Hall Ticket Number :

R-14

Code: 4GC13

B.Tech. I Year Supplementary Examinations Nov/Dec 2019
Engineering Chemistry
(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) Differentiate temporary and permanent hardness of water.

    b) Write about methods for the treatment of portable water?

OR

2. What are boiler troubles? How are they caused? Give suggestions to minimize the troubles.

UNIT–II

3. Discuss the mechanism of dry corrosion with suitable examples.

OR

4. Discuss the phenomenon of electroplating with suitable examples.

UNIT–III

5. a) What is synthetic rubber? Write any five draw backs of raw rubber?

    b) Explain the synthesis, mechanism and applications of carbohydrates

OR

6. a) Describe doped conducting polymers with suitable example.

    b) Write a note on vulcanization of rubber.

UNIT–IV

7. a) Write a note on production and uses of producer gas, water gas and Bio gas.

    b) Define knocking? Write about octane number?

OR

8. Calculate the gross and net calorific value of a coal sample from the data obtained from bomb calorimeter weight of coal 0.73gms, weight of the water in calorimeter 1500gms, water equivalent of calorimeter 470gms, initial temperature 25^0C and final temp 28^0C , % of H_2 2.5% and latent heat of steam 587 cal/gm.

UNIT–V

9. a) What are lubricants? Write any three properties and applications of lubricants.

    b) What are refractories? Discuss any three properties of refractories?

OR

10. What are viscosity and viscosity index of lubricating oil? Discuss the functions of lubricants

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B.Tech. I Year Supplementary Examinations Nov/Dec 2019
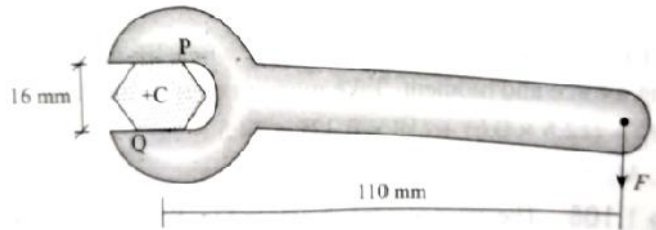## Engineering Mechanics
(Common to CE & ME)

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 moment of 24N-m is required to turn the bolt about the axis. Determine the force F. If the wrench fits easily on the bolt, find the reactions at two corners P and Q of the bolt.
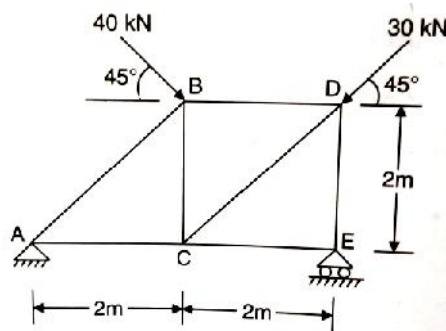

OR

2.　Two identical rollers, each of weight 100 N, are supported by an inclined plane and a vertical wall as shown in fig. Assuming smooth surfaces, find the reactions induced at the points of support A, B and C.
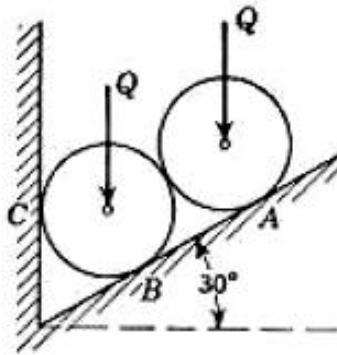
UNIT–II

3.　Determine the forces in all the members of the truss shown in fig. Indicate the magnitude and nature of the forces on the diagram.


OR

4.　What is the difference between a truss and frame? Write down the basic assumptions for truss analysis and also discuss two methods for analyzing the truss for different forces and their merits and demerits.

UNIT–III

5.　A ladder 5m long and of 250N weight is placed against a vertical wall in a position where its inclination to the vertical is 30^0. A man weighing 800N climbs the ladder. At what position will he induce slipping? The co-efficient of friction for both the contact surfaces of the ladder viz. with wall and the floor is 0.2.

