R-15

Code: 5GC21

I B.Tech. II Semester Regular Examinations June 2016
Technical English
(Common to All Branches)

Max. Marks: 70   Time: 3 Hours
Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)
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UNIT–I

1. a) Do you believe that Modern Technology made human being lazy?   7M
    b) Write in your own words on 'Mass Production'   7M

OR

2. a) Explain the advantages of Technology in about 50 words.   7M
    b) Complete the sentences as directed.
       i) He *unfolded* his full hand shirt in the exam hall. (write the antonym of the italicized word)
       ii) He is a great **patriot**. (write the synonym of the bold word)
       iii) She went to ___ shop to buy a pen.(fill in the blank with 'stationary' / 'stationery')
       iv) He accepted the gift _____ money.(fill in the blank with a homonym of accept)
       v) Kanhayya _____ the strike at Delhi. (Fill in the blank with suitable phrasal verb)
       vi) The students are ___ (listening/hearing) a tractor noise.(Choose the right verb)
       vii) I have to attend ____ exam before final exam.(imagine and fill with prefix word)   7M

UNIT–II

3. a) Suggest few responsibilities to save climate from radiation.   7M
    b) What is low pressure? How does it effect on climate?   7M

OR

4. a) Write with examples of the factors that cause climate change.   7M
    b) What is Elnino and Lanina? Explain the condition of recent times.   7M

UNIT–III

5. a) In response to an advertisement, write a cover letter, possessed basic qualification
       of B.Tech., to Soft Tech Software Company for the position of Project Manager.   7M
    b) What are Photovoltaic panels?-Explain how it works.   7M

OR

6. a) Why top countries use solar power? What are the benefits by using solar panels?   7M
    b) Rewrite the following sentences as directed.
          i) I saw an angry tiger in the zoo. (Change into complex sentence)
          ii) In spite of his poverty, he couldn't pay fee. (Change into compound sentence)
          iii) What is the _____ (fair/fare) of shatavahana express ticket from here?
          iv) I _____ (alter/altar) my class due to busy schedule.
          v) I _____ (waist/waste) my money on movies.
          vi) The passengers are _____ (weighing/waiting) for the luggage.
          vii) He took a _____ (break/brake) for rest for a while.   7M

UNIT–IV

7. a) Write on 'water pollution' that caused by factory chemicals.   7M
    b) What kind of measures to prevent soil erosion?   7M

OR

8. a) What are the methods to generate power form water?   7M
    b) Keeping in view of Raman's, how can we prevent wastage of water?   7M

UNIT–V

9. a) Spiritual knowledge is the only thing that can destroy our miseries for ever-Explain.   10M
    b) Write an essay that tells us about 'unattached'.   4M

OR

10. a) Define 'nature of work' in about 5O words.   10M
    b) Fill in the blanks with suitable connotations.
        i) He is _____ (handicapped/disabled) to listen music.
        ii) Her _____ (childish/childlike) mentality irritates everyone.
        iii) The flight ticket to Mumbai is _____ (cheap/economical)
        iv) She is very _____ (curious/interest) to ask doubts.   4M

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I B.Tech. II Semester Regular Examinations May/June 2016
Engineering Physics
(Common to CE, ME, CSE and IT)

Max. Marks: 70   Time: 3 Hours
Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)
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UNIT–I

1. a) Write a short not on Population inversion. What is meant by Direct and In direct Band gap semiconductors?   7M   6 m

   b) Describe the construction and working of semiconducting Laser?   7M

OR

2. a) Derive the expressions for the numerical aperture and fractional index change of an Optical fiber. Explain how the optical fibers are classified.   10M

   b) Calculate the fractional change for a given optical fiber if the refractive indices if the core and cladding are 1.563 and 1.498 respectively.   4M

UNIT–II

3. a) Explain the principle, procedure and advantage of Powder method of X-ray diffraction.   10M

   b) A beam of X-rays is incident on a NaCl crystal with lattice spacing 0.282 nm. Calculate the wavelength of X- rays if the first order Bragg reflection takes place at a glancing angle of $8° 35'$.   4M

