

Hall Ticket Number :

**R-15**

**Code: 5GC12**

*I B.Tech. I Semester Supplementary Examinations June 2017*

**Engineering Chemistry**

(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 short notes on
- i) Colloidal conditioning 7M
  - ii) Calgon conditioning 7M
- b) Explain the "Chlorinator" used in purification of drinking water. 7M

**OR**

2. a) Give a detailed account on Caustic embrittlement 7M
- b) Write short notes on Boiler corrosion. How it can be prevent? 7M

**UNIT-II**

3. Explain the following
- a) Galvanic corrosion. 7M
  - b) Concentration cell corrosion 7M

**OR**

4. a) Write briefly about primary cells and secondary cells. 7M
- b) Explain the construction and functioning of the Nickel-cadmium battery. 7M

**UNIT-III**

5. a) Write the following Thermoplastic & Thermosetting resins. 7M
- b) Distinguish between addition & condensation polymerization. 7M

**OR**

6. How polyaniline and polyacetylene acts as conducting polymers? Explain the mechanism of conduction of electrons through the polymers 14M

**UNIT-IV**

7. a) How are Octane number and Cetane number related to chemical composition and molecular structure of fuel? 7M
- b) How would you explain the chemistry of manufacture of water gas? 7M

**OR**

8. a) Examine the various constituents that are normally present in petroleum crude. 4M
- b) Illustrate the function of petroleum refineries in processing crude petroleum. 10M

**UNIT-V**

9. a) Define Lubricant? Give the functions of Lubricants. 7M
- b) Write short notes on extreme – Pressure Lubrication. 7M

**OR**

10. Give an account of flash and fire point of a Lubricant. Describe the determination of flash point by Penskey-Marten's method. 14M

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Code: 5G512

I B.Tech. I Semester Supplementary Examinations June 2017

**Engineering Graphics-I**

( Common to CE &amp; ME )

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. Two points A and B are 100 mm apart. A point C is 75 mm from A and 60 mm from B. Draw an ellipse passing through A, B and C. 14M

**OR**

2. Draw a rectangle having its sides 125 mm and 75 mm long. Inscribe two parabolas in it with their axes bisecting each other. 14M

**UNIT-II**

3. Show by means of a drawing that when the diameter of the directing circle is twice that of generating circle, the hypocycloid is a straight line. Take the diameter of the generating circle equal to 50 mm. 14M

**OR**

4. An inelastic string 145 mm long has its one end attached to its circumference of a circular disc of 40 mm diameter. Draw the curve traced out by the other end of the string, when it is completely wound around the disc, keeping the string always tight. 14M

**UNIT-III**

5. A line AB inclined at  $40^\circ$  to the V.P. has its ends 50 mm and 20 mm above the H.P. The length of its front view is 65 mm and its V.T. is 10 mm above the H.P. Determine the true length of AB, its inclination with the H.P. and its H.T. 14M

**OR**

6. The front view of a line AB measures 65 mm and makes an angle of  $45^\circ$  with xy. A is in the H.P. and the V.T. of the line is 15 mm below the H.P. The line is inclined at  $30^\circ$  to the V.P. Draw the projections of AB and find its true length and inclination with the H.P. Also locate its H.T. 14M

**UNIT-IV**

7. A circular plate of negligible thickness and 50 mm diameter appears as an ellipse in the front view having its major axis 50 mm and minor axis 30 mm long. Draw its top view when the major axis of the ellipse is horizontal. 14M

**OR**

8. A thin  $30^\circ$ - $60^\circ$  set-square has its longest edge in the V.P. and inclined at  $30^\circ$  to the H.P. Its surface makes an angle of  $45^\circ$  with the V.P. Draw its projections. 14M

**UNIT-V**

9. A thin regular pentagonal plate of 60 mm long edges has one of its edges in the H.P. and perpendicular to V.P. while its farthest corner is 60 mm above the H.P. Draw the projections of the plate. Project another front view on an A.V.P. making an angle of  $45^\circ$  with the V.P. 14M

