Code: 4GC13

B.Tech. I Year Supplementary Examinations May/June 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) What is hardness of water? Mention its units?

    b) Describe the desalination process by reverse osmosis with a neat sketch.

OR

2. a) Write a note on internal treatment?

    b) What is break point chlorination? State its significance?

UNIT–II

3. a) Differentiate between cathodic protection and anodic protection?

    b) what is the EMF Of the following cell at $25^{\circ}C$

    $Zn(s)/Zn^{++}(0.1M)//Cu^{++}(1.75M)/Cu(s)$. The standard emf of the cell is 1.1V.

OR

4. a) What is electrochemical corrosion? Explain electrochemical theory of corrosion.

    b) How is corrosion prevented by sacrificial anodic protection and cathodic protection? Explain.

UNIT–III

5. What are silicones? Give preparation, properties and applications of silicones.

OR

6. Describe the preparation, properties and uses of
    (i) Bakelite (ii) nylon 6,6

UNIT–IV

7. Give an account of the different methods used for the synthesis of petrol

OR

8. A Sample was found to have the following percentage composition
    C = 75%, H = 5.2%, O = 12.1%, N = 3.2%, ash = 4.5%.
    - (i) calculate the weight &volume of air required of combustion of 1 kg of coal
    - (ii) calculate the higher calorific value and lower calorific value of coal sample

UNIT–V

9. What is the composition of Portland cement? Explain how Portland cement is manufactured by wet process, with the help of chemical reactions involved in it.

OR

10. Write a short notes on
    - (a) Fire and flash points.
    - (b) Cloud and pour point.
    - (c) Aniline point

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Code: 4G512

B.Tech. I Year Supplementary Examinations May 2019
Engineering Graphics
(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 top view of a line is 60mm long. The line is parallel to V.P and inclined at 45° to the H.P. One end of the line is 25mm in front of the V.P. and lies in the H.P. Draw its projections and determine the true length.

   b) The front view of a line, parallel to the V.P. and inclined 60° to the H.P., is 50mm long. One end of the line is 20mm in front of the V.P. and 25mm above the H.P. Draw its projections and determine the true length of a line.

OR

2. The major axis of an ellipse is 110mm long and the foci are at a distance of 15mm from its ends. Draw the ellipse, one-half of it by 'concentric circles method' and the other half by 'rectangular method'. Determine the eccentricity of the ellipse.

UNIT–II

3. A line AB, 65mm long, has its end A 20mm above the H.P. and 25mm in front of the V.P. The end B is 40mm above the H.P. and 65mm in front of the V.P. Draw the projections of AB and show its inclinations with the H.P. and the V.P.

OR

4. The end A of a line AB is 10mm in front of the VP and 20mm above the H.P The line is inclined at 30° to the HP and front view is 45° with the xy. Top view is 60mm long. Draw the projections. Find the true length and inclination with the VP. Locate the traces.

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. A pentagonal prism of side of base 25mm and axis 40mm long, is resting on HP on a corner of its base. Draw the projections of the prism, when the base is inclined at 60° to HP and the axis appears to be inclined at 30° to VP. Follow the change if position method

UNIT–IV

7. A hexagonal prism, edge of base 20 mm and axis 50 mm long, rests with its base on H.P such that one of its rectangular faces is parallel to V.P. It is cut by a plane perpendicular to V.P, inclined at 45° to H.P and passing through the right corner of the top face of the prism. Draw the sectional top view and develop the lateral surface of the truncated prism

OR

8. A vertical cone, base diameter 75 mm and axis 100 mm long, is completely penetrated by a cylinder of 45 mm diameter and axis 100 mm long. The axis of the cylinder is parallel to Hp and Vp and intersects axis of the cone at a point 28 mm above the base. Draw projections showing curves of intersection in FV & TV. in I angle projection system

9. a) Draw the isometric projection of a circle of diameter 50mm with its plane horizontal and vertical.

   b) Draw the isometric view of a square prism with the side of the base 40mm and length of the axis 70mm. when its axis is

   i) Vertical   ii) Horizontal.