OR

4. a) Write the properties of Ultrasonics and explain how do you produce Ultrasonics by piezoelectric method with a neat sketch.   10M

   b) Write the applications of Ultrasonics in non- destructive testing.   4M

UNIT–III

5. a) Give an account of Heisenberg's uncertainty principle and explain the outline an idealized experiment to bring out its significance.   7M

   b) Derive the Schrodinger time independent wave equation for matter waves.   7M   8 m

OR

6. a) What are the failures classical free electron theory   4M

   b) Discuss the Kronig-Penny model for the motion of an electron in a periodic potential.   10M

UNIT–IV

7. a) Distinguish between intrinsic and extrinsic semiconductors.   4M

   b) Define and explain the Hall effect with a neat sketch. Derive the expression for the hall coefficient.   10M

OR

8. a) Explain the origin of magnetic moment in magnetic materials and detail the classification of magnetic materials.   7M

   b) Discuss with help of a neat diagram, the hysteresis loop observed in ferromagnetic material.   7M

UNIT–V

9. a) Explain
      (i)   Critical Magnetic field (H_c)
      (ii) Messiner effect
      (iii) Phenomenon of BCS theory.   10M

   b) A lead super conductor with T_c =7.2 K has a critical magnetic field of $6.5x10^3$ A/m at absolute zero. What would be magnitude of critical magnetic field at   5 K temperature?   4M

OR

10. a) Discuss the detailed procedure to synthesize the nanomaterials using SOL-GEL method using a flow chart.   10M

    b) Discuss about applications of nanomaterials in the field of energy and environment.   4M

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Code : 5GC12

R-15

I B.Tech. I Semester Supplementary Examinations May/June 2016
Engineering Chemistry
(Common to CE, ME, CSE & IT)

Max. Marks: 70   **Time: 3 Hours**

Answer *all five* units by choosing one question from each unit (5 x 14 = 70Marks)

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UNIT–I

1. a) How is hard water estimated by EDTA method? From the following results calculate the total hardness of water sample and express the hardness of water in ppm. 50 ml of water required 14 ml of 0.05 M EDTA. (1000 ml of 1 M EDTA = 100 gms of $CaCO_3$)   7M

    b) With the help of neat diagram, describe the reverse osmosis method for the desalination of brackish water.   7M

OR

2. a) Describe the ion-exchange process of softening for water.   7M

    b) Write a short note on
    (i) Break point chlorination,
    (ii) Calgon conditioning.   7M

UNIT–II

3. a) Discuss the various factors affecting the rate of corrosion.   7M

    b) What are potentiometric sensors? Describe the analysis of urea by using electrochemical sensors.   7M

OR

4. a) Explain the composition, applications and advantages of the following cells. (i) Ni-Cd cell & (ii) Lithium ion cell.   7M

    b) Define corrosion. Explain dry corrosion and its mechanism.   7M

UNIT–III

5. a) Explain the synthesis of conducting polymers with examples.   7M

    b) What are silicones? Draw the structure of siloxane polymer obtained by hydrolyzing dichlorodimethylsilane.   7M

OR

6. Describe the methods of preparations, properties and applications of the following:
    (i)   Bakelite,
    (ii)   Buna-S,
    (iii) Nylon-6,6 &
    (iv)   PVC   14M

UNIT–IV

7. a) Describe the determination of calorific value of solid fuel using bomb calorimeter. 7M

   b) The percentage composition of a sample of coal by weight was found to be: C = 76%, H = 5.2%, O = 12.8%, N = 2.7%, S = 1.2%, the remaining being ash. Calculate the minimum (**i**) Weight and (**ii**) volume at NTP of air necessary for complete combustion of 1 kg of coal and percentage composition by weight of dry products, if 50% excess air supplied. 7M