OR

6. A 108N block is held on a 40^0 incline by a bar attached to a 150N block on a horizontal plane shown in fig. The bar which is fastened by smooth pins at each end is inclined 20^0 to the horizontal. The co-efficient of friction between each block and its plane is 0.325. For what horizontal force P, applied to 150N block will motion to the right be impending?
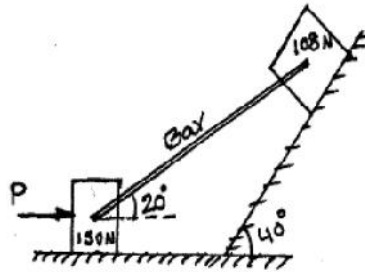
UNIT–IV

7. Find the position of the centroid of the gusset plate as shown in fig.
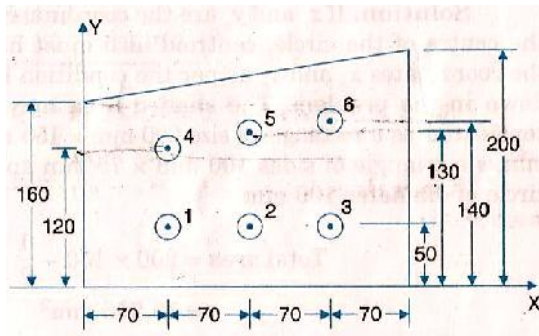
OR

8. Compute the second moment of area of the bearing block with respect to its base. Fig.
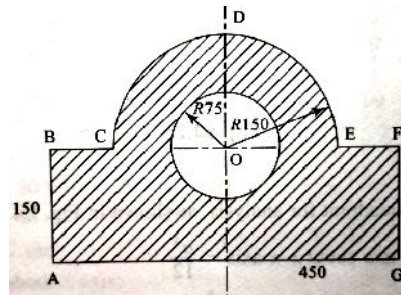
UNIT–V

9. A block starts from rest from 'A'. If the coefficient of friction between all surfaces of contact is 0.3, find the distance of point at which the block stop on the horizontal plane. Assume the magnitude of velocity at the end of slope is same as that at the beginning of the horizontal plane.
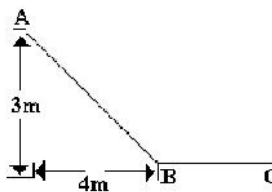
OR

10. A wheel of radius 1m rolls freely with an angular velocity of 5rad/s and with an angular acceleration of 4rad/s^2, both clockwise as shown in fig. Compute the velocity and accelerations of points B and D.

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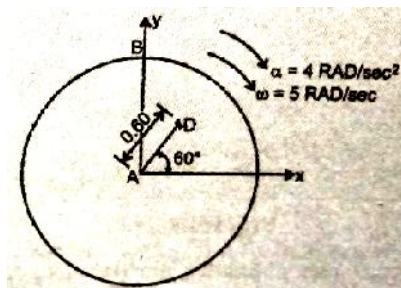
Code: 4GC12

B.Tech. I Year Supplementary Examinations Nov/Dec 2019

Engineering Physics

(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) Explain the construction and working of He – Ne laser   8M

    b) Newton's rings are observed in the reflected light of wave length 5900 Å. The diameter of 10th dark ring is 0.5 cm. Find the radius of curvature of the lens used.   6M

OR

2. a) Discuss the point to point optical fiber communication system and mention its advantages over the conventional communication systems   8M

    b) The angle of acceptance of an optical fiber is 30^0 when kept in air. Find the angle of acceptance when it is in a medium of refractive index 1.33.   6M

UNIT–II

3. a) Derive Bragg's law for X-ray diffracton   8M

    b) Copper has fcc structure of atomic radius 0.1278 nm. Calculate the interplanar spacing for (3 2 1) plane.   6M

OR

4. a) What is space lattice? Describe briefly the seven systems of crystals   7M

    b) Explain the various detection methods for ultrasonics.   7M

UNIT–III

5. a) Setup time-independent Schrodinger wave equation in one dimension and explain Eigen function and Eigen values   7M

    b) Define Fermi energy and Fermi factor. Discuss the probability of occupation of electrons when $E<E_f$ and $E>E_f$.   7M

OR

6. a) What is wave function? Give its physical significance and properties   8M

    b) Find the relaxation time of conduction electrons in a metal of resistivity 1.54×10^{-8} ohm-m, if the metal has 5.8×10^{28} conduction electrons per m^3.   6M

