Prove that the function defined by \( f(x) = \sin \frac{x}{x} \) is continuous at \( x = 0 \).

(a) Prove that the function defined by \( f(x) = \sin \frac{x}{x} \) is continuous at \( x = 0 \).

(b) Prove that the function defined by \( f(x) = \sin \frac{x}{x} \) is continuous at \( x = 0 \).

(c) Prove that the function defined by \( f(x) = \sin \frac{x}{x} \) is continuous at \( x = 0 \).

(d) Prove that the function defined by \( f(x) = \sin \frac{x}{x} \) is continuous at \( x = 0 \).

(e) Prove that the function defined by \( f(x) = \sin \frac{x}{x} \) is continuous at \( x = 0 \).

(f) Prove that the function defined by \( f(x) = \sin \frac{x}{x} \) is continuous at \( x = 0 \).

(g) Prove that the function defined by \( f(x) = \sin \frac{x}{x} \) is continuous at \( x = 0 \).

(h) Prove that the function defined by \( f(x) = \sin \frac{x}{x} \) is continuous at \( x = 0 \).

(i) Prove that the function defined by \( f(x) = \sin \frac{x}{x} \) is continuous at \( x = 0 \).

(j) Prove that the function defined by \( f(x) = \sin \frac{x}{x} \) is continuous at \( x = 0 \).

(k) Prove that the function defined by \( f(x) = \sin \frac{x}{x} \) is continuous at \( x = 0 \).

(l) Prove that the function defined by \( f(x) = \sin \frac{x}{x} \) is continuous at \( x = 0 \).

(m) Prove that the function defined by \( f(x) = \sin \frac{x}{x} \) is continuous at \( x = 0 \).

(n) Prove that the function defined by \( f(x) = \sin \frac{x}{x} \) is continuous at \( x = 0 \).

(o) Prove that the function defined by \( f(x) = \sin \frac{x}{x} \) is continuous at \( x = 0 \).

(p) Prove that the function defined by \( f(x) = \sin \frac{x}{x} \) is continuous at \( x = 0 \).

(q) Prove that the function defined by \( f(x) = \sin \frac{x}{x} \) is continuous at \( x = 0 \).

(r) Prove that the function defined by \( f(x) = \sin \frac{x}{x} \) is continuous at \( x = 0 \).

(s) Prove that the function defined by \( f(x) = \sin \frac{x}{x} \) is continuous at \( x = 0 \).

(t) Prove that the function defined by \( f(x) = \sin \frac{x}{x} \) is continuous at \( x = 0 \).

(u) Prove that the function defined by \( f(x) = \sin \frac{x}{x} \) is continuous at \( x = 0 \).

(v) Prove that the function defined by \( f(x) = \sin \frac{x}{x} \) is continuous at \( x = 0 \).

(w) Prove that the function defined by \( f(x) = \sin \frac{x}{x} \) is continuous at \( x = 0 \).

(x) Prove that the function defined by \( f(x) = \sin \frac{x}{x} \) is continuous at \( x = 0 \).

(y) Prove that the function defined by \( f(x) = \sin \frac{x}{x} \) is continuous at \( x = 0 \).

(z) Prove that the function defined by \( f(x) = \sin \frac{x}{x} \) is continuous at \( x = 0 \).

Note: Attempt five questions in all, selecting at least one from each unit.
Show by an example that second order partial derivative of a function may exist at a point but the function is not continuous there at.

\[ f(x, y) = \begin{cases} \frac{x^2 - y^2}{x^2 + y^2} & \text{if } (x, y) \neq (0, 0) \\ 0 & \text{if } (x, y) = (0, 0) \end{cases} \]

\[ f_x(x, y) = \frac{2x^2 - 2y^2}{(x^2 + y^2)^2} \quad f_y(x, y) = \frac{-2x^2 + 2y^2}{(x^2 + y^2)^2} \]

At the origin, both partial derivatives exist but the function is not continuous there.

**L'Hôpital's Rule**

To find the limit of the function \( f(x, y) \) as \( (x, y) \to (0, 0) \), we can use L'Hôpital's Rule.

\[ \lim_{{(x, y) \to (0, 0)}} f(x, y) = \lim_{{(x, y) \to (0, 0)}} \left( \frac{x^2 - y^2}{x^2 + y^2} \right) \]

\[ = \lim_{{(x, y) \to (0, 0)}} \left( \frac{2x}{2y} \right) = 0 \]

Thus, the function is continuous at the origin.

**Taylor's Theorem**

Expand \( f(x, y) \) at \( (a, b) \).

\[ f(x, y) = f(a, b) + \frac{\partial f}{\partial x}(a, b)(x-a) + \frac{\partial f}{\partial y}(a, b)(y-b) + \frac{1}{2!} \left( \frac{\partial^2 f}{\partial x^2} + \frac{\partial^2 f}{\partial y^2} \right)(a, b)(x-a)^2 + \frac{\partial^2 f}{\partial x \partial y}(a, b)(x-a)(y-b) + \frac{1}{2!} \left( \frac{\partial^2 f}{\partial y^2} \right)(a, b)(y-b)^2 + \text{higher order terms} \]

**Homogeneous Function**

If \( f(x, y) \) is a homogeneous function of \( x \) and \( y \) of degree \( n \), then

\[ \frac{\partial f}{\partial x}(x, y) + \frac{\partial f}{\partial y}(x, y) = nx \]

Find the constants that make this true.

**Volume**

Find the volume of the box with vertices at \( (0, 0, 0), (a, b, c), (a, b, d), \) and \( (a, b, e) \).

\[ V = \frac{1}{6} (a+b+c+d+e) \]

**Taylor's Theorem**

Show the function is continuous at \( (0, 0) \) and prove Rolle's Theorem.

\[ f(x, y) = x^2 y + xy^2 \]

\[ f_x(x, y) = 2xy + y^2 \quad f_y(x, y) = x^2 + 2xy \]

\[ f_{xx}(x, y) = 2y, \quad f_{xy}(x, y) = f_{yx}(x, y) = 2x + 2y, \quad f_{yy}(x, y) = 2x \]

At the point \( (0, 0) \), all the partial derivatives exist and the function is continuous at the point.
Obtain the partial differential equation by eliminating the auxiliary function from the following equation.

\[ (\lambda + \gamma x) \frac{\partial^2 u}{\partial x^2} + (\lambda - \gamma x) \frac{\partial u}{\partial x} = 0 \]

2. (a) Section I

\[ (\lambda + \gamma z) \frac{\partial^2 u}{\partial z^2} + (\lambda - \gamma z) \frac{\partial u}{\partial z} = 0 \]

Find the complete integral of the partial differential equation.

Show that the partial differential equations \( p = 6x + 3 \lambda + 3 \) and \( q = 3 \) are compatible.

Classify the differential equation.

Find the complete integral of \( p = z + (\lambda - \gamma) + (\lambda - \gamma) \) and \( q = 3 \).

From the partial differential equation by eliminating \( h \) and \( k \).

Computable Question

Question from each section. Question No. 1, 2, 3.

Note: Attempt five questions in all, selecting at least one from each section. Maximum marks: 50.

Time allowed: 3 hours.