OR

8. a) Describe the Otto Hoffmann's method of manufacture of metallurgical coke with a neat labeled diagram 7M

   b) Write a note on Production and uses of Producer gas and Biogas. 7M

UNIT–V

9. a) What are refractories? Discuss any three properties of refractories. 7M

   b) Explain theory of lubricants. Write any three applications of lubricants. 7M

OR

10. a) How can you classify the rocket propellants? What are the characteristics requires for good propellants. 7M

    b) What is Portland cement? Explain hardening and setting of cement with various reactions involved in that process. 7M

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R-15

Code: 5G522B

I B.Tech. II Semester Regular Examinations May/June 2016
Engineering Graphics -II
(Mechanical Engineering)

Max. Marks: 70   Time: 3 Hours
Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)
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UNIT–I

1. A square prism, base 40 mm side and height 65 mm, has its axis inclined at 45° to the H.P and has an edge of its base, on the H.P. and inclined at 30° to the V.P. draw its projections   14M

OR

2. A pentagonal prism is resting on a corner of its base on the ground with a longer edge containing that corner inclined at 45^0 to the H.P. and the vertical plane containing that edge and the axis inclined at 30^0 to the V.P. Draw its projections. Base 40 mm side , height 65 mm   14M
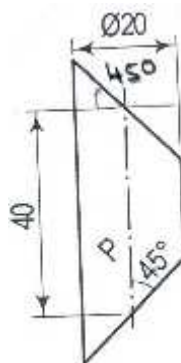
UNIT–II

3. A hexagonal pyramid, base 30 mm side and axis 65 mm long, is resting on its base on the H.P. with two edges parallel to the V.P. It is cut by a section plane, perpendicular to the V.P. inclined at 45^0 to the H.P and intersecting the axis at a point 25 mm above the base. Draw the front view, sectional top view, sectional side view and true shape of section   14M

OR

4. A tetrahedron of 65 mm long edges is lying on the H.P on one of its faces, with an edge perpendicular to the V.P. It is cut by section plane which is perpendicular to the V.P so that the true shape of the section is an isosceles triangle of base 50 mm long and altitude 40 mm. Find the inclination of the section plane with the H.P and draw the front view, sectional top view and true shape of the section   14M

UNIT–III

5. Draw the devoplement of lateral surface of the part "P" of the cylinder for which front view shown below.


14M

OR

6. A vertical cylinder of 60 mm diameter is penetrated by a horizontal square prism, base 40 mm side and their axes are bisecting each other. Draw their projections showing curves of intersections   14M

UNIT–IV

7. a) Draw the isometric view of the frustum of the square pyramid. Base side 60 mm top side 40 mm and axis 50 mm   7M

    b) Draw the isometric view of the frustum of a cone with base dia 80 mm top dia 60 mm axis 60 mm   7M
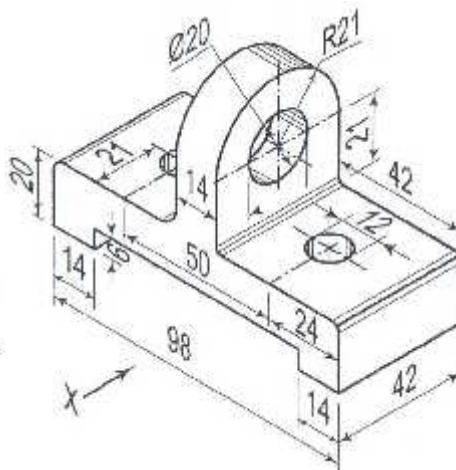
OR

