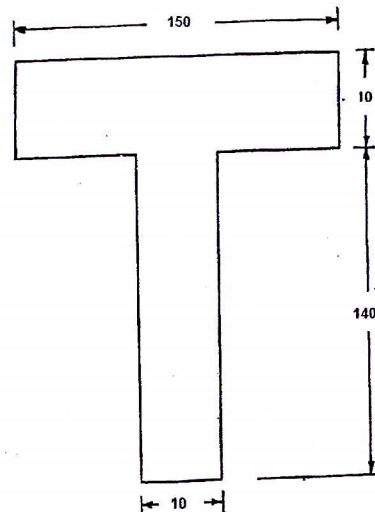
6. Two electric trains A and B leave the same station on parallel lines. The train A starts with a uniform acceleration of 0.2 m/Sec^2 and attains a speed of 45 kmph. The train B leaves 1 minute after, with a uniform acceleration of 0.4 m/sec^2 to attain a maximum speed of 72 kmph. When the train B will overtake train A.

7. A wagon Weighing 500 KN starts from rest, runs 30 m down one percent grade and strikes the bumper. If the rolling resistance of the track is 5 N/KN, find the velocity of the wagon when it strikes the post. If the bumper spring which compresses 1 mm for every 15 KN, determine by how much this spring will be compressed.

8. a) Explain how a simple pendulum differs from a compound pendulum.

b) The amplitude and maximum velocity of a particle is 400 mm and 2m/sec. A particle moves in simple harmonic motion. Determine the max acceleration and the period of motion.