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R-14

Code: 4G513

B.Tech. I Year Supplementary Examinations May 2018

Engineering Drawing

(Common to EEE, ECE, 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)

UNIT-I

1. Two straight lines OA and OB make an angle of 75° between them. P is a point 40 mm from OA and 50 mm from OB. Draw a hyperbola through P, with OA and OB as asymptotes, marking at least ten points. 14M

OR

2. A circle of 50 mm diameter rolls on the circumference of another circle of 175 mm diameter and outside it. Trace the locus of a point on the circumference of the rolling circle for one complete revolution. Name the curve. Draw a tangent and a normal to the curve at a point 125 mm from the center of the directing circle. 14M

UNIT-II

3. a) A point P is 15 mm above the H.P. and 20 mm in front of the V.P. Another point Q is 25 mm behind the V.P. and 40 mm below the H.P. Draw projections of P and Q keeping the distance between their projectors equal to 90 mm. Draw straight lines joining (i) their top views and (ii) their front views. 7M
- b) The front view of a line, inclined at 30° to the V.P. is 65 mm long. Draw the projections of the line, when it is parallel to and 40 mm above the H.P., its one end being 30 mm in front of the V.P. 7M

OR

4. The front view of a line AB measures 65 mm and makes an angle of 45° 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° to the V.P. Draw the projections of AB and find its true length and inclination with H.P. Also locate its H.T. 14M

UNIT-III

5. Draw a regular hexagon of 40 mm side, with it two sides vertical. Draw a circle of 40 mm diameter in its center. The figure represents a hexagonal plate with a hole in it and having its surface parallel to the V.P. Draw its projections when the surface is vertical and inclined at 30° to the V.P. Assume the thickness of the plate to be equal to that of a line. 14M

OR

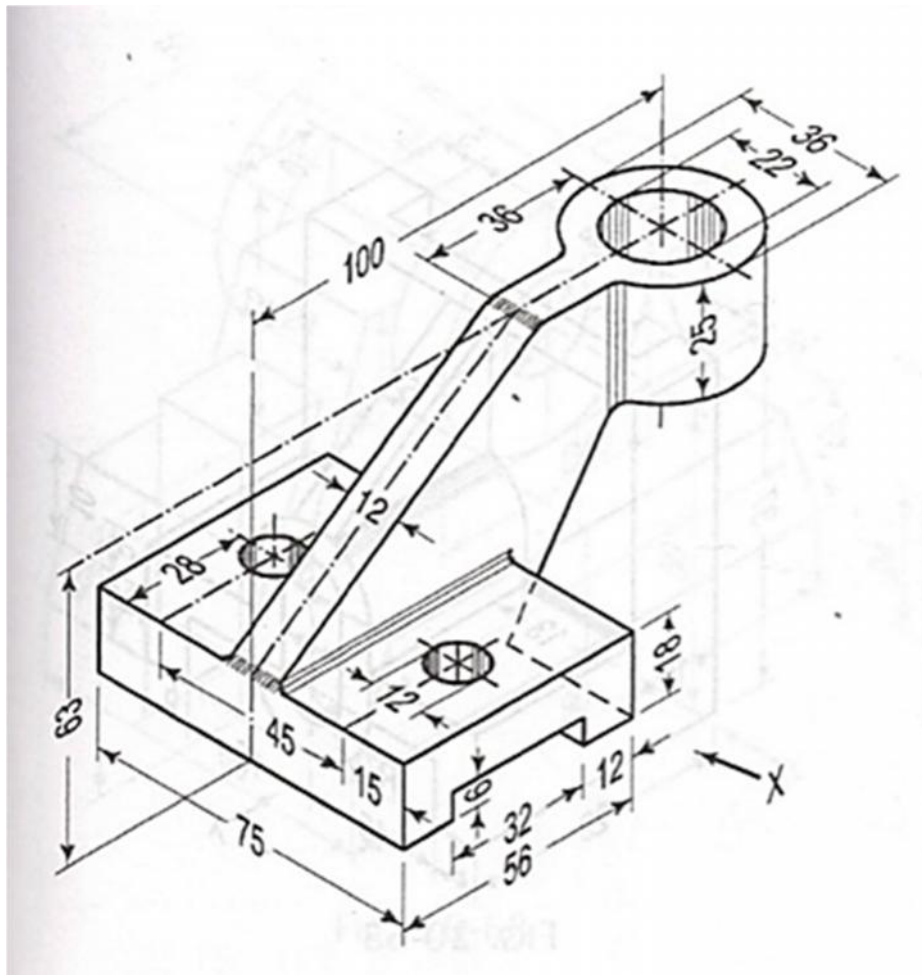
6. A plate having shape of an isosceles triangle has base 50 mm long and altitude 70 mm. It is so placed that in the front view it is seen as an equilateral triangle of 50 mm sides and one side inclined at 45° to xy. Draw its top view. 14M

UNIT-IV

7. A square pyramid, base 40 mm side and axis 90 mm long, has a triangular face on the ground and the vertical plane containing the axis makes an angle of 45° with the V.P. Draw its projections. 14M
- OR**
8. Draw the projections of a cone, base 45 mm diameter and axis 50 mm long. When it is resting on the ground on a point on its base circle with the axis making an angle of 30° with the H.P. and 45° with the V.P. 14M

UNIT-V

9. A square pyramid base 40 mm side and axis 65 mm long, has its base on the H.P. and all the edges of the base equally inclined to the V.P. It is cut by a section plane, perpendicular to the V.P., inclined at 45° to the H.P. and bisecting the axis. Draw isometric projection of the retained part. 14M
- OR**
10. Draw front view, left side view and top view of the given isometric view. 14M



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: 4G111

B.Tech. I Year Supplementary Examinations May 2018

Programming in C & Datastructures

(Common to CSE & IT)

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 about Software Development Life Cycle.
b) What is an algorithm and flowchart and describe the various symbols in flowchart. Draw a flowchart for adding two numbers

OR

2. a) Explain the structure of a "C" programming language
b) Explain the "C" input and output library functions.