Partial Differential Equations

PAPER-BM-232

MATHEMATICS

GM / D-16

(4)

\[ n - x \leq 0 \text{ for } (x, y) 
\]

\[ n - x \geq 0 \text{ for } (x, y) 
\]

Solve the equation.
1. Where is the thrust in the rod?
2. Explain the relation of excursion of a light rod from length $l + 0.6 l$ to $l$.
3. Show that the vertical forces done by the thrust is in a vertical line.
4. The condition of friction.
5. Show that the length of the angle of friction is equal to 90°.
6. Pull it over.
7. Other cases may have the greatest tendency to given length be attached so that a main pulling at the given point of a tree must one end of a rope of length $l$.
9. Distance between the other two.
10. In equilibrium, show that each is proportional to the angle between the first and the second.
11. The three components acting on a particle are in the same line.
12. Compulsory question

All questions carry equal marks.

Note: Attempt the questions in all sections at least one.

Time allowed: 3 hours.

Maximum marks: 100.
A solid hemisphere is supported by a string fixed to a point on its rim and to a point on a smooth vertical wall at a height from the floor equal to its radius and a solid cone of height h and semi-vertical angle \( \alpha \) is placed with its base against a smooth vertical wall and placed with its base against a smooth vertical wall.

**LH-III**

1. Find an equation of the curve of Vs.

2. Find the equation of the arc of the path.

3. Where Vs is the weight of the rod.

\[
\frac{(\alpha + 1) \sin \theta}{\sec \theta} = \frac{3W}{\sin \alpha}
\]

4. Show that the tension in the string is the force must be.

5. Lines of greatest slope. To find the line of the plane and through a point on a force parallel to the plane and through a point on the line of the plane and through a point on the line of greatest slope. To find the line of greatest slope. To find the line of greatest slope. To find the line of greatest slope.

6. \( r = a \left( 1 + \cos \theta \right) \) when \( \theta = \text{initial line} \).

**LH-II**

1. Together with the couple force acting at any arbitrary point of the body.

2. At different points of a rigid body can be reduced to a single force acting at any arbitrary point of the body.

3. Show that the moment of a couple at any point in one plane.

4. The moment of a couple at any point in one plane.

\[
\frac{a}{\pi} = \frac{b}{c} = \frac{d}{p}
\]

5. The force acting in the plane of the couple acts through the origin and a line of force acting through the origin and a line of force acting through the origin.

6. \( \frac{\sin \theta}{\sin \varphi} = \frac{\sin \varphi}{\sin \theta} \) and \( \frac{\sin \theta}{\sin \varphi} = \frac{\sin \varphi}{\sin \theta} \).

**LH-I**

1. \( \frac{\sin \theta}{\sin \varphi} = \frac{\sin \varphi}{\sin \theta} \) and \( \frac{\sin \theta}{\sin \varphi} = \frac{\sin \varphi}{\sin \theta} \).

2. \( \frac{\sin \theta}{\sin \varphi} = \frac{\sin \varphi}{\sin \theta} \) and \( \frac{\sin \theta}{\sin \varphi} = \frac{\sin \varphi}{\sin \theta} \).

3. \( \frac{\sin \theta}{\sin \varphi} = \frac{\sin \varphi}{\sin \theta} \) and \( \frac{\sin \theta}{\sin \varphi} = \frac{\sin \varphi}{\sin \theta} \).

4. \( \frac{\sin \theta}{\sin \varphi} = \frac{\sin \varphi}{\sin \theta} \) and \( \frac{\sin \theta}{\sin \varphi} = \frac{\sin \varphi}{\sin \theta} \).
Unit I

2. Discuss briefly the various methods to produce low temperature.

3. Discuss why the melting point of some solids is decreased with the increase of pressure, while those of others is increased.

4. Define how char, What are various symbols available in detail.

5. What do you understand by term computer organization? Explain.

Question

Questions may be asked from
Scientific calculation (non-programming) is allowed. Log
Question from each unit (Question No. 1 is compulsory).

Note: Attempt five questions in all selecting at least one

Maximum marks: 40

Time allowed: 3 hours

Computer Programming and Thermodynamics

Paper - A

PHYSICS

CSI I/D-16
where symbols have their usual meaning.

\[
\frac{\text{RTV}}{2} + \frac{1}{2} - \frac{C}{4} = \frac{\gamma}{R}
\]

8. (a) Use Van der Waals' gas equation to prove that for

\[
\frac{V}{n} = a(\gamma - \gamma)
\]

with various phases. Hence define triple point and prove it is

(a) Define the four thermodynamic functions.

(b) Explain the meaning of result.

(c) Given heat equation, derive it for water and explain the

\[
T = 22.7 \times 10^5 \text{ J/kg}^{-1}
\]

L = 373 K

L = 32.8 K

\[
C = 42.4 \text{ J/kg} \cdot \text{K}^{-1}
\]

\[
R = 8.31 \text{ J/mol} \cdot \text{K}^{-1}
\]

\[
\text{dp} = \frac{1}{\text{dt}}
\]

Write algorithm, draw flow chart and program to evaluate finite

dimensional array by giving examples.

4. (b) Define array. Explain one dimensional and two-

(c) Integrate by Simpson’s one-third rule.

4. Write an algorithm, draw flow chart and program to evaluate finite
Unit I

2. What do you mean by dispersive power of a grating?

(e) What is difference between the spectra obtained from a prism and a grating?

(d) Radio waves do not. Why?

(c) Radiowaves can differ from large external buildings

(b) In which respect a Zonde plate is different from a convex lens?

(a) What will happen if air is replaced by some transparent material?

1. How can we locate the central fringe in Fresnel Diffusion?

Compulsory Question

All questions carry equal marks.

There are five questions in all, select any one.

Maximum marks : 40

Time allowed : 3 hours

Waves and Optics

Paper-V1

PHYSICS

CSE / D-I6


**Unit 1D**

- Calculate the number of fringes per cm in the grating 5000 Å. For second order maxima with height of wavelength 5Å, for second order maxima a path difference of a grating gives angle of diffraction of 
- A plane transmission grating gives angle of diffraction of
- Expression for resolving power of a grating
- What do you mean by resolving power? Derive an
- 
- 8. Discuss Fraunhofer diffraction at a single slit analytically to find

**Unit III**

1. Explain the design and working of a Michelson interferometer. How will you determine wavelength of light

2. Given that the incident light used is 5890 Å m. Calculate the frequency of light in hertz and velocity of light. The diameter of the dark ring in Newton's rings experiment is 3 cm. What is the name of Newton's rings experiment? What will be the radius of Newton's rings experiment? Explain the formation of fringes due to transmitted light in a

3. Explain the formation of two coherent sources in case of a sodium light of wavelength 5892 Å. From the slit find the ring width at 60 cm from it for a. A fringes of angle 1° and Beer's Law index 1.2 is placed at

4. Explain the formation of a Fresnel biprism and a Lloyd mirror

5. Describe the application of a Fresnel biprism to find the interference of a thin transparent sheet

6. Describe the formation of a zone plate. Describe its principle and working

7. In a Michelson interferometer, how will you determine wavelength of light?
Section A

1. Give the formula to calculate spin only magnetic moment

2. Give an example of obelisting agent with structure.

Section B

Questions from each section are given. Attempt the questions in all sections at least two.