8. Draw the isometric view of the object for which orthographic views are shown below
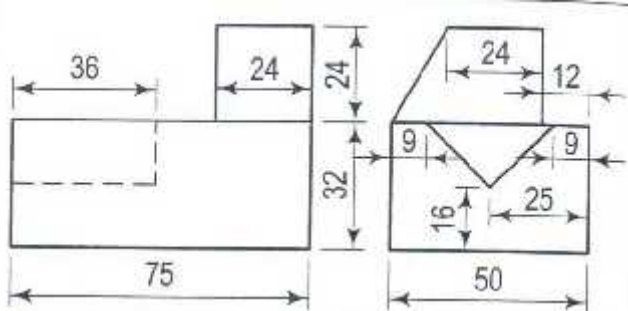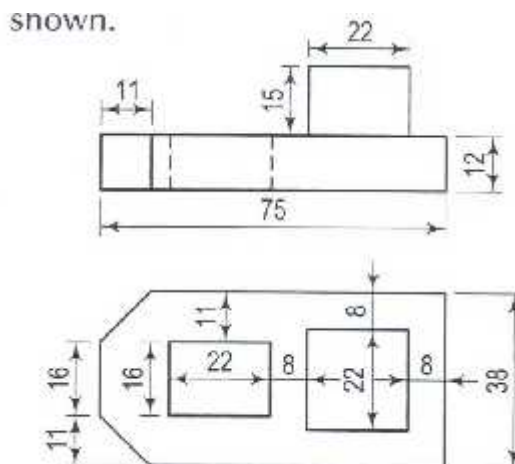

14M

UNIT–V

9. Isometric view of an object is shown below. Draw front view, top view and side view

14M

OR

10. Draw the isometric view of the object for which orthographic views are shown below

14M

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I B.Tech. II Semester Regular Examinations May/June 2016
Engineering Mathematics-II
(Common to All Branches)

Max. Marks: 70   Time: 3 Hours
Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)
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UNIT–I

1. Evaluate the double integral $\iint\limits_{R} xy\,dxdy,$ where R is the region bounded by

    the x-axis, the line y=2x and the parabola $y = \dfrac{x^2}{4a}$ 14M

OR

2. Evaluate $\iint\limits_{R}(x+y)^2\,dxdy$, where R is the parallelogram in the xy-plane with

    vertices (1,0), (3,1), (2,2), (0,1) using the transformation u=x+y and v=x-2y   14M

UNIT–II

3. Find the Laplace transform of the periodic function defined by the saw
    tooth wave $f(t) = t, \quad 0 \le t \le a, \quad f(t+a) = f(t).$ 14M

OR

4. Find the inverse Laplace transform of the following functions

    a) $\dfrac{2(s+1)}{(s^2+2s+2)^2}$ **b)** $\log\left(\dfrac{s+c}{s+d}\right)$ where c, d are constants.

                                                                                    14M

UNIT–III

5. Find the solution of the initial value problem $y'' + 4y' + 13y = e^{-t},$
    $y(0) = 0,\ y'(0) = 2.$ 14M

OR

6. Using convolution, solve the initial value problem $y'' + 9y = \sin 3t,$
    $y(0) = 0,\ y'(0) = 0.$ 14M

UNIT–IV

7. a) Find $div\overline{F}$ and $curl\overline{F}$ where $\overline{F} = grad(x^3 + y^3 + z^3 - 3xyz)$.   7M

    b) Show that $\nabla^2\left(\dfrac{1}{r}\right) = 0$.   7M

OR

8. Show that the vector field $\overline{F} = 2x(y^2 + z^3)\overline{i} + 2x^2 y\overline{j} + 3x^2 z^2 \overline{k}$ is conservative.
    Find its scalar potential and the work done in moving a particle from
    (-1, 2, 1) to (2, 3, 4).   14M

UNIT–V

9. Verify Green's theorem for $\int\limits_{C}\left[(xy + y^2)dx + x^2 dy\right]$ where C is bounded by

    y=x and y=x².   14M

OR

10. Verify Stoke's theorem for a vector field $\overline{F} = (2x - y)\overline{i} - yz^2\overline{j} - y^2 z\overline{k}$ over the

    upper half surface of $x^2 + y^2 + z^2 = 1,$ bounded by its projection on the xy-plane.   14M

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R-15

Code: 5G521

I B.Tech. II Semester Regular Examinations June 2016
Engineering Mechanics-Dynamics
(Common to CE and ME)

