

**Code: 4GC14**

B.Tech. I Year Supplementary Examinations May 2018

**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  $\frac{dy}{dx} + \frac{y}{x \log x} = \frac{\sin 2x}{\log x}$  7M
- b) Prove that the system of confocal and coaxial parabolas  $y^2 = 4a(x+a)$  is self Orthogonal 7M

**OR**

2. a) Solve  $(D^2 - 4D + 3)y = \sin 3x \cos 2x$  7M
- b) Solve  $(D^2 + 1)y = \operatorname{cosec} x \cot x$  by the method of variation of Parameter 7M

**UNIT-II**

3. a) Expand  $\log(1+e^x)$  in ascending powers of  $x$  7M
- b) If  $u = \frac{x+y}{1-xy}$ ,  $V = \tan^{-1} x + \tan^{-1} y$  then find  $\frac{\partial(u,v)}{\partial(x,y)}$  7M

**OR**

4. a) Examine the function for extreme values  $f(x, y) = x^4 + y^4 - 2x^2 + 4xy - 2y^2$  7M
- b) Find the volume of the largest rectangular parallelepiped that can be inscribed in ellipsoid  $\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$  7M

**UNIT-III**

5. Trace the curve  $9ay^2 = (x-2a)(x-5a)^2$  14M

**OR**

6. a) Evaluate  $\int_0^a \int_0^{\sqrt{a^2-y^2}} \sqrt{a^2-x^2-y^2} dx dy$  7M
- b) Evaluate  $\int_0^1 \int_y^1 \int_0^{1-x} x dz dx dy$  7M

**UNIT-IV**

7. a) Find the Laplace Transforms of i)  $\sin 2t \sin 3t$  ii)  $L \left\{ e^t \left( \cos 2t + \frac{\sinh 2t}{2} \right) \right\}$  7M
- b) Using convolution theorem find  $L^{-1} \left\{ \frac{s}{(s^2+1)(s^2+4)} \right\}$  7M

**OR**

8. Using Laplace transform solve  $(D^2 + 2D - 3)y = \sin x$  if  $y(0) = y'(0) = 0$ . 14M

**UNIT-V**

9. a) Find the directional derivative of  $2xy + z^2$  at  $(1, -1, 3)$  in the direction of  $\vec{i} + 2\vec{j} + 3\vec{k}$ . 7M

b) Show that  $\text{Curl grad } f = 0$  where  $f$  is a scalar point function

7M

**OR**

10. Verify Green's theorem for  $\int_C [(xy + y^2)dx + x^2 dy]$  where  $C$  is bounded by  $y = x$  and  $y = x^2$

14M

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**R-14**

**Code: 4GC13**

B.Tech. I Year Supplementary Examinations May/June 2018

**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) Comment on hardness of water and mention any one of the method for estimation of hardness of water. 7M
- b) What are boiler troubles? Write a note on disadvantages of boiler troubles. 7M

**OR**

2. a) Explain the treatment of saline water by reverse osmosis in detail. 7M
- b) Write any one of the methods for purification of lake water for domestic purpose and comment on break point chlorine. 7M

**UNIT-II**

3. a) What are fuel cells? Write the working procedure for H<sub>2</sub>-O<sub>2</sub> fuel cell 7M
- b) Write a note on lead-acid batteries with chemical reactions involving. 7M

**OR**

4. a) Explain any two methods for prevention of corrosions. 7M
- b) Explain the factors which effect the corrosion. 7M

**UNIT-III**

5. a) Differentiate between thermoplastics and thermosetting plastics 7M
- b) Write a brief notes on Vulcanization and compounding of rubber 7M

**OR**

6. a) What are conducting polymers? Explain the synthesis, mechanism and applications of polyacetylene. 7M
- b) Describe the preparation, properties and engineering applications of Buna-S and Buna-N rubbers 7M

**UNIT-IV**

7. a) Explain the classification of fuels and write the characteristics for good fuel 7M
- b) Explain Otto Hoffmann's by product oven process 7M

**OR**

8. a) Explain the following 7M
  - i) Knocking
  - ii) Octane number
  - iii) Cetane number
- b) Compare the liquid fuels with gaseous fuels. 7M

**UNIT-V**

9. a) What is Portland cement? Describe the manufacture of Portland cement by wet method. 7M
- b) What is setting and hardening of cement? Explain various reactions involved in setting and hardening of cement 7M

**OR**

10. a) What are lubricants? Discuss any three properties of lubricants. 7M
- b) What are refractories? Discuss any three properties of refractories. 7M

