

R16

I B.TECH I SEM

SUPPLEMENTARY EXAMINATIONS

APRIL 2024



Subject Code: R16CC1102

I B.Tech I Semester Supple Examinations, April-2024

**ENGINEERING MATHEMATICS
(Common to CE, EEE, ME, ECE & CSE)**

Time: 3 hours

Max Marks: 60

Question Paper Consists of **Part-A** and **Part-B**.

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

PART-A

1. (a) Solve $(2xy + y - \tan y)dx + (x^2 - x \tan^2 y + \sec^2 y)dy = 0$
- (b) Find the general solution of the differential equation $(D^4 - 6D^3 + 12D^2 - 8D)y = 0$.
- (c) Evaluate $\lim_{s \rightarrow \infty} \left\{ \log \left(\frac{s}{s-1} \right) \right\} - \log \left(\frac{s}{s-1} \right)$.
- (d) If $u = x \log xy$, where $x^3 + y^3 + 3xy = 1$, find the value of $\frac{du}{dx}$
- (e) Form the partial differential equation by eliminating the arbitrary constants a and b from $z = ax + by + a^2 + b^2$.
- (f) Solve $\frac{\partial^2 z}{\partial x^2} + 5 \frac{\partial^2 z}{\partial x \partial y} + 6 \frac{\partial^2 z}{\partial y^2} = 0$

[2+2+2+2+2+2]

PART-B

4X 12 = 48

2. (a) Solve the differential equation $\frac{dy}{dx} = \frac{x^3 + y^3}{xy^2}$
- (b) If the air is maintained at 30°C and the temperature of the body cools from 80°C to 60°C in 12 minutes, find the temperature of the body after 24 minutes.
3. (a) Solve $\frac{d^2 y}{dx^2} - 2 \frac{dy}{dx} + y = xe^x \sin x$.
- (b) A simple pendulum of length l is oscillating through a small angle θ in a medium in which the resistance is proportional to the velocity. Find the differential equation of its motion. Discuss the motion and find the period of oscillation.
4. (a) Using Taylor's theorem, prove that $x - \frac{x^3}{6} < \sin x < x - \frac{x^3}{6} + \frac{x^5}{120}$, for $x > 0$.
- (b) Find the maximum and minimum values of $3x^4 - 2x^3 - 6x^2 + 6x + 1$ in the interval $(0, 2)$.

5. (a) If $y_1 = \frac{x_2 x_3}{x_1}$, $y_2 = \frac{x_3 x_1}{x_2}$, $y_3 = \frac{x_1 x_2}{x_3}$, show that the Jacobian of y_1, y_2, y_3 with respect to x_1, x_2, x_3 is 4.

(b) Find the maximum value of $x^m y^n z^p$ subject to $x + y + z = a$.

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

(b) Solve $x^2(y - z)p + y^2(z - x)q = z^2(x - y)$.

7. (a) Solve $\frac{\partial^3 z}{\partial x^3} - 3\frac{\partial^3 z}{\partial^2 x \partial y} + 4\frac{\partial^3 z}{\partial y^3} = e^{x+2y}$.

(b) Using the method of separation of variables, solve $\frac{\partial u}{\partial x} = 2\frac{\partial u}{\partial t} + u$ where $u(x, 0) = 6e^{-3x}$.



Subject Code: R16CC1104

I B.Tech I Semester Supple Examinations, April-2024

**PROGRAMMING WITH C
(Common to CE, EEE & ME)**

Time: 3 hours

Max Marks: 60

Question Paper Consists of **Part-A** and **Part-B**.

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

PART-A

1. (a) What is conditional Operator? Give an example.
- (b) What is the difference between Break and Continue statements?
- (c) What are the two essential properties of any recursive function?
- (d) Write the difference between malloc() and realloc() functions.
- (e) What is the use of 'typedef'. Give an example.
- (f) What is the primary use of Formatted I/O operations on files? Give an example for Formatted Output operation.