Max. Marks: 70   Time: 3 Hours
Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)
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UNIT–I

1. a) The greatest possible acceleration or deceleration that a train may have is a
        and its maximum speed is **v**. Find the minimum time in which the train can
        get from one station to the next, if the total distance is **s**.   7M

    b) A particle under constant deceleration is moving in a straight line and covers
        a distance of 20 m in first two seconds and 40 m in the next 5 seconds.
        Calculate the distance it covers in the subsequent 3 seconds and the total
        distance covered, before it comes to rest.   7M

OR

2. a) An electric train which starts from one station is uniformly accelerated for the first
        10 seconds, during which period it covers 150 metres. It then runs with constant
        speed until it is finally retarded uniformly in the last 40 metres. Calculate the
        maximum speed and the time taken over the journey to the next stopping station
        which is 600m form the previous station   7M

    b) A particle is projected with a velocity of 10m/s at an angle of elevation of 60°. Find
        i) The equation of the path of motion.
        ii) The length of latus rectum of the path of motion
        iii) Time required to cover the range.
        iv) The length of range   7M

UNIT–II

3.   A flywheel rotating freely at the speed of 1750 rpm clockwise is provided with a
        counter clockwise torque, which is first applied at time t = 0 producing a
        counterclockwise acceleration   = 4.5 t rad/s^2. Determine the **(i)** time required to
        produce clockwise angular speed 950 rpm, **(ii)** time required to reverse direction
        of rotation, **(iii)** total number of revolutions during the first 14 s of movement.   14M

OR

4.   A bicycle wheel of 0.89 m diameter rolls without slip at 18 rad/s angular velocity
        (Fig.1) If the angular acceleration becomes 13 rad/s^2, determine the velocity and the
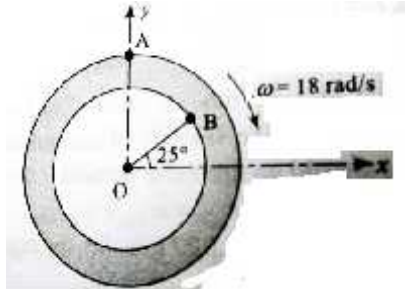   acceleration of point A on the tyre and B on the rim. The rim has diameter 0.78 m

Fig.1   14M

UNIT–III

5. Using D'Alembert's principle, determine the tension in the string and acceleration of blocks A and B weighing 1500 N and 500 N connected by an inextensible string as shown in Fig.2 below. Assume pulleys as frictionless and weightless
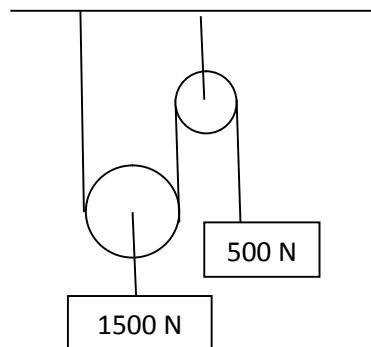

500 N

1500 N

Fig. 2 14M

OR

6. A 750 N crate rests on a 500 N cart. The coefficient of friction between the crate and the cart is 0.3 and Between cart and the road is 0.2. If the cart is to be pulled by a force P such that the crate does not slip. Determine (a) the maximum allowable magnitude of P and (b) the corresponding acceleration of the cart.
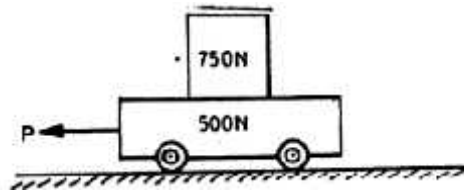