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**UNIT-III**

5. a) What do you mean by friction? What is limiting friction? 7M  
 b) A body weighing 20kN resting on a rough horizontal plane can just be moved by a horizontal force of 5kN. Determine the co-efficient of friction and the total friction. 7M

**OR**

6. a) Prove that the angle of repose is equal to the angle of friction. 7M  
 b) State the laws of friction. 7M

**UNIT-IV**

7. a) Define centroid of area and centre of gravity of a body 7M  
 b) Determine the C.G. of a uniform triangular lamina 7M

**OR**

8. a) What do you mean by mass moment of inertia and moment of inertia of an area 7M  
 b) Determine the least and greatest moment of inertia of an inverted T-section. 45cmX60cmX15cm. 7M

**UNIT-V**

9. a) Define  
 (i) Speed, (ii) displacement, (iii) velocity, (iv) acceleration.  
 What is the difference between speed & velocity? 7M

- b) Establish with usual notations the formula  $s = ut + \frac{1}{2}at^2$  7M

**OR**

10. a) Define work, power and energy? Derive a formula for K.E. of a body. 7M  
 b) When velocity of a body is 750m/sec, it possesses a kinetic energy of 2200kJ. How much kinetic energy it will lose when its velocity comes down to 500m/sec 7M

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**R-14**

**Code: 4G512**

B.Tech. I Year Supplementary Examinations May 2018

**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) Construct an ellipse when its major axis is 90mm and minor axis is 55mm by concentric circle method. 7M
- b) A ball thrown from the ground level reaches a maximum height of 5 m and travels a horizontal distance of 11 m from the point of projection. Trace the path of the ball [Rectangle method] 7M

**OR**

- 2. a) Draw the projections of the following points on a common reference line:
  - i. P, 25 mm below the HP and in the VP.
  - ii. Q, 40 mm behind the VP and in the HP
  - iii. R, 30 mm below the HP and 30 mm in front of the VP
  - iv. S, 25mm above the HP and 25 mm behind the VP
  - v. T, 25 mm above the HP and 30 mm in front of the VP
  - vi. U, in both the VP and HP
  - vii. V, 35 mm below the HP and 30 mm behind the VP. 7M
- b) The end P of a line 60 mm long is 15 mm above the HP and 15 mm in front of the VP. The line is parallel to the HP and inclined to the VP. The length of the elevation is 40 mm. Draw the projections of the line and find the inclination of the line with the VP. 7M

**UNIT-II**

- 3. a) A line PQ has its ends 10 mm and 45 mm above the HP and the length of its front view is 70 mm. the line is inclined at 25° to the HP. The HT of the line is 15 mm in front of the VP. Draw the projections of the line and find its true length and true inclinations with the VP. Also show its VT. 7M
- b) A circular lamina of diameter 60 mm is held vertical with its surface inclined at 45° to the VP. Its centre is 40 mm above the HP and 30 mm in front of the VP. Draw its top and front views and also its traces. 7M

**OR**

- 4. a) The mid-point of a straight line AB is 60 mm above the HP and 50 mm in front of the VP. The line measures 80 mm long and inclined at 30° to HP and 45° to VP. Draw its projections. 7M
- b) A hexagonal plate of side 35 mm rests on the HP on one of its sides perpendicular to the VP. Draw its projections when its surface is inclined at 50° to the HP. Also show its traces. 7M

## UNIT-III

5. Draw the projections of a cone, base 30 mm diameter and axis 50 mm long, resting on HP on a point of its base circle with the axis making an angle of  $45^\circ$  with HP and its top view making an angle of  $30^\circ$ . 14M

OR

6. A sphere of 60 mm diameter rests on HP. It is cut by a section plane perpendicular to VP and inclined at  $60^\circ$  to HP. The section plane passing through a point on the surface of the sphere at a distance of 20 mm from its bottom and on the left side. Draw the sectional top view and true shape of the section. 14M

## UNIT-IV

7. A right circular cone of base 60 mm diameter and 60 mm height stands vertically with its base on HP. A semi-circular hole of 36 mm diameter is cut through the cone such that the axis of the hole is parallel to HP, perpendicular to VP and intersecting the axis of the cone 20 mm above the base. The flat surface of the hole is parallel to HP and perpendicular to VP. Draw the development of the lateral surface of the cone with the hole. 14M