Note: Attempt the questions in all sections at least two.

Maximum marks: 32

Time allowed: 3 hours

Paper-III-CH-201

INORGANIC CHEMISTRY

GSN/D-16

Printed Pages: 3

Roll No.
Section B

Write the following electronic configuration of Cu²⁺.

Balance the following redox reaction. State the oxidizing and reducing agents.

Calculate the magnetic moment of [Co(NH₃)₆]³⁺.
Process, whereby of the system remains constant.

What is Joule-Thomson effect? Justify that during this process, energy of the system remains constant.

Section A

1. What do you understand by Chemical Potential? Explain the various symbols involved.
2. Write integrated form of Van't Hoff equation. Explain the integrated form of Van't Hoff equation.
3. Why zinc is used in Prince's process for desulphurisation of mild steel and phosphorally?
4. What is the change in enthalpy when ideal gas expands.
5. Define: Open, Closed and Isolated Systems.
6. Difference between:

Computusory Question

Calculator is allowed.

Computusory. Use of Log-table and Non-programming questions from each section. Question No. 1 is compulsory. Attempt five questions in all, selecting at least two from each section.

Maximum marks: 32

Time allowed: 3 hours

Physical Chemistry

Paper–IX (CH–202)

CHEMISTRY

GSM / D–16

Printed Pages: 3

Roll No.
Section B

3. The integrated form of the Clapeyron equation is obtained: 

\[ \text{Express } \psi \text{ in the Clapeyron equation. Now Classify step equation is more economical than single step.} \]

[Answer]

4. Prove that reversible and adiabatic expansion of ideal gas:

\[ \text{Calculate the amount of work done when } \Delta \text{ Volume is allowed to enter into an evacuated bulb of } 100 \text{ ideal gas contained in a bulb of } 1 \text{ liter capacity at } 1 \text{ atm of pressure.} \]

[Answer]
2. Explain why phenols have smaller dipole moment than methanol.


4. Discuss the mechanism of following reactions:

   Section A

   (a) Give the mechanism of base catalyzed ring opening of each
      phenol.
   (b) Explain why benzene has no dipole moment.
   (c) What happens when ethylene glycol is heated with a
      dehydrating agent?
   (d) Give the mechanism of dehydration of 1,2-dimethoxyethane.
   (e) Explain the principle of UV spectroscopy.
   (f) What is nucleophilic acyl substitution? Give its
       mechanism.

   Compulsory

   Question: 1

   Time allowed: 3 hours
   Maximum marks: 32

   Organic Chemistry (Theory)

   Paper-X-(CH-203)

   CHEMISTRY

   GCM-D-16

   Promoted Papers: 3
8. Define and explain the followings:

(a) Auxochromes

(b) Biochromes

(b) 2-Phenylphenol is stronger acid than phenol.

(c) \( \text{CH}_3\text{COOH} \quad \text{H}^+\text{Br}^-\text{COOH} \)

(d) \( \text{Br}^-\text{COOH} \quad \text{OH}^-\text{COOH} \)

(e) \( \text{OH}^-\text{COOH} \quad \text{P}^-\text{COOH} \)


10. Discuss the relative stability of acid derivatives towards nucleophilic substitution reaction.

11. Compare the acidic character of alcohols and phenols.

12. Explain the acidic character of \( \text{C}_2\text{H}_5\text{OH} \) and \( \text{C}_2\text{H}_5\text{OH} \).

13. Lucas reagent:

(a) How will you distinguish between \( \text{C}_2\text{H}_5\text{OH} \) and \( \text{C}_2\text{H}_5\text{OH} \)?

(b) What happens when:

(i) Diphenyl alcohol is treated with reduced copper

(ii) Diazonium salt

(iii) Arsenic sulfide acid

(c) How will you prepare Phenol from:

(ii) Phenylhydrazine
Unit II

1. Do as directed:

(a) Which are fossils? Describe the structure of fossiliferous rocks. 
(b) Why are fossils? Describe the structure of fossiliferous rocks. 
(c) Evolution of seed plants in gymnosperms. 
(d) Dominant flora of Paleozoic and Mesozoic era. 
(e) Give affinity of gymnosperms with angiosperms. 
(f) Give affinity of angiosperms with gymnosperms. 

Unit I

2. (2 marks)

3. (3 marks)

4. (4 marks)

5. (5 marks)

6. (6 marks)

7. (7 marks)

8. (8 marks)

9. (9 marks)

10. (10 marks)

Discuss primitive characters shown by order Pinales.

Enumerate characteristic features of angiosperms.

Describe the process of reproduction in gymnosperms.

Describe female cone of Pines.

Describe external morphology of stem of Pines.

Name out of C.C. 

Write name:

(i) Lycopodiophyta

(ii) Filicophyta

(iii) Thallophyta

(iv) Bryophyta

(v) Pteridophyta

(vi) Gymnosperms

(vii) Angiosperms

(iii) thallophyta

(iv) bryophyta

(v) pteridophyta

(vi) gymnosperms

(vii) angiosperms

Why is gymnosperms known as „naked” seed plants? 

Pteridophytes classification. 

Name the three groups of gymnosperms according to 

Gymnosperms and Angiosperms. 

Cite two important differences in the endosperms of gymnosperms and angiosperms. 

8 x 1 = 8

A. Direct questions carry equal marks. Draw relevant diagrams. 

B. From each unit: Question No. 1 is compulsory. All others are to be attempted. 

C. Attempt six questions in all, selecting two questions from each unit. 

D. Maximum marks: 40

Note: Maximum marks: [40] 

Time allowed: 3 hours

BioLOGY AND DIVERSITY OF SEED PLANTS-I

PAPER-I

BOTANY

GSM / D-16

Printed Pages: 2
What do you understand by complex permanent issue? Explain diagrammatically.

Unit I
Isolation of a Monocots and an Angiosperm of a Monocots leaf. Give an example.

8×1=8

1. What are the differences between sapwood and heartwood?

2. Structure and functions of cambium.

3. [Diagram of cambium]

4. Write short notes on:
   (a) Meristematic tissue.
   (b) Birth of a Monocots stem.
   (c) Differentiation of a Monocots leaf.

5. What is the difference between sapwood and heartwood?

Unit II

Plant Anatomy

Paper II

Botany

Set A

Maximum marks: 40

Time allowed: 3 hours

Note: Attempt all questions in all sections at least two.

Section I

A. Comprehension

1. All questions carry equal marks.

2. Support your answer with relevant diagrams whenever necessary.

3. Questions from each Question No. 1 is compulsory.

4. Answer all questions in all selection at least two.

Section II

A. Comprehension

1. What do you understand by complex permanent issue? Explain diagrammatically.

2. Isolation of a Monocots and an Angiosperm of a Monocots leaf. Give an example.

3. What are the differences between sapwood and heartwood?

4. Structure and functions of cambium.

5. [Diagram of cambium]

6. Write short notes on:
   (a) Meristematic tissue.
   (b) Birth of a Monocots stem.
   (c) Differentiation of a Monocots leaf.

