

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)

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)

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 H₂-O₂ 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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R-14

Code: 4G511

B.Tech. I Year Supplementary Examinations May 2018

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)

UNIT-I

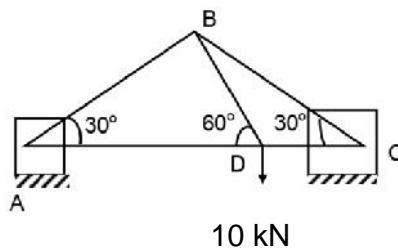
1. a) What do you mean by co-polar concurrent forces? State the theorem of parallelogram of forces 7M
- b) P and Q are two collinear forces. When they act in opposite directions, their resultant is 34N, when they act at right angles to each other their resultant is 50N. Find P and Q. 7M

OR

2. a) What is the physical significance of moment? Define couple 7M
- b) A uniform beam 4.8m long and weighing 15kN rests on two supports. The maximum weight which can be hung at one end without upsetting the beam is 25kN. Find the position of the support nearest to the weight 7M

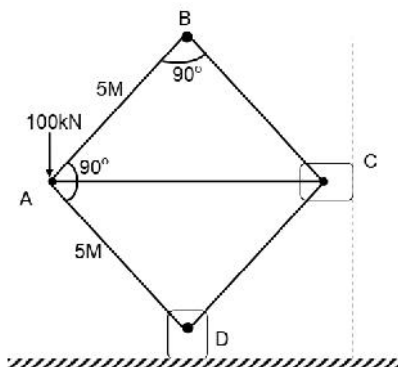
UNIT-II

3. a) What is a framed structure? What assumptions are made while determining stresses in a framed structure? 7M
- b) Determine the stress in each member of the truss loaded as shown below in figure.



OR

4. a) What do you mean by perfect frame, deficient frame, redundant frame 7M
- b) Determine the forces in each members of the plane truss loaded and supported as shown in figure.



7M

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

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° with HP and its top view making an angle of 30° . 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° 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

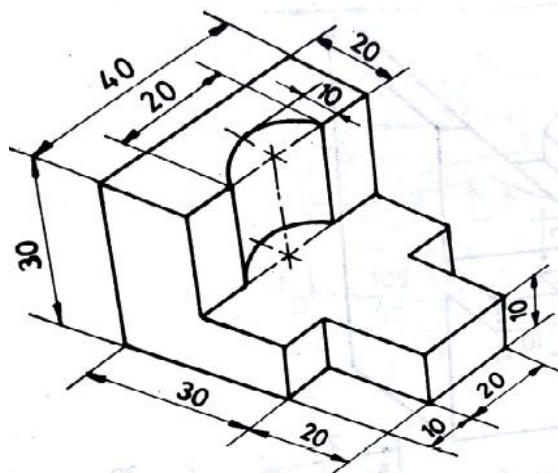
8. A cone of base 60 mm diameter and axis 70 mm long, rests with its base on HP. It is completely penetrated by a horizontal cylinder of 30 mm diameter such that both the axes intersect each other at right angles. The axis of the cylinder is parallel to VP and 20 mm above the base of the cone. Draw the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



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)

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\AA is incident on a glass plate ($\mu=1.5$) such that an angle of refraction into plate is 60° . 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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R-14

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)

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