OR

10. Convert Isometric to Ortho
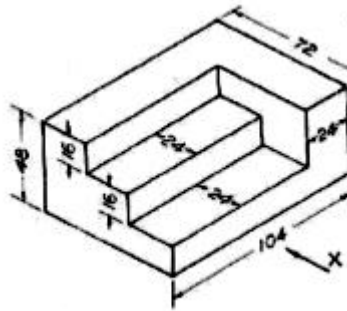
Draw 1)Front View 2) Top View 3) Left Side View

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Code: 4G511

B.Tech. I Year Supplementary Examinations May / June 2019

Engineering Mechanics

(Common to CE & ME)
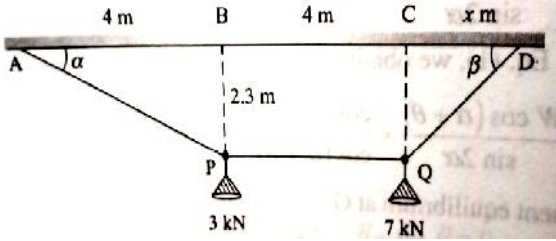
Max. Marks: 70   Time: 3 Hours

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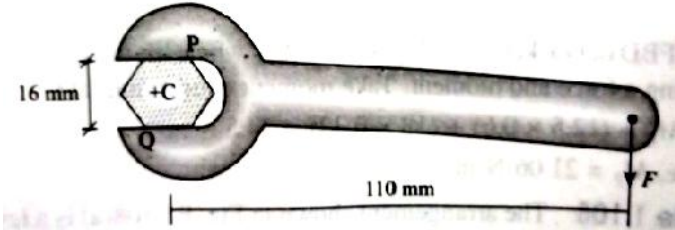
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UNIT–I

1.   Two loads are suspended from flexible cable APQD as shown in fig. Neglecting self-weight of cable, determine the tension in segments AP, PQ, and QD. Also, determine the values of   and x.

OR

2.   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.
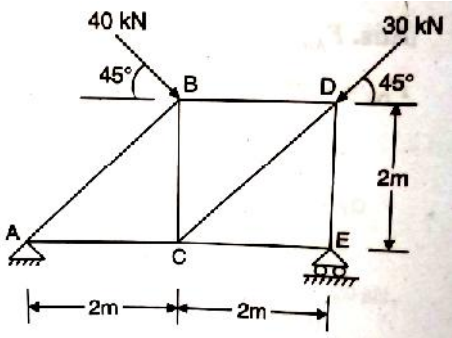

UNIT–II

3.   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.

OR

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

UNIT–III

5. a) Define the following:
   i. Friction
   ii. Angle of friction
   iii. Limiting friction
   iv. Cone of friction

   b) Explain the types of friction with examples.

OR

6. Block-A weighing 240kg resting on rough floor supports block-B weighing 120kg as shown in fig. Both the blocks are connected with a rope passing over a smooth pulley. Compute the magnitude of force P at impending motion and the tension induced in the rope, if the coefficient of friction for all contact surfaces is 0.3.
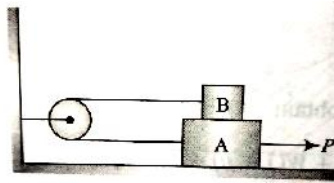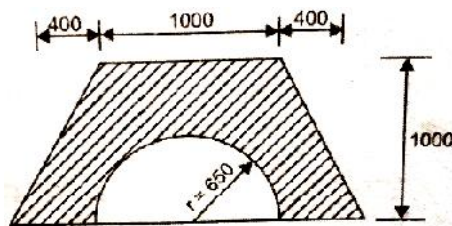

UNIT–IV

7. Find the surface area and volume of a body formed by joining two hemi spheres at the end of cylinder as shown in fig. by using Pappus and Guldinus theorems.
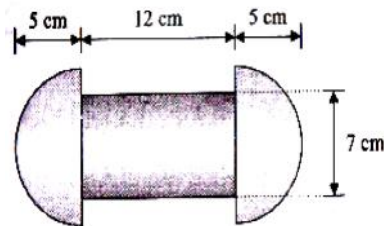
OR

8. The cross-section of a plain concrete culvert as shown in fig. Determine the moment of inertia about the horizontal centroidal axes.

UNIT–V

9. Ram and Rahim are sitting in cars A and B respectively. The cars are 300m apart and at rest. Ram starts the car and moves towards B with an acceleration of 0.5m/s^2. After three seconds, Rahim starts his car towards A with an acceleration of 1m/s^2. Calculate the time and point at which two cars meet with respect to A.

OR

10. The motion of a particle in rectilinear motion is defined by the relation $s = 2t^3 - 9t^2 + 12t - 10$ where s is expressed in meters and t in seconds. Find

   i). The acceleration of the particle when the velocity is zero

   ii). The position and the total distance travelled when the acceleration is zero.

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B.Tech. I Year Supplementary Examinations May 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 interference due to thin films and draw the conditions for constructive and destructive interference.

   b) Distinguish between interference and diffraction of light.

OR

2. Distinguish between gas and solid state lasers with examples.

UNIT–II

3. a) Explain the terms

      (i) Screw and edge dislocations   (ii) Burger's vector.

   b) For a simple cubic lattice find the ratios of interplanar separation $d_{111}:d_{110}:d_{100}$

OR

4. a) With neat diagrams and examples explain the seven crystal systems.

   b) Derive Bragg's law.