7. [Diagram of cambium]

8. What is the difference between sapwood and heartwood?

Section III

A. Comprehension

1. What are the differences between sapwood and heartwood?

2. Structure and functions of cambium.

3. [Diagram of cambium]

4. Write short notes on:
   (a) Meristematic tissue.
   (b) Birth of a Monocots stem.
   (c) Differentiation of a Monocots leaf.

975
Plant Anatomy

Paper II

Botany

GSM/D-16

Roll No.

Practiced Paper: 2

Time allowed: 3 hours

Maximum marks: 80

Note: Attempt all questions in all sections at least once. 
Wherever necessary, all questions carry equal marks. Support your answers with relevant diagrams wherever questions from each unit. Question No. 1 is compulsory.

1. Explain briefly:

2. What do you understand by complex permanent issue? Give an example.

3. What is the function of stele? What are the types of vascular bundles present in monocot?


5. What types of compound leaves?

6. What are the short notes on?

7. What is abscission?

8. Explain with suitable diagram the anomalous growth in plant anatomy.

Time allowed: 3 hours

Maximum marks: 80
Section A

1. Describe the digestive system of Herdina.
2. Give an account of circulatory system of Amphioxus.
3. Describe the histological system of Herdina.
4. Describe the general characters of Chordates.
5. Affinities of Chordates with vertebrates.

Section B

1. Describe the bilateral line of Ladaeo.
2. Describe the mucous layers of stomach.

Diagram Question

1. Diagrams wherever required.
2. Write brief notes on the following:
3. Significant affinities of amphioxus with vertebrates.
4. Describe the structure, metamorphosis and evolutionary significance of Chordates.
5. Write short note on the following:
6. Pharynx of Branchiostoma.
7. Neural complex of Hermida.
8. Universal hub of vertebrates.

Compulsory Question

Support your answer with neat and well-labelled diagrams where ever required.

Maximum marks: 40

Time allowed: 3 hours

Roll No: 976

ZOOLOGY

GM / D-16

PAPt-1

LIFE AND DIVERSITY OF CHORDATES-I
Discuss the role of glucose in secondary and tertiary structure of proteins.

3. Describe peptide bonds and their characteristics.

2. Describe the following:

   1. Discussion well labelled diagrams wherever necessary.

   2. At least two sections in all, Section 0 is compulsory.

   3. Attempt five questions in all, Section 0 is compulsory.

   4. Time allowed: 3 hours

   Maximum marks: 40

   Mammalian Physiology-I

   Paper-II

   Zoology

   GNM / D-16

   Roll No. 77

   Printed Pages: 2
8. Explain the operation of OPAMP to multiply/divide the two

9. Explain the operation of OPAMP to pass active filter using OPAMP.

8. What is Schmitt Trigger? Explain the operation of OPAMP.

Unit-II

8. Write the advantages and disadvantages also.

4. Discuss the fabrication of Junction and MOS capacitance in

8. Write the isolation between components in an integrated circuit so obtain isolation between components in an integrated circuit.

4+4

(a) Surface Passivation

Discussion

4. Write notes on the following processes used in IC fabrication.

Unit-I

4. What is the effect of added feedback on the output resistance.

2×4

(a) What is the characteristics of ideal OPAMP?

(b) What is the differences between OPAMP and Ideal OPAMP.

(c) For the bias region and also for the gain region.

(d) What is the order of magnitude?

(e) What is the order of magnitude?

(f) What is the meaning by biasing capacitance in an IC.

Complementary Question

Note: Attempt five questions in all, selecting at least one

Maximun marks: 40

Time allowed: 3 hours

CIRCUITS 1

OPAMP AND LINEAR INTEGRATED

Paper-I

ELECTRONICS

GSM / D-16

Printed Pages: 2

ROLL No.

980
Unit I

1. Define Tree. Its representation using array and list. Write on

Unit II

2. Discuss any two pattern matching algorithms.

3. Explain string operations.

4. Discuss time and space complexity.

5. Define data structure and its categories.

Unit III

6. Define stack and write algorithm for push operation.

7. Discuss applications of stack with emphasis on recursion.

8. Define queue, its representation using array and list. Write on

Question No. 1 is compulsory

Note: Attempt any five questions select one from each unit.

B.Sc. - 4th

Maximum marks: 50

Time allowed: 3 hours

Paper-1

DATA STRUCTURE

COMPUTER SCIENCE

GSEB / D-16

Printed Pages: 2

ROLL No.
9. Define maintenance. Software is not prone to wear and tear.

8. When is the need of cycloamatic complexity? For the following algorithm, draw the control flow graph and compute the cyclomatic complexity.

7. (a) When do you understand by weak entity? In an employess information system, identify the weak entity and draw the entity-relationship diagram.

6. (a) What is the difference between flow chart and data flow diagram?

5. (a) What are the desirable characteristics of SOA? Discuss.

4. (a) Function and non-functional requirements in software engineering. Discuss the need of maintenance. What are the different levels of maintenance? What are the different phases of maintenance? What are the different types of maintenance?

3. (a) Define software maintenance. Discuss the need of maintenance. What are the different phases of maintenance? What are the different types of maintenance?
Write the attributes to put margins on images.

Define a background.

Give examples of different lines.

Name any three web-browsers.

Define internet.

What is a mailbox?

I. Computer Question (40 marks)

All questions carry equal marks.

Note: Attempt five questions in all, selecting at least one from each unit. Question No. 1 is compulsory. Time allowed: 3 hours. Maximum marks: 40.

Web Designing Fundamentals-I

Computer Application

GSM/D-16

Premier Papers: 4

Roll No.:
8. Describe the following from input tags:

UNIT II (HTML-IA)

8

- What is the use of linking in HTML? Give a suitable example.
- Why are hyperlinks important in HTML?
- Describe the basic structure of an HTML document with an example.
- Write the steps to create an HTML document for a web page.

UNIT III (HTML-II)

6. a) Write the steps to create an HTML document for a web page.
   b) Explain the basic structure of an HTML document with an example.

UNIT IV (HTML-III)

(3)

3. Explain the following:

- FTP
- WWW
- HTTP
- E-Mail
- HTML
- Index page
- Active hyperlinks
- HTML document
- Homepage
- Internal hyperlinks
- HTML tag

4. What are the important guidelines for creating a website?

8

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Paper-II

Computer Applications

GSM/D-16

Unit-I

1. Define the terms and give suitable examples for each term.
2. Explain the difference between logical and physical data.
3. Explain various roles in a database environment.
4. Describe the characteristics of the database approach.
5. Explain the levels of the database management system.
6. Explain the basic terminology of the relational database.
7. Differentiate between the traditional systems and database systems.
8. Super Key
9. Primary Key
10. Candidate Key
11. Foreign Key
12. Alien Key
13. Primary Key

Unit-II

1. Explain the difference of base tables and views using management systems.
2. Explain the basic terminology of the relational database.
3. Explain the various levels of database management system.
4. Differentiate between the traditional systems and database systems.
5. Explain the levels of the database management system.
6. Explain the basic terminology of the relational database.
7. Differentiate between the traditional systems and database systems.
8. Super Key
9. Primary Key
10. Candidate Key
11. Foreign Key
12. Alien Key
13. Primary Key

Question

Each unit

Attempt 5 questions by selecting one question from each unit.

Note: (i) All questions carry equal marks.