**OR**

10. The top view of a 75 mm long line AB measures 65 mm, while the length of its front view is 50 mm. It's one end A is in the H.P. and 12 mm in front of the V.P. Draw the projections of AB and determine its inclinations with H.P. and V.P. using auxiliary plane method. 14M

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**Code: 5GC14**

I B.Tech. I Semester Supplementary Examinations June 2017

**Engineering Mathematics-I**

( Common All Branches )

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) Solve  $(x + 2y^3) \frac{dy}{dx} = y$  7M

b) Find the orthogonal trajectories of the family of confocal conics

$$\frac{x^2}{a^2} + \frac{y^2}{b^2 + \lambda} = 1$$
 where  $\lambda$  is the parameter 7M

**OR**

2. a) Solve  $\frac{dy}{dx} = \frac{y}{x + \sqrt{xy}}$  7M

b) A body originally at  $80^\circ C$  cools down to  $60^\circ C$  in 20 minutes, the temperature of the air being  $40^\circ C$ . What will be the temperature of the body after 40 minutes from the original? 7M**UNIT-II**

3. a) Solve  $\frac{d^2y}{dx^2} - 3\frac{dy}{dx} + 2y = e^{3x}$  7M

b) In an L.C.R circuit the charge  $q$  on a plate of a condenser is given by

$$L \frac{d^2q}{dt^2} + R \frac{dq}{dt} + \frac{q}{C} = E \sin pt$$
 the circuit is turned to resonance so that

$$p^2 = \frac{1}{LC}$$
 find the current  $i$  7M

**OR**

4. a) Solve  $\frac{d^2y}{dx^2} - 6\frac{dy}{dx} + 25y = e^{2x} + \sin x + x$  7M

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

**UNIT-III**

5. a) Solve in series the equation  $\frac{d^2y}{dx^2} + x^2 y = 0$  7M

b) Verify Rolle's theorem for  $f(x) = (x-a)^m (x-b)^n$  where  $m, n$  are positive integers in  $[a, b]$ . 7M**OR**

6. a) Solve in series the equation  $(1-x^2) \frac{d^2y}{dx^2} - x \frac{dy}{dx} + 4y = 0$  7M

b) Expand  $e^{a \sin^{-1} x}$  in ascending powers of  $x$  7M

<b>UNIT-IV</b>
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7. a) Find first and second partial derivatives of  $f(x, y) = ax^2 + 2hxy + by^2$  and  
 verify  $\frac{\partial^2 f}{\partial x \partial y} = \frac{\partial^2 f}{\partial y \partial x}$  7M
- b) Find the maximum and minimum values of  $x^3 + 3xy^2 - 15x^2 - 15y^2 + 72x$  7M

**OR**

8. a) If  $u = x^2 - 2y$ ,  $v = x + y + z$ ,  $w = x - 2y + 3z$ , find  $\frac{\partial(u, v, w)}{\partial(x, y, z)}$  7M
- b) Find the dimensions of the rectangular box, open at the top, of maximum capacity whose surface is 432 sq.cm. 7M

<b>UNIT-V</b>
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9. Trace the curve  $y^2(a - x) = x^3$ ,  $a > 0$  14M
- OR**
10. Trace the curve  $r = a \sin 3\theta$ , 14M

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**Code: 5G511**

I B.Tech. I Semester Supplementary Examinations June 2017

**Engineering Mechanics - Statics**

( Common to CE & ME )