UNIT–III

5. a) What are matter waves? Explain their properties.

   b) State and explain de-Broglie's hypothesis of matter waves.

OR

6. Discuss with suitable mathematical expressions, the Kronog-Penney model for the energies of an electron in a metal.

UNIT–IV

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

   b) Classify the magnetic materials into soft and hard based on hysteresis loop.

OR

8. Describe different types of magnetic materials in terms of their spin dipole alignment and its temperature dependence with examples.

UNIT–V

9. Describe the basic principles of Nano materials causing the change in its properties.

OR

10. a) Prove that every super conducting material exhibit the diamagnetic property.

    b) Explain DC and AC Josephson effects and mention I-V characteristics.

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B.Tech. I year Supplementary Examinations May / June 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 $x\dfrac{dy}{dx} + y = \log x$

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

OR

2. a) Find the orthogonal trajectories of the family of cardioids $r = a(1 - \cos_{''})$, where 'a' is the parameter.

    b) Solve $(D^2 - 1)y = x\sin x + e^x$

UNIT–II

3. a) Verify Lagrange's mean value theorem for $f(x) = x^3 - x^2 - 5x + 3$ in $[0,4]$

    b) Find the minimum value of $x^2 + y^2 + z^2$ given that $xyz = a^3$

OR

4. a) Verify Rolle's theorem for the function $\log\left[\dfrac{x^2 + ab}{x(a+b)}\right]$ in $[a,b], a > 0, b > 0$.

    b) If $x + y + z = u, y + z = uv, z = uvw$, then evaluate $\dfrac{\partial(x, y, z)}{\partial(u, v, w)}$

UNIT–III

5. a) Trace the curve $y^2(a - x) = x^3\ (a > 0)$

    b) Evaluate $\displaystyle\int_0^5\int_0^{x^2} x(x^2 + y^2)\,dxdy$

OR

6. a) Trace the curve $r = a(1 + \cos_{''})$

    b) Evaluate $\displaystyle\iint(x^2 + y^2)\,dxdy$ in the positive quadrant for which $x + y \le 1$

UNIT–IV

7. a) Evaluate $L\{e^{2t} + 4t^3 - 2\sin 3t + 3\cos 3t\}$

    b) Find $L\{f(t)\}$, where $f(t)$ is a periodic function of period $2f$ and it is given by $f(t) = \begin{cases} \sin t, 0 < t < f \\ 0 \quad , f < t < 2f \end{cases}$

OR

8. a) Find the Laplace transform of $e^{-3t}(2\cos 5t - 3\sin 5t)$

    b) Find the inverse Laplace transform of $\log\left(\dfrac{s+3}{s+4}\right)$

UNIT–V

9. a) Find the angles between the surface $x^2 + y^2 + z^2 = 9$ and $z = x^2 + y^2 - 3$ at the point $(2, -1, 2)$

    b) If $\overline{f} = (5xy - 6x^2)\overline{i} + (2y - 4x)\overline{j}$, evaluate $\displaystyle\int_c \overline{f}.d\overline{r}$ along the curve 'c' in xy-plane $y = x^3$ from (1,1) to (2,8).

OR

10.   (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 $\overline{f} = grad(x^3 + y^3 + z^3 - 3xyz)$.

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Code: 4G113

B.Tech. I Year Supplementary Examinations May / June 2019
Programming in C Introduction to Data Structures
(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 Central Processing Unit (CPU) in a computer? Explain about various components and their functions of CPU.

    b) What is an integer constant, floating constant and character constant? Give valid examples.

OR

2. a) What are the steps involved in program development process? Explain.

    b) Describe the Structure of a C Program.

UNIT–II

3. a) Write a program to find the factorial of a given number

    b) Explain the following string handling functions with examples:

    (i) strcpy( )   (ii) strcat( )   (iii) strrev( )   (iv) strlen

OR

4. a) What are the relational operators? Explain with examples.

    b) What is an array? Write a C program to accept elements into a one dimensional array.

UNIT–III

5. a) Explain dynamic memory allocation with examples

    b) What is a pointer? What are the features of pointers? Write a C program to print address of a variable

OR

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

    b) Write a c program to swap two numbers using call by value and call by reference.

UNIT–IV

7. a) Write C programs that use recursive functions to perform the linear searching operations for a Key value in a given list of integers

    b) What is a FILE? Explain the formatted input and output functions and give examples

OR

8. a) Write a program to copy content of existing file to another file.

    b) Write a C program to sort integer numbers using selection sort.

UNIT–V

9.   Write a 'C' program to implement the stack operations using arrays.

OR

10.   Write a C program to implement the operation of circular queue.

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