750N

500N

P

Fig.3. 14M

UNIT–IV

7. Determine the constant force P that will give the system of bodies shown in Fig. 4 A velocity of 3 m/s after moving 4.5 m from rest. Coefficient of friction between the blocks and plane is 0.3. Pulleys are smooth.
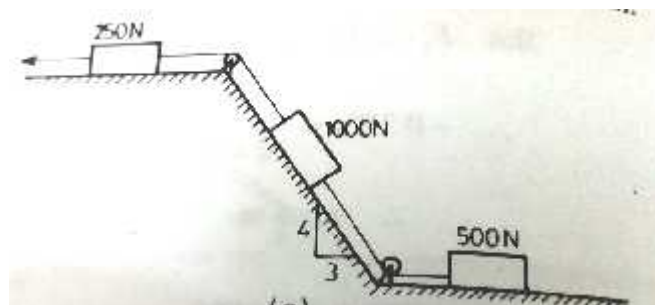

750N

1000N

500N

Fig.4 14M

OR

8. A tennis ball strikes a smooth horizontal floor from a height h and is assumed to bounce a finite number of times. Derive the expression for the velocity of the ball after bouncing n times. Also determine the expression for total vertical distance travelled. 14M

UNIT–V

9.   A solid cylinder and a thin hoop of equal mass and radius are connected by a bar C_1C_2 as shown in Fig.5. If the assembly rolls down the incline without slip, determine the acceleration of the assembly and the tension in the bar.
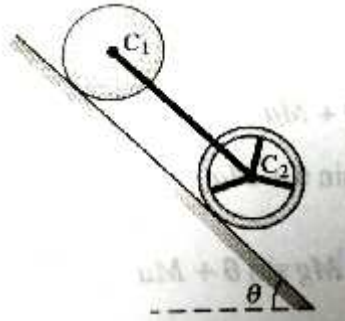

Fig.5

14M

OR

10.   A right circular homogeneous cylinder of mass M and diameter d is suspended from an inextensible cord wound around its periphery as shown in Fig. 6. Determine the acceleration of the mass centre C of the cylinder, when it is allowed a free fall. In this condition, what will be tension in the cord?
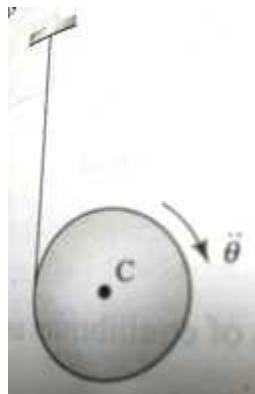

Fig.6   14M

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I B.Tech. II Semester Regular Examinations May/June 2016
C Programming and Data Structures
(Common to All Branches)

Max. Marks: 70   Time: 3 Hours
Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)
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UNIT–I

1. a) What is meant by a pointer? Explain about pointer to array.   7M

   b) Write a C program to sort element in an array using pointer to array.   7M

OR

2. a) What do you mean by dynamic memory allocation?   7M

   b) Discuss the different dynamic memory allocation functions available in c.   7M

UNIT–II

3. a) Explain file handling functions with syntax.   7M

   b) Write a C program to count the number of occurrences of a key word in an
      input program.   7M

OR

4. a) Explain Quick sort with the help of an example?   7M

   b) Write a C program to sort the elements using Quicksort.   7M

UNIT–III

5. a) Explain stack with basic Operations (push and pop).   9M

   b) Convert the following infix expression into Postfix Expression
      A+B*C/D^E+(F+G)*H   5M

OR

6.   Write an algorithm to insert and delete an element in a circular Queue.   14M

UNIT–IV

7. a) Write a C program to search an element in a list using linked list.   7M

   b) Write a C program to concatenate two linked lists.   7M

OR

8.   Writ a C program to insert and delete an element in a given list using double
      linked list.   14M

UNIT–V

9. a) Define binary tree, complete binary tree and almost complete binary tree.   7M

   b) Explain various traversal techniques in a binary search tree   7M

OR

10. a) Consider the set S= {15, 20, -4, 28, 2, 6, 9}, Draw the binary search tree T by
       taking keys in set S one at a time in the order assume the binary search tree is
       initially empty.   7M

    b) Write a recursive algorithm to search the element in a binary search tree. 7M

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