Max. Marks: 70

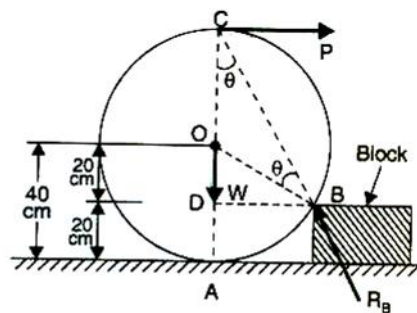
Time: 3 Hours

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

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**UNIT-I**

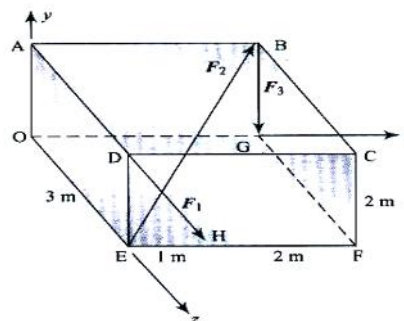
1. a) State the Varignon's principle. Also give the proof of Varignon's principle. 6M
- b) A roller of radius 40 cm, weighing 3000 N is to be pulled over a rectangular block of height 20 cm as shown in figure, by a horizontal force applied at the end of a string wound round the circumference of the roller. Find the magnitude of the horizontal force which will just turn the roller over the corner of the rectangular block. Also determine the magnitude and direction of reactions at A and B. All surfaces may be taken as smooth.



8M

**OR**

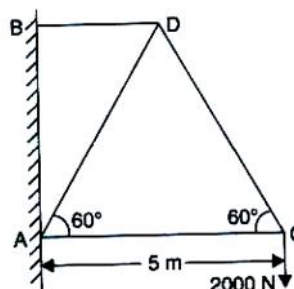
2. The forces  $F_1$ ,  $F_2$  and  $F_3$  act on the box as shown in figure. Determine the resultant of the forces. The magnitude of the given forces are 19 N, 23 N and 46 N respectively.



14M

**UNIT-II**

3. a) What is a frame? State the difference between a perfect frame and an imperfect frame. 4M
- b) Determine the forces in all the members of a cantilever truss shown in figure.



10M

**OR**

4. A simply supported beam AB is subjected to a distributed load increasing from 1500 N/m to 4500 N/m from end A to end B respectively. The span AB = 6 m. Determine the reactions at the supports.

14M

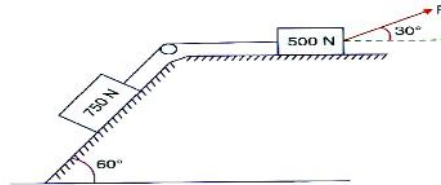
## UNIT-III

5. A uniform ladder of length 10 m and weighing 20 N is placed against a smooth vertical wall with its lower end 8 m from the wall. In this position the ladder is just to slip. Determine (i) The co-efficient of friction between the ladder and the floor and (ii) Frictional force acting on the ladder at the point of contact between ladder and floor.

14M

OR

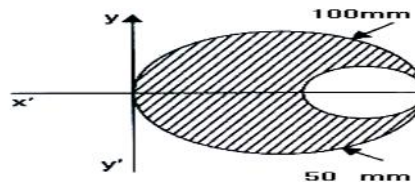
6. a) State the laws of static and dynamic friction. 4M  
 b) What is the value of P in the system shown in figure to cause the motion of 500 N block to the right side? Assume the pulley is smooth and the coefficient of friction between other contact surfaces is 0.20.



10M

## UNIT-IV

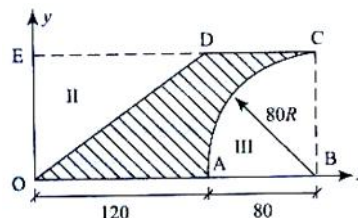
7. a) State and explain Pappus and Guldinus theorems. 6M  
 b) From a circular plate of diameter 100 mm a circular part of diameter 50 mm is cut as shown in figure. Find the centroid of the remainder.



8M

OR

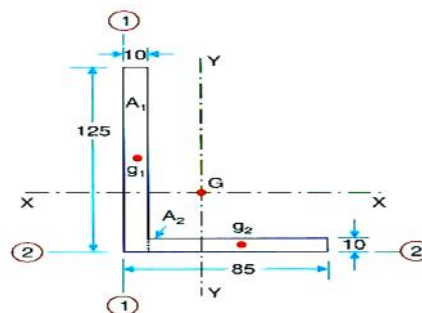
8. Determine the location of centroid of the composite figure as shown in figure. All dimensions are in mm.