UNIT–IV

7. a) Describe with suitable diagrams the construction and action of a P-N junction diode   8M

    b) Give a brief account of high temperature superconductivity   6M

OR

8. a) Describe in short the formation of energy bands in solids and hence explain how it helps to classify materials into conductors and insulators   8M

    b) The Hall co-efficient of a material is -3.68×10^{-5} m^3/C. What is the type of charge carriers? Also calculate the carrier concentration.   6M

UNIT–V

9. a) Explain magnetic hysteresis on the basis of domain theory   7M

    b) Explain in detail any two applications of nanotechnology   7M

OR

10. a) Discuss the applications of hard and soft magnets   7M

    b) Explain the synthesis of nanomaterials using sol-gel method   7M

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R-14

Code: 4GC14

B.Tech. I Year Supplementary Examinations Nov/Dec 2019
Mathematics-I
(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) Solve $x\dfrac{dy}{dx} + y = \log x$ 7M

   b) Solve $y'' - y' - 2y = 3e^{2x},\ y(0) = 0,\ y'(0) = -2$ 7M

OR

2. a) Solve $\dfrac{dy}{dx} - \dfrac{2y}{x} = \dfrac{5x^2}{(2+x)(3-2x)}$ 7M

   b) Solve $\left(D^3 + 2D^2 + D\right)y = e^{2x} + x^2 + x + \sin 2x$ 7M

UNIT–II

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

   b) Given that $x + y + z = a$, find the minimum value of $x^m y^n z^p$ 7M

OR

4. a) Prove that $\dfrac{f}{6} + \dfrac{1}{5\sqrt{3}} < \sin^{-1}\left(\dfrac{3}{5}\right) < \dfrac{f}{6} + \dfrac{1}{8}$ 7M

   b) If $x = r\sin\theta\,\cos w,\ y = r\sin\theta\,\sin w,\ z = r\cos\theta$, show that $\dfrac{\partial(x, y, z)}{\partial(r, \theta, w)} = r^2 \sin\theta$ and

   find $\dfrac{\partial(r, \theta, w)}{\partial(x, y, z)}$ 7M

UNIT–III

5. a) Trace the curve $y^2 = (x - 2)(x - 3)^2$ 7M

   b) Change the order of integration and evaluate $\displaystyle\int_{0}^{4a} \int_{\frac{x^2}{4a}}^{2\sqrt{ax}} dy\,dx$ 7M

OR

6. a) Trace the curve $x = a(\theta + \sin\theta),\ y = a(1 - \cos\theta)$ 7M

   b) Evaluate $\displaystyle\int_{0}^{1} \int_{0}^{\sqrt{1-x^2}} \int_{0}^{\sqrt{1-x^2-y^2}} (xyz)\,dz\,dy\,dx$ 7M

7. a) Find the Laplace transform of $\dfrac{e^{-at} - e^{-bt}}{t}$ 7M

   b) Using Laplace transform, solve $\left(D^2 + 4D + 5\right) y = 5$, given that $y(0) = 0, y''(0) = 0$ 7M

<div align="center">OR</div>

8. a) Evaluate $L\left\{\dfrac{1 - \cos t}{t}\right\}$ 7M

   b) Using Convolution theorem, find $L^{-1}\left\{\dfrac{s}{\left(s^2 + a^2\right)^2}\right\}$ 7M

9. a) (i) If $\overline{f} = (x + 3y)\overline{i} + (y - 2z)\overline{j} + (x + pz)\overline{k}$ is solenoidal, find p.

   (ii) Find curl $\overline{f}$ where $\overline{f} = grad\left(x^3 + y^3 + z^3 - 3xyz\right)$.   7M

   b) Evaluate by Green's theorem $\int_c (y - \sin x)dx + (\cos x)dy$ where 'c' is the triangle enclosed by the lines $y = 0, x = \dfrac{f}{2}, f\, y = 2x$ 7M

<div align="center">OR</div>

10. a) Evaluate $\nabla.\left(\dfrac{\overline{r}}{r^3}\right)$ where $\overline{r} = x\overline{i} + y\overline{j} + z\overline{k}$ and $r = \left|\overline{r}\right|$ 7M

    b) If $\overline{f} = \left(2x^2 - 3z\right)\overline{i} - 2xy\overline{j} - 4x\overline{k}$ then evaluate $\iiint_v \nabla.\overline{f}\,dv$ where 'v' is the closed region bounded by $x = 0, y = 0, z = 0, 2x + 2y + z = 4$ 7M