OR

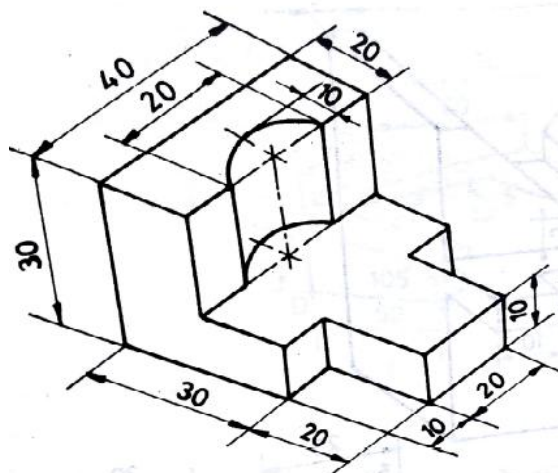
8. A cone of base 60 mm diameter and axis 70 mm long, rests with its base on HP. It is completely penetrated by a horizontal cylinder of 30 mm diameter such that both the axes intersect each other at right angles. The axis of the cylinder is parallel to VP and 20 mm above the base of the cone. Draw the Projections of the solids showing the curves of intersection. 14M

## UNIT-V

9. The frustum of a cone has its top and bottom diameters 35 mm and 50 mm respectively and altitude 53 mm. It rests in the top face of the frustum of a square pyramid. The sides of the top and bottom faces of the pyramid are 58 mm and 70 mm respectively. The height is 22 mm. Draw the isometric view. 14M

OR

10. Draw the front view, Top view and Side view of the object shown in figure below.



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14M

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**R-14**

**Code: 4GC12**

B.Tech. I Year Supplementary Examinations May/June 2018

**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) Derive the expression of wave length of monochromatic light using Newton's rings setup? 11M  
b) A parallel beams of light with wavelength  $5893\text{\AA}$  is incident on a glass plate ( $\mu=1.5$ ) such that an angle of refraction into plate is  $60^\circ$ . Calculate the smallest thickness of the plate which will make it appear dark by reflection. 3M

**OR**

2. a) With the help of suitable diagram, explain the construction and working of Ruby laser. 10M  
b) Mention the applications of lasers in different fields 4M

**UNIT-II**

3. Derive the packing fractions for SC, BCC and FCC. Show that FCC is the most closely packed of three cubic structures.. 14M

**OR**

4. a) Explain the working and construction of piezoelectric method of ultrasonic wave production. 10M  
b) Explain the different detection methods of Ultrasonic waves. 4M

**UNIT-III**

5. a) Show that the energies of a particle in a potential box are quantized. 10M  
b) Explain the Physical significance of wave function. 4M

**OR**

6. a) What are the salient features of classical free electron theory? Mention its merits and demerits. 7M  
b) On the basis of band theory, explain how the solids are classified into metals, semiconductors and insulators. 7M

**UNIT-IV**

7. a) Distinguish between intrinsic and extrinsic semiconductors. 4M  
b) Explain the I-V characteristics of p-n Junction diode. 6M  
c) Explain the direct and indirect band gap semiconductor 4M

**OR**

8. a) Explain Hysteresis Curve. 7M  
b) Distinguish between soft and hard magnetic materials 7M

**UNIT-V**

9. a) What is a superconductor? Write the general properties of superconductors 6M  
b) Explain the BCS theory of Superconductivity in detail. 8M

**OR**

10. a) Describe the method of chemical vapour deposition in nano materials preparation 6M  
b) Write the optical, thermal, mechanical and magnetic properties of Nanomaterials. 8M

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<b>R-14</b>
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**Code: 4G113**

B.Tech. I Year Supplementary Examinations May 2018

**Programming in C & 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) Explain the importance of computer system? 8M
- b) Write an algorithm and flowchart on simple interest 6M

**OR**

- 2. a) Explain the structure of C programming with simple example 4M
- b) Write a program on calculating area and perimeter of square and rectangle. 10M

**UNIT-II**

- 3. a) Define an Array? Write a c program on display 10 numbers using an array 7M
- b) Write a C program to check whether the given number is Divisible by 3 or not 7M

**OR**

- 4. a) Write a C program to find whether the given Character is alphabet, Digit or any other 7M
- b) Write a C program to perform multiplication of two matrices 7M

**UNIT-III**

- 5. Define a recursive function? Write a C program to find the factorial of a given integer using recursive function 14M

**OR**

- 6. How to create dynamic memory allocation with suitable example 14M

**UNIT-IV**

- 7. a) Write a C program to write data to text file and read it 7M
- b) Write a c program on Quick sort? 7M

**OR**

- 8. a) What are the string manipulation functions? Write a c program to find length of the given string 7M
- b) Write a c program on Binary Search 7M

**UNIT-V**

- 9. Write a C Program to implement Queue using arrays 14M

**OR**

- 10. Write a C program to convert infix expression to postfix expression 14M

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