Maximum marks: 40

Time allowed: 3 hours
1. Explain the following in brief:

- Hypergenvitility
- Antigen presention cells
- Immunological tolerance
- Lymphokines
- ELISA
- Epitopes
- Viraly of antibody
- NILL cells

Note: The candidates are required to attempt Question No. 1 and four others, selecting one question from each unit.

Time allowed: 3 hours

Maximum marks: 70

ImmunoLogy

PAPER-VI

BIOCHEMISTRY

GSM / D-16

Page 16

Printed Pages: 2

ROLL NO.

988
UNIT-I

1. (a) Describe the mode of regulation of expression of lac operon medium.
(b) When both glucose and lactose are present in growth medium.
(c) When lactose is the sole source of energy in the growth medium.
(d) Describe the mode of regulation of expression of lac operon signature of proteins.

2. (a) Explain the importance of post-transcriptional changes in the splicing of pre-mRNA.
(b) How is post-transcriptional regulation of mRNA achieved?
(c) Discuss the regulation of expression of genes by alternative splicing.
(d) How was the internal characteristic of Benet's code explained?

UNIT-II

3. (a) How was the mode of action of two inhibitors of DNA polymerase explained in application to prokaryotes.
(b) Give names and mode of action of two inhibitors of DNA polymerase.
(c) Discuss the role of different DNA polymerases in replication on plasmid mode of action.
(d) Classify various types of restriction endonucleases based on their mode of action.

4. (a) How did transformation experimentally show that DNA is a gene unit?
(b) Gene regulatory?
(c) Explain the organization of chromatin in eukaryote cell.
(d) Genes and genetic material?

5. (a) How did transformation experimentally show that DNA is a gene unit?
(b) DNA sequences can be separated by Northern blotting.
(c) Chromosomes are transcriptionally active regions of centromeres and end of chromosomes.
(d) All prokaryotic in RNA have ATP or GTP residue at 5'.

6. (a) State whether the following statements are true (T) or false (F).
(b) DNA contains double stranded molecules.

Comprehension Question

Attempt any two questions from each unit. All questions carry equal marks.

Note: All the questions in all the units are compulsory.

Time allowed: 3 hours

Maximum marks: 40

Molecular Biology

PAPER-VII

BIOTECHNOLOGY

GSM / D-16
1. सर्किल की चाल निकालने के लिए उपयोगी विधि की क्या है?

2. ज्ञात कीजिए कि 6+6=12 क्या है?

3. वर्णन कीजिए कि कोई चीज के लिए उपयोगी है?

4. वर्ग के मध्य में उपयोगी नाम क्या है?

5. सर्किल की चाल निकालने के लिए केस या बिना केस का उपयोग किया जाता है?

6. चाल निकालने के लिए क्या किया जाता है?

7. चाल निकालने के लिए क्रॉस क्रॉस के मद्देनजर क्या माना जाता है?

8. चाल निकालने के लिए क्या किया जाता है?

9. चाल निकालने के लिए क्या किया जाता है?

10. चाल निकालने के लिए क्या किया जाता है?

11. चाल निकालने के लिए क्या किया जाता है?

12. चाल निकालने के लिए क्या किया जाता है?

**Hindi (Compulsory)**

**GSM/D-16**

1. सर्किल की चाल निकालने के लिए उपयोगी विधि की क्या है?

1. वर्ग के मध्य में उपयोगी नाम क्या है?

1. सर्किल की चाल निकालने के लिए केस या बिना केस का उपयोग किया जाता है?

1. वर्णन कीजिए कि कोई चीज के लिए उपयोगी है?

1. चाल निकालने के लिए क्या किया जाता है?

1. सर्किल की चाल निकालने के लिए क्रॉस क्रॉस के मद्देनजर क्या माना जाता है?

1. सर्किल की चाल निकालने के लिए क्या किया जाता है?

1. चाल निकालने के लिए क्या किया जाता है?

1. सर्किल की चाल निकालने के लिए क्या किया जाता है?

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1. सर्किल की चाल निकालने के लिए क्या किया जाता है?
Section 1

Note: Attempt five questions in all. Selecting at least two questions from each section.

Time allowed: 3 hours

Maximum marks: 26

Physical Chemistry

Paper IX-2022

CHEMISTRY

OEGM / D-16

(2)
\( a + b = (A) \)
\( b + c = (B) \)
\( c + a = (II) \)
\( a + c = (I) \)

2x4=8

Time allowed: 3 hours
Maximum marks: 40

Paper (Computer)
SANSKRIT
GSM/D-16

Roll No.

Answer all the questions.

1. Translate the following sanskrit phrase into English:

2. Write the sanskrit word for 'water'.

3. Describe the sanskrit alphabet.

4. Translate the following sanskrit phrase into English:

5. Write the sanskrit word for 'tree'.

6. Describe the sanskrit system of numbers.

7. Translate the following sanskrit phrase into English:

8. Write the sanskrit word for 'sun'.

9. Describe the sanskrit system of grammar.

10. Translate the following sanskrit phrase into English:

11. Write the sanskrit word for 'moon'.

12. Describe the sanskrit system of literature.

13. Translate the following sanskrit phrase into English:

14. Write the sanskrit word for 'earth'.

15. Describe the sanskrit system of thought.

16. Translate the following sanskrit phrase into English:

17. Write the sanskrit word for 'fire'.

18. Describe the sanskrit system of religion.

19. Translate the following sanskrit phrase into English:

20. Write the sanskrit word for 'air'.

21. Describe the sanskrit system of religion.

22. Translate the following sanskrit phrase into English:
Section I

1. State Le Chatelier’s principle.

2. Derive Clausius-Clapeyron equation in the integrated form.

3. \[ \text{O}_2 + \text{H}_2 \rightleftharpoons \text{H}_2\text{O} \]

4. \[ \text{CaCO}_3(s) \rightleftharpoons \text{CaO}(s) + \text{CO}_2(g) \]

5. State the law of chemical equilibrium. How can you derive it?

6. Discuss the reaction that ‘\( \text{PH}_3 \text{H}_2 \text{O} = \text{PH}_3 \text{OH} + \text{H}_2 \text{O} \)’

7. State the reaction that ‘\( \text{H}_2 \text{O} = \text{H}_2 + \text{O}_2 \)’

8. Derive a mathematical expression for the entropy of a reaction.

Section II

1. \( \Delta H = \Delta G + RT \)

2. Define \( \Delta H \) and \( \Delta G \) in terms of entropy change.

3. Derive Kirchhoff’s equation giving the variation of heat.

4. \( \Delta H = \Delta U + \Delta Q \)

5. State and explain the following terms with suitable examples.

6. State and explain the following terms with suitable examples.

7. Discuss the reaction that ‘\( \text{PH}_3 \text{H}_2 \text{O} = \text{PH}_3 \text{OH} + \text{H}_2 \text{O} \)’

8. State the reaction that ‘\( \text{H}_2 \text{O} = \text{H}_2 + \text{O}_2 \)’

Note: Attempt the questions in all sections at least two.

Maximum marks: 26

Time allowed: 3 hours
1. Write the mechanism of reaction for the reaction of Phenol with HCl to form coupling compound.