[2+2+2+2+2+2]

PART-B

4X 12 = 48

2. (a) Define Algorithm and Flow chart. Design an algorithm and draw its flow chart to find the second big of three numbers. (6 M)
- (b) Illustrate the use of Bitwise operators with an example C language code. (6 M)
3. (a) Write a C program to convert the given single digit number into its equivalent English Word using Switch statement and also clearly show the use of 'Default' case. (6 M)
- (b) Define a String. Write a C program to reverse the given string without using string handling library functions. (6 M)
4. (a) What is recursion. Design a recursive function to find the sum of the elements of the given array. (6 M)
- (b) Define Function. Distinguish between 'Call by Value' and "Call by Reference with an example. (6 M)
5. (a) Define Pointer. Write an example C Program to illustrate the process of accessing the elements of an Array using pointer. (6 M)
- (b) What are Command line Arguments? Explain the purpose of *argv* and *argc* with an example program. (6 M)
6. (a) Write a C Program to find the average weight of a class of 50 students using 'Array of Structure' concept. Take *Student ID* and *weight of the student* as members of Student Structure. (6 M)
- (b) Define Structure. Illustrate the process of using a structure as member of another structure with an example. (6 M)
7. (a) Write a C program to create a text file and copy it's contents into another text file. (6 M)
- (b) Define a Binary File and Text File. Write short note on various file opening modes? (6 M)

Subject Code: R16CC1105

I B.Tech I Semester Supple Examinations, April-2024

ENGINEERING CHEMISTRY

(Common to CE, EEE & ME)

Time: 3 hours

Max Marks: 60

Question Paper Consists of **Part-A** and **Part-B**.

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

PART-A

1. (a) How is temporary hardness caused? How is it removed?
- (b) What are biodegradable polymers?
- (c) What are fuel cells?
- (d) Define higher calorific value.
- (e) What is photosensitization?
- (f) Define corrosion.

[2+2+2+2+2+2]

PART-B

4X 12 = 48

2. (a) Discuss boiler corrosion.
- (b) Explain EDTA method for estimation of hardness in water.
3. (a) Discuss preparation and applications of BUNA-N.
- (b) Explain compounding of plastics.
4. (a) Explain any one method for preparation of carbon nanotubes.
- (b) Write applications of green synthesis.
5. (a) Discuss electrochemical series.
- (b) Explain dry theory of corrosion.
6. (a) Explain ultimate analysis of coal and its significance.
- (b) Write notes on rocket fuels.
7. (a) Explain Lamberts Beer's Law.
- (b) Discuss colorimetric method for analysis of Iron.

Subject Code: R16CC1107

I B.Tech I Semester Supple Examinations, April-2024

ENGINEERING GRAPHICS

(Common to ECE & CSE)

Time: 3 hours

Max Marks: 60

Question Paper Consists of **Part-A** and **Part-B**.

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

PART-A

6 x 2 = 12

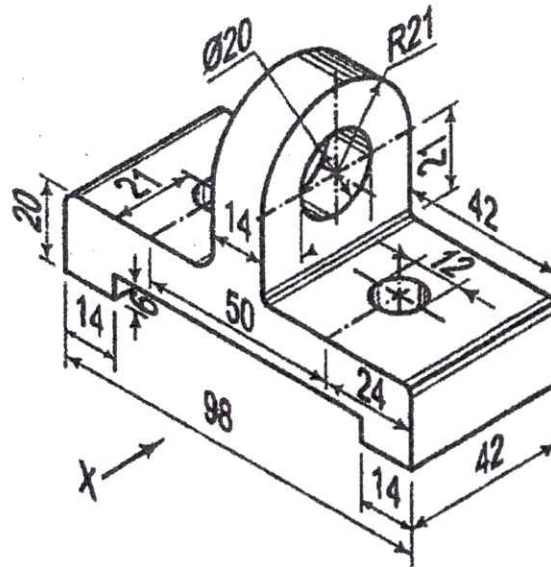
- 1 (a) Divide a straight line of length 135 mm into 8 equal parts.
- (b) Draw the projections of point A which is on HP and 30 mm behind VP.
- (c) Draw the projections of a straight line FG, 80mm long on the HP, parallel to and 40mm behind the VP.
- (d) A cube of 40mm side rests with one of its square faces on the HP such that one of its vertical faces is perpendicular to VP. Draw its projections
- (e) Draw the front view of a square PQRS plane, with its side 40mm contained by the profile plane (PP) and perfectly standing on the one of its corner
- (f) Draw isometric view of a cube of 50mm long edge