14M

## UNIT-V

9. a) State the theorem of perpendicular axis. How will you prove this theorem? 6M  
 b) Determine the moment of inertia of the L-section shown in the figure about its centroidal axes parallel to the legs. All dimensions are in mm.



8M

OR

10. A brass cone with base diameter of 400 mm and height of 225 mm is placed on a vertical aluminium cylinder of height 300 mm and diameter 400 mm. Density of brass =  $85 \text{ kN/m}^3$  and density of aluminium =  $25.6 \text{ kN/m}^3$ . Determine the mass moment of inertia of the composite body about the vertical geometrical axis.

14M

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Hall Ticket Number :									
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<b>R-15</b>
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**Code: 5GC11**

I B.Tech. I Semester Supplementary Examinations June 2017

**English through Literature**

( Common All Branches )

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. Estimate G.B. Naidu's contribution to the field of science. 14M

**OR**

2. a) How does the poet describe nature in "The Road not Taken"? 7M  
b) Assess the character of Cabuliwala. 7M

**UNIT-II**

3. a) Give the summary of Rudyard Kipling's poem "If". 7M  
b) In what way Sudha Murthy's life remain exemplary? 7M

**OR**

4. Critically analyse the story "A Dog's Tale" 14M

**UNIT-III**

5. Justify the title of the story " Gift of Magi" 14M

**OR**

6. a) Appreciate the poem "Leisure" 7M  
b) Write a note on Vijay Bhatkar 7M

**UNIT-IV**

7. a) Compare the attitude of father with that of peasants in "Night of the Scorpion"? 7M  
b) Estimate the contribution of Bose to the field of science 7M

**OR**

8. Examine the role of fate in "An Astrologer's Day" 14M

**UNIT-V**

9. Critically appreciate Chekhov's play "The Proposal" 14M

**OR**

10. Who is Homi Jehanghir Baba? Briefly discuss the various positions he held, institutions he established and awards he received and contributions he made to the development of India. 14M

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Hall Ticket Number :

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**R-15**

**Code: 5G111**

I B.Tech. I Semester Supplementary Examinations June 2017

**Problem solving Techniques and Introduction to C programming**

( Common to All Branches )

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) What is the role of Debugging programs in implementation of algorithms? 6M  
b) Define Flow Chart? Draw a flow chart to read 50 numbers and print their sum. 8M

**OR**

2. a) What is the need of Computer Language? Describe different computer languages in detail. 7M  
b) Does the use of Procedures will emphasize modularity of the program? Justify. 7M

**UNIT-II**

3. a) List and explain various Bitwise Operators with suitable examples. 6M  
b) What are the rules to be followed in naming a variable? 8M

**OR**

4. a) What is a data type? Write in brief about the data types in C. 6M  
b) Illustrate about various input and output statements in C. 8M

**UNIT-III**

5. a) Differentiate break and continue with a suitable example. 5M  
b) Write code segments for displaying numbers from 1 to 10 using While, do ..while, and for statements. 9M

**OR**

6. a) Illustrate multi way selection statement with sample c code. 7M  
b) Write a C program to find the given number is palindrome or not. 7M

**UNIT-IV**

7. a) Write a C program to find the maximum element in an array. 7M  
b) Write a C program to find the occurrence of a substring in a given string. 7M

**OR**

8. What is an Array? How to declare two dimension array? Write a C program to perform multiplication of two matrices. 14M

**UNIT-V**

9. a) Compare library functions and user-defined functions. 7M  
b) Write a C program which uses a recursive function to evaluate,  
 $F(x) = x - x^3/3! + x^5/5! - x^7/7! + \dots$  7M

**OR**

10. What are the storage classes in C? Explain their usage with suitable examples. 14M

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