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B.Tech. I Year Supplementary Examinations Nov/Dec 2019
Programming in C and Introduction to Datastructures
(Common to CE, EEE, ME & ECE)

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 Programming Language? What is the generation of programming Language? Describe it briefly.   10M

   b) Describe Structure of C Language   4M

OR

2. a) What are identifiers? What are the rules for declaring identifiers? Give example.   8M

   b) What is constant? Describe its classification with example   6M

UNIT–II

3. a) What are Unary operators and their uses?   7M

   b) Describe logical operators with their return values.   7M

OR

4. a) Explain various iterative statements available in C language with examples.   8M

   b) Write a program to find out whether the given number is Armstrong or not?   6M

UNIT–III

5. a) Write a short note on macros.   7M

   b) Write a program to read and display array elements using pointers   7M

OR

6. a) What do you mean by functions? Give the structure of the functions and explain about the arguments and their return values.   7M

   b) Write a program to find minimum and maximum element by using pointers   7M

UNIT–IV

7. a) Define Structures. Explain with an example how structure members are initialized and accessed   7M

   b) Explain different modes to open a file   7M

OR

8. Write a program for sorting given numbers using selection sort technique   14M

UNIT–V

9. a) Define Stack. Explain in detail about stack operations.   10M

   b) Write the steps for evaluating postfix expression   4M

OR

10. What is linked list? Write a C program to demonstrate queues using single linked list   14M

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Code: 4G512

B.Tech. I Year Supplementary Examinations Nov/Dec 2019
Engineering Graphics
(Common to CE & 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 fixed point is 75mm from a fixed a straight line. Draw the locus of a point P moving such a way that its distance from the fixed straight line is

   i)   Twice a distance from the fixed point

   ii) Equal to its distance from the fixed point. Name the curves.

OR

2.   Construct a cycloid having a rolling (generating) circle diameter as 50mm. Draw a normal and a tangent to a curve at a point 35mm above the base line.

UNIT–II

3.   Draw the projections of a regular hexagon of 25mm side, having one of its sides in the HP and inclined at 60º to the VP and its surface making an angle of 45º with the HP.

OR

4.   One end A of a line AB, 75mm ling is 20mm above the H.P. and 25mm infront of the V.P. The line is inclined at 30º to the H.P. and the top view makes 45º with the V.P. Draw the projections of the line and find the true inclination with the vertical plane

UNIT–III

5. a) Draw the projections of a cone of base 30mm diameter and axis 50mm long, when it is resting on HP on its base

    b) Draw the projections of a cylinder of base 30mm diameter and axis 50mm long, when it is resting on HP on its base

OR

6.   Draw the projections of a pentagonal prism, base 25mm side and axis 50mm long, resting on one of its rectangular faces on the HP, with the axis inclined at 45º to the VP

UNIT–IV

7. a) Draw the development of surface of a cube of side 40 mm

    b) Draw the development of a pentagonal prism 30 mm base edge and 50 mm long axis

OR

8.   A cylinder of 50mm diameter and 70m axis is completely penetrated by a square prism of 25mm sides and 70mm axis, horizontally. Both axes Intersect & bisect each other. All faces of prism are equally inclined to HP. Draw projections showing curves of intersections.

UNIT–V

9. Draw the isometric view of a pentagon of 50mm side, plane vertical and horizontal.

OR

10. Convert Iso to Ortho
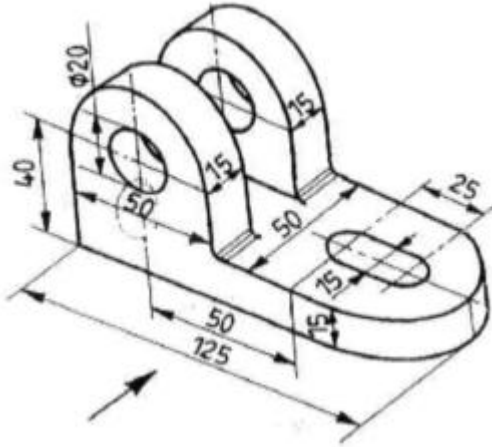
And draw a)Front View b) Top View c) Right Side View

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