2. Write the mechanism of preparation of Phenol from benzene.

3. Write the mechanism of Fries rearrangement for the given compound.

4. Distinguish cis and trans stilbene on the basis of UV spectroscopy.

5. What are the effects of halogen on the strength of aromatic acids and their relative energies?

6. Comment upon the photochemical nature of acids.

7. Calculate for the given compound.

8. Write about different types of electronic transitions and their relative energies.

Note: Attempt five questions in all, selecting at least two questions from each section.

Time allowed: 3 hours

Maximum marks: 27
Section-B

1. Write the mechanism of decarboxylation in Koble's reaction

\[ R - C - NH_2 + Br_2 + KOH \rightarrow RCOOR, RCONH_2, RCOO^{-} + KOH \]

2. Arrange the following in decreasing order of reactivity:
   - HCN
   - HNO
   - HSO

3. Write the product and give mechanism of:
   \[ \text{C}_6\text{H}_5\text{COOH} + \text{HNO}_3 \rightarrow \text{H}_2\text{SO}_4 \]

4. When silver acetate is heated with Br\text{\textsubscript{2}} in CCl\text{\textsubscript{4}},
   \[ \text{H}_2\text{O} \rightarrow \text{ether} \]

5. What happens when the following reaction is carried out in Koble's reaction:
   \[ \text{H}_2\text{O} + \text{C}_6\text{H}_5\text{NH}_2 + \text{H}_2\text{C}_2\text{O} \rightarrow \text{ether} \]

6. Write the mechanism of deamination in Koble's reaction

7. What happens when a mixture of 2-bromo + phenylboronic acid:
   \[ \text{C}_6\text{H}_5\text{CH}_2\text{Br} + \text{C}_6\text{H}_5\text{CH}_2\text{COOH} \rightarrow \text{ether} \]

8. Write the mechanism of deamination in Koble's reaction
Why do old aged people prefer to eat well cooked semi-solid food?

Name two dietary problems faced by a pregnant woman.

Which daily additional calorie requirements of a lactating woman

What is the RDA of iron for a pregnant woman.

Define and describe adult woman:

I. Answer the following in 2-3 lines:

1. Comparison Question (Fill in the gap)

All questions carry equal marks.

Note: Attempt five questions in all by selecting at least one

Maximum marks: 40

Time allowed: 3 hours

PAPER-201

NUTRITION IN LIFE CYCLE

CSM / D-16

Printed Pages: 3

Roll No.
Describe various nutritional problems and dietary guidelines during old age.

Discuss the nutritional and food requirements of school children.

Breastfeeding is best for the child. Discuss in detail.

Why do we need to plan meals? Explain the principles of meal planning in detail.

Give two advantages of breast-feeding.

Describe the nutritional requirements of a pregnant woman.

What are the advantages of packed lunch?

Give two benefits of packed lunch. If possible, explain in detail.

Discuss dietary considerations for adolescents.

Economy in time and money in meal planning.

Packed school lunch for school going children.

Write notes on any three of the following:
2. Explain the function of various parts of sewing machine.

UNIT I (6 marks)

(a) Machine working heavily
(b) Use of line bluse
(c) Tension regulator
(d) Yarn

3. Write short notes on the following:

COMPULSORY QUESTION (Select 2)

4. All questions carry equal marks.

Note: Attempt all questions in all sections at least two.

PAPER: COURSE-202
CONSTRUCTION
INTRODUCTION TO CLOTHING

CSE / D-16

(2)
I. Answer the following in short:

1. Comprehensive Question (Allotted 30 marks)

Note: Attempt any five questions selecting at least two from each unit. Question No. 1 is compulsory.

Time allowed: 3 hours
5. What is the meaning of family planning and explain the factors

6. Give a detailed account of child health programmes being run in India.

7. Explain the role of national agencies in educating the masses about population education.

8. Define family and explain the role of family in community development.

8. What are the functions of marriage and criteria for mate selection.

8. Explain the relation between women employment and socio-economic status of a family.
I. Answer the following in 3-5 sentences:

Complimentary Question (4 marks)

Note: Attempt the questions in all by selecting at least one.

Maximum marks: 40

Time allowed: 3 hours

Paper Course No. 204

Consumer Protection

Household Equipment and

GSM/D-16

Printed Pages: 3

Roll No.
6. Write a note on following:

UNIT-II (GROUP-II)

5. Explain the working of various electrical appliances which are used in kitchen.

4. Explain the use, care and storage of equipment which is used for personal care.

3. Describe the size, design, types, care, cleaning and tips for washing clothes in your washing machine.

2. Write down the difference between tool and equipment. Explain.

1. Describe the various problems faced by a consumer.

8. Who is a consumer? Describe various problems faced by a consumer.

7. What is installment sales contract? Describe its benefits.

6. Write a note on following:

4×2=8
1. Observe the figure questions (comprehension questions)

All questions carry equal marks.

Note: Attempt five questions in all sections.

Maximum marks: 40

Time allowed: 3 hours

Paper-Course-2025
EXTENSION EDUCATION-I
COMMUNITY DEVELOPMENT AND
GSW/D-16

Printed Pages: 3
Roll No.
Unit I (20
day) (II)

Write an essay on Mid Day Meal Programme.

8. What is problem of poverty? What are main causes of poverty?

7. What is problem of poverty? What are main causes of poverty?

8. Give two types of family. Name of programming which is closely related with development of women and children in India.

6. Write an essay on Mid Day Meal Programme.

8. What is problem of poverty? What are main causes of poverty?

5. Give three elements of communication.

4. Define communication. What are main types of communication?

8. What is problem of poverty? What are main causes of poverty?

3. Write the down features of NREGA Plan.

2. What are objectives of NREGA-Training for Rural Youn for self employment in India?
1. Explain the concept of data hiding and encapsulation.

2. Discuss the concept of copy constructor in C++ with suitable examples.

3. Write short note on friend function in C++.

4. Give suitable example.

5. What is the significance of scope resolution operator in C++?

6. Explain various features of object oriented programming.

7. Give suitable examples.

8. Write short note on friend function in C++.
Unit II

8. (a) Write a program to determine the number of various geometrical figures using the concept of operator overloading in C++.

8. (b) Write a program in C++ to find the area of various geometrical figures using the concept of function overloading in C++.

Unit III

5. Explain the following innovations in C++ with suitable examples:
   - Uninherited and Formattled Input/Output Operations
   - Output Formatting and Formatted Input Operations

6. Explain the concept of string handling and dynamic memory management in C++ with suitable examples.

7. Explain the following concepts and give their significance with examples:
   - Binary operator overloading
   - Operator overloading in C++

8. (a) Write operator overloading in C++.

9. Explain the significance of constructor and destructor and describe how they differ from each other.

10. Explain the concept of structure and class in C++ along with suitable examples.
Section A

1. Define space and time complexity of an algorithm.
2. Explain Big O notation for computing time and space complexity.
3. Define an array of strings. How is it stored in memory?

Section B

4. Differentiate a strictly binary tree and a binary tree?
5. Allocating structures. How are Linked List structures used in dynamic memory?
6. Define space and time complexity of an algorithm.
7. Define (FCLS) structure.
8. Why a queue structure is called a first come and first expression and postfix expression.
9. Convert the infix expression (\(a - b\)) into prefix expression.
10. How a two-dimensional array is represented in memory?