PART-B

4 x 12 = 48

- 2 (a) The major and minor axes of an ellipse are 120mm and 80mm respectively. Construct an ellipse by rectangle method.
- (b) Construct a diagonal scale of R.F=1/4000 to show metres and long enough to measure upto 500 metres. Mark a length of 352 meters on it.
- 3 (a) A point U is 12mm below HP, 25mm behind VP and 38mm away from Profile Plane. Draw front view, top view and left side view of the point.
- (b) Draw the projections of a straight line 60mm long when it is parallel to both HP and VP. It is 15mm in front of VP and 40mm above HP.
- 4 A line AB of 70mm long has its end A at 10mm above H.P and 15mm in front of V.P. Its front view and top view measure 50mm and 60mm respectively. Draw the projections of the line and determine its inclinations with H.P. and V.P. Locate the traces of the line.
- 5 Draw the projections of a circle of 60mm diameter resting on the ground on a point A on the circumference, its plane inclined at 45° to the H.P. and the top view of the diameter AB making 30° angle with the V.P.

- 6 A hexagonal pyramid, base 30mm side axis 50mm long, has an edge of its base on the ground. Its axis is inclined at 30° to the ground and parallel to the VP. Draw its projections.
- 7 Draw the (i) Front view (**Marked as 'X'**) (ii) Top view and (iii) Side view for the below figure.



(Note: All dimensions are in mm)

Subject Code: R16CC1108

I B.Tech I Semester Supple Examinations, April-2024

ENGINEERING PHYSICS
(Common to ECE & CSE)

Time: 3 hours

Max Marks: 60

Question Paper Consists of **Part-A** and **Part-B**.

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

PART-A

1. (a) What is the principle of working of quarter wave plate? What should be the thickness of quarter-wave plate for a light of wavelength 5890 \AA if $\mu_e = 1.553$ and $\mu_o = 1.544$?
- (b) Define the properties of metastable state of an atom.
- (c) Define primitive unit cell. Give examples.
- (d) Mention any six properties of ultrasonic waves.
- (e) Mention the failures of quantum free electron theory.
- (f) Why the electrical conductivity of extrinsic semiconductors is larger than intrinsic semiconductors.

[2+2+2+2+2+2]

PART-B

4X 12 = 48

2. (a) Derive the expression for maximum and minimum intensity of a diffraction in a Fresnel diffraction due to single slit. [8M]
- (b) Describe the conditions for sustained interference. [4M]
3. (a) Discuss the construction and working of He-Ne laser systems. Mention its limitations and advantages. [8M]
- (b) Describe the construction and working of optical fibre using ray optics. [4M]
4. (a) Based on the characteristic parameters of the unit cell, discuss the different Bravais lattices. [7M]
- (b) Derive the relation between interplanar distance and Miller indices of the crystalline plane. [5M]
5. (a) Discuss the construction and working of piezoelectric oscillator for the production of ultrasonic waves. Discuss its limitations and advantages. [7M]
- (b) Define reverberation time. Explain Sabine's formula of reverberation time. Find the reverberation time for a hall of dimensions $40' \times 30' \times 20'$ having average absorption coefficient of 0.15. [7M]
6. (a) Derive the Schrodinger time independent wave equation for a free particle. [7M]
- (b) Explain the Fermi-Dirac distribution function. Define Fermi energy. Based on the distribution function prove that the probability of finding the electron for $E < E_F$ is '1', '0' for $E < E_F$ and 0.5 at $E = E_F$. [7M]

7. (a) State and Explain Hall effect. Obtain the relation between Hall coefficient and Hall voltage. Mention the advantages and drawbacks of Hall effect. [8M]
- (b) How the solids are classified based on band theory. Differentiate with the energy band diagram. [4M]