UNIT-II

3. Explain about operators in C programming language.

OR

4. Write the syntax for various control statements and give example for each control statement.

UNIT-III

5. a) What is parameter pass by value and pass by reference in functions? Write a program to exchange the values of two variables using functions in both methods
b) What is a pointer and write syntax for pointer declaration.

OR

6. a) Explain pointers to functions and command line arguments with examples
b) Explain about storage classes in C.

UNIT-IV

7. Explain nested structures and array of structures.

OR

8. a) Write and explain selection sort program with example
b) Write and Explain linear search method with example

UNIT-V

9. a) Explain infix, prefix and postfix notations. Give an example converting from one form to other forms
b) Write a program for insertion, deletion and searching of an item in the tree data structure.

OR

10. a) Define Stack and Queue and explain their operations.
b) Explain about insertion in Singly Linked List.

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R-14

Code: 4GC15

B.Tech. I Year Supplementary Examinations May 2018

Mathematical Methods

(Common to CSE & IT)

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) Define rank of a matrix and Find the rank of the following matrix

$$A = \begin{bmatrix} 2 & 1 & -7 & 14 \\ -6 & -3 & 19 & -38 \\ 1 & 0 & -3 & 6 \\ 2 & 1 & -6 & 12 \end{bmatrix}$$

7M

b) Investigate for consistency of the following equations and if possible find the solution $4x - 2y + 6z = 8, x + y - 3z = -1, 15x - 3y + 9z = 21$

7M

OR

2. a) Find Eigen values and Eigenvectors of a matrix, $A = \begin{bmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{bmatrix}$

7M

b) Verify Cayley-Hamilton theorem for the matrix A and find its inverse

$$A = \begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$$

7M

UNIT-II

3. a) Reduce the Quadratic form $3x^2 + 5y^2 + 3z^2 - 2yz + 2zx - 2xy$ to the canonical form by an orthogonal reduction

9M

b) Find the nature, signature and index of the quadratic form $x_1^2 + 2x_2^2 - 3x_3^2$

5M

OR

4. a) Define complex matrices and give examples for each

6M

b) Express $A = \begin{bmatrix} 2i & 2+i & 1-i \\ -2+i & -i & 3i \\ -1-i & 3i & 0 \end{bmatrix}$ as $P+iQ$ where P is real and skew-symmetric and Q is real and symmetric

8M

UNIT-III

5. a) Find a real root of the equation $\cos x = xe^x$ using the Bisection method correct to three decimal places

7M

b) Find the positive root of the equation $x^4 - x = 10$ correct to three decimal places, using Newton-Raphson method

7M

OR

6. a) Find the cubic polynomial which takes the following values, hence find $f(4)$

x	0	1	2	3
f(x)	1	2	1	10

7M

- b) Apply Lagrange's method to find the value of $f(x)$ when $x=3$ for the data

x	0	1	2	5
f(x)	2	3	12	147

7M

UNIT-IV

7. a) Using the method of least squares fit the curve $y = ax^2 + bx + c$ to the following

x	1	2	3	4	5	6	7	8
y	1	1.2	1.8	2.5	3.6	4.7	6.6	9.1

7M

- b) Evaluate $\int_0^6 \frac{dx}{1+x^2}$ by using (i) Trapezoidal rule (ii) Simpson's 1/3 rule
(iii) Simpson's 3/8 rule

7M

OR

8. a) Solve $\frac{dy}{dx} = x + y$, $y(1) = 0$. Find $y(1.1)$ and $y(1.2)$ by Taylor's series method.

Compare the results with its exact value

7M

- b) Using Runge-Kutta method of fourth order, find y for $x = 0.1, 0.2, 0.3$ given that $\frac{dy}{dx} = xy + y^2$, $y(0) = 1$

7M

UNIT-V

9. a) Expand $f(x) = x \sin x$ as a Fourier series in the interval $(0, 2\pi)$

7M

- b) Obtain the Half range Fourier for $y = x^2$ in $(-f, f)$ and deduce that

$$\frac{1}{1^4} + \frac{1}{2^4} + \frac{1}{3^4} + \frac{1}{4^4} + \dots = \frac{f^4}{90}$$

7M

OR

10. a) Form the partial differential equation by eliminating arbitrary function from the equation $z = (x + y)f(x^2 - y^2)$

7M

- b) Use the method of separation of variables, solve $\frac{\partial^2 z}{\partial x^2} - 2 \frac{\partial z}{\partial x} + \frac{\partial z}{\partial y} = 0$

7M

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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