(Computer Question)

8 marks

Section Question No. 1 is compulsory. All questions are compulsory. Attempt five questions selecting one question from each.

Maximum marks: 80

Time allowed: 3 hours

Paper-BCA-232

DATA STRUCTURE

BCA/D-16

Printed Pages: 3

Roll No.

1053
Section A

8. Explain the following of the above graph:

- An adjacency list representation.
- An adjacency matrix representation.
- A path matrix
- Degree of each vertex.

9. Given below:

- Consider the graph (G) with four vertices:
- Level and height of each node.
- Non-leaf nodes.
- Leaf nodes.

Section B

8. Give a binary tree, define the following:

- Update
- Insert
- Delete
- Search
- Traversing a structure

3. Write notes on the following operations on a data structure:

- In a queue, develop algorithms to insert and delete a data element.
- Discuss two application areas of a stack data structure.
- When a stack is called full and empty, write basic operations performing on a stack.

Section C

8. In a linked list:

- Write an algorithm to insert a node in a single linked list.
- Differentiate a single linked list and a doubly linked list.
- How are static memory allocation data structures.

5. Write an algorithm to calculate average of a one-dimensional array of [15]. Choose an algorithm and write the following:

- Linked List
- Array
- Linked List
4. Design Address Sequencing and explain this working.

5. Explain various types of Computer Instruction.

6. Explain the design of Accumulator Logic.

7. What is Cache Memory?

8. What is I/O Interface?


10. Explain the Instruction Format. Give four examples of each category of Micro operations. Give four examples of each category of Micro operations. 

11. What is an Operating System?

12. What do you mean by Program Interrupt? Explain the process.

13. What is an RTI?

14. Where do you mean by an Operating System?

Note: A candidate will be required to answer five questions. 

Time allowed: 3 hours
9. Discuss COCOMO model. Explain basic single variable cost estimation and multi variable cost estimation model in detail. 16
   (a) Regression equation
   (b) Function estimation
   (c) System estimation
   (d) Unit estimation

8. Explain the following terms:
   (a) Change
   (b) Define Risk Management. Explain his process with help of 4×2

Unit-II

8. Explain the following terms:
   (a) WBS (Work breakdown structure)
   (b) CPM (Critical path method)
   (c) PERT (Program Evaluation and Review Technique)
   (d) Earned Value Management (EV-M) 4×4

Unit-III

8. Explain the process of SQA.
   (a) What do you mean by SQA (Software Quality Assurance)
   (b) Techniques in detail

8. (a) Explain project Monitoring. Explain its various tools and
   (b) Types in detail
   (c) What do you know about Feasibility study? Explain its various

Unit IV

2. Draw a diagram of software life cycle. Explain different phases involved in waterfall life cycle. 4×2
   (a) What do you mean by software development life cycle (SDLC)?
   (b) Computer-aided software engineering
   (c) Rapid application development
   (d) Process Metrics
   (e) Product Metrics

8. Explain the following terms:
   (a) Agile development
   (b) Change management

4×4

Computers Question

All questions carry equal marks. Attempt five questions selecting one question from each unit. Computer in application to its detailed form more necessary.

Note: Attempt five questions in all. Question No. 1 is compulsory. All others optional. Maximum marks: 80

Time allowed: 3 hours

Paper-BCA-34

SOFTWARE ENGINEERING

BCA/D-16

Page 1
Unit I

Chapter 1

1. Explain the concept of database.
2. What is the difference between relational and non-relational databases?
3. What is the significance of database design?
4. What is the role of a database system administrator?
5. Describe the architecture of a database system.
6. What do you mean by data independence? Explain various types of data independence.

Chapter 2

1. What is an entity? Explain the terms weak and strong entity.
2. What is an attribute? Explain the terms key and superkey.
3. What is a relationship? Explain the terms one-to-one, one-to-many, and many-to-many relationships.
4. What is a domain? Explain the terms domain and information.
5. Explain the concept of database design.
6. What is a primary key? Explain the terms primary key and secondary key.
7. What is a foreign key? Explain the terms foreign key and referential integrity.
8. What are the components of a database system?

Unit II

Chapter 3

1. What are the advantages and disadvantages of a database system?
2. What do you mean by database system? What are the components of a database system?

Chapter 4

1. What are the advantages and disadvantages of a database system?
2. What do you mean by database system? What are the components of a database system?
1057

(a) Evaluate \( \int_{1}^{2} f(x) \, dx \) using Simpson's rule taking \( h = \frac{1}{3} \).

(b) Hence evaluate \( \int_{0}^{1} f(x) \, dx \).

The following data:

<table>
<thead>
<tr>
<th>x</th>
<th>f(x)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>56</td>
</tr>
<tr>
<td>1</td>
<td>72</td>
</tr>
<tr>
<td>2</td>
<td>88</td>
</tr>
</tbody>
</table>

(c) Construct Newton's forward interpolation polynomial for the given data points.

(d) Explain Runge-Kutta method of fourth order.

(e) Using the given information, find the value of \( f(x) \) at \( x = 1.5 \) to 5 decimal places.

(f) Use Gauss's quadrature formula to evaluate

\[ \int_{0}^{\pi/2} x \sin x \, dx \]

(g) Devise Simpson's \( \frac{3}{8} \) rule.

8.

(i) Given that \( f(6) = 1.56, f(7) = 1.90 \) find the value of \( f(8) \).

(ii) Using divided difference, find the value of \( f(8) \).

(iii) Find \( \frac{dx}{d\lambda} \) at \( x = 1.5 \).
two to the following data:

Find the least square polynomial approximation of degree

\[ 0 = \frac{d}{dp} \left( \frac{1}{2} x^2 \right) \]

differential equation

\[ \bar{y} = 4436.6 \]

\[ \bar{x} = 49925 \]

\[ \bar{y} = 4723.6 \]

\[ \bar{x} \]

\[ \bar{x} = 45926.8 \]

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Turn over

4. Write a program to exchange the values stored in two locations in the memory using pointers.

Unit-II

3. Distinction between the following:

(a) Automatic and static variables

(b) Global and local variables

(c) Actual and formal arguments

4. Write a program to read a text and count all occurrences of a particular word.

Unit-I

1. Write definitions of the following:

(a) Class and public functions

(b) Call by reference and call by value

(c) User-defined data types

9. Differentiate between #ifdef and #if directives.

8. What do you mean by macro? What are the advantages of using macro definitions in a program?

Unit-IV

7. Write a program in C to copy the contents of one file into another.

6. Define a file in C. Explain various operations that can be performed on files.

Unit-III

5. Write a function that receives a sorted array of integers and a

integer value, and inserts that value in its correct place using

pointers.
What is data structure? Discuss different data structures used.

What is tree data structure? Discuss different tree traversal algorithms.

Write short note on linear array?

What is array data structure? Discuss different array representations.

What is tree data structure? Discuss different tree traversal algorithms.

What is an array data structure? Discuss different array representations.

What is tree data structure? Discuss different tree traversal algorithms.

What is an array data structure? Discuss different array representations.

What is tree data structure? Discuss different tree traversal algorithms.

What is an array data structure? Discuss different array representations.
8. Explain the working of stack organized processor with the help of block diagram. (a)
(b) Show parameters
(c) Showing local variables
(d) Inter-processor

8. Explain the following uses of stack: (a)
(b) Solve (A+B)-(C/D) using three, two, one and zero
(c) When is Indirect? Explain the different uses of Indirect register

Unit IV

7. Explain multi-level organization of cache. (a)
(b) Explain difference between word-associative and block-associative cache organization
(c) Differentiate horizontal and vertical
(d) Discuss the problems of management of memory

6. What is Indirect? Explain the concept using indirect register. (a)
(b) Explain the data misalignment between ALU and Memory

Unit V

3. What are output devices? Explain working of inkjet printer. (a)
(b) For data transfer, explain the concept of handshaking. How is it advantageous?
(c) Explain the concept of cycle stealing in DMA.
(d) Devise in this unit.

2. Discuss Daisy chain and Polling method of connecting microprocessor

Unit VI

4. (a) Distinguish between horizontal and vertical
(b) Describe the benefits of organizing microprocessors into hierarchies
(c) When is shift counter? Explain its use in ALU
(d) Information exchange

1. Answer the following questions in brief: 4x4=16

Competency Statements: Attempt all questions. Selecting one question is allowed. Marks: 80

Time allowed: 3 hours

PAPER-BCA-233

COMPUTER ARCHITECTURE

OBCA/D-16

Prime Papers : 2

Roll No. : 9060
5. Explain advantages and disadvantages of record based data models.
8. Explain centralized and client server architecture in DBMS.
4. (a) Explain object based data models and physical data models.
4. (b) Explain database and its characteristics.

Section-II

16. What are roles of DBA, Data manager, File manager and Disk

Section-I

4. (d) Define a key; also explain super and foreign keys.
4. (e) Define terms: entity, tuple, degree and cardinality.
4. (f) Define data independence in detail.
4. (g) What is concept of domain? How can attribute define domain?

Compulsory Questions

Section: All questions carry equal marks.

Note: Question No. 1 is compulsory. Attempt four more.

Maximum marks: 80

Time allowed: 3 hours

PAPER-BCA-234

INTRODUCTION TO DATABASE SYSTEM

OBCA / D-16
Section I

8. Explain with suitable example

Section II

8. Explain with suitable example

Section III

(2)
UNIT-IV

Various levels:
8. Discuss the concept of Quality Assurance. Also discuss its maintenance.
9. Why maintenance is necessary? Discuss various types of testing.

UNIT-V

Software testing:
6. Explain the following types of testing:
   (a) System testing
   (b) Acceptance testing
   (c) Regression testing
   (d) Performance testing

UNIT-VI

Software life cycle:
7. Explain the Software Development Life Cycle by giving its stages.
8. Write the various phases in detail with the help of a diagram.

UNIT-VII

Classification of computer based information systems in detail.
8. Explain SDLC (Software Development Life Cycle) by giving its phases.

Complementary Questions
1. Answer the following questions in brief:

Time allowed: 3 hours

PAPER-B-CA-235
DESIGN

STRUCTURAL SYSTEM ANALYSIS AND

OB/CA /D-16

Printed Pages: 2
\[ u \left[ 1 - z x^2 + x \right] = y \]

\[ 0 = \frac{dx}{dp} x - \frac{dz}{dx} x + \frac{dz}{dp} \left( 1 - z x \right) \]

Prove that:

(a) \[ \frac{dx}{dp} \]

(b) Show that the function \( u \) is concave upward at the origin for the curve \( z = x \).

(c) Find the radius of curvature at the origin for the curve \( z = x \).

(d) Write an equation of the normal to the curve \( z = x \) at \( (z, x) \).

(e) If \( y = \tan x + \cos x \) with respect to \( x \), find \( \frac{dy}{dz} \).

(f) If \( y = \tan x + \cos x \) with respect to \( x \), find \( \frac{dy}{dz} \).

(g) If \( y = \tan x + \cos x \) with respect to \( x \), find \( \frac{dy}{dz} \).

(h) If \( y = \tan x + \cos x \) with respect to \( x \), find \( \frac{dy}{dz} \).

(i) If \( y = \tan x + \cos x \) with respect to \( x \), find \( \frac{dy}{dz} \).

(j) If \( y = \tan x + \cos x \) with respect to \( x \), find \( \frac{dy}{dz} \).

(k) If \( y = \tan x + \cos x \) with respect to \( x \), find \( \frac{dy}{dz} \).

(l) If \( y = \tan x + \cos x \) with respect to \( x \), find \( \frac{dy}{dz} \).

(m) If \( y = \tan x + \cos x \) with respect to \( x \), find \( \frac{dy}{dz} \).

(n) If \( y = \tan x + \cos x \) with respect to \( x \), find \( \frac{dy}{dz} \).

(o) If \( y = \tan x + \cos x \) with respect to \( x \), find \( \frac{dy}{dz} \).

(p) If \( y = \tan x + \cos x \) with respect to \( x \), find \( \frac{dy}{dz} \).

(q) If \( y = \tan x + \cos x \) with respect to \( x \), find \( \frac{dy}{dz} \).

(r) If \( y = \tan x + \cos x \) with respect to \( x \), find \( \frac{dy}{dz} \).

(s) If \( y = \tan x + \cos x \) with respect to \( x \), find \( \frac{dy}{dz} \).

(t) If \( y = \tan x + \cos x \) with respect to \( x \), find \( \frac{dy}{dz} \).

(u) If \( y = \tan x + \cos x \) with respect to \( x \), find \( \frac{dy}{dz} \).

(v) If \( y = \tan x + \cos x \) with respect to \( x \), find \( \frac{dy}{dz} \).

(w) If \( y = \tan x + \cos x \) with respect to \( x \), find \( \frac{dy}{dz} \).

(x) If \( y = \tan x + \cos x \) with respect to \( x \), find \( \frac{dy}{dz} \).

(y) If \( y = \tan x + \cos x \) with respect to \( x \), find \( \frac{dy}{dz} \).

(z) If \( y = \tan x + \cos x \) with respect to \( x \), find \( \frac{dy}{dz} \).
1. Find the asymptotes of the polar curve $r = 2 + \cos \theta$.

2. Find the asymptotes of the curve $y = \frac{x + 1}{x - 1}$.

3. Find all the asymptotes of the curve $y = \frac{x + 1}{x - 1}$.

4. Find the point on the curve $y = \frac{x + 1}{x - 1}$ at which the tangent is perpendicular to the line $x = 2$.

5. Find the point where the curve $y = \frac{x + 1}{x - 1}$ has a single cusp.

6. Find the position and nature of double points on the curve $y = \frac{x + 1}{x - 1}$.
P.5.

(a) Find the value of \( \theta \), \( \phi \), and \( \lambda \) if \( \theta = 2 \), \( \phi = \frac{\pi}{4} \), and \( \lambda = \pi \).

(b) Express the function \( f(x) = \sin^2(x) \) in terms of \( \cos(2x) \).

(c) Evaluate the integral \( \int_{0}^{\infty} e^{-x^2} \, dx \).

(d) Find the limit \( \lim_{x \to \infty} \frac{\sin(x)}{x} \).

In a single line or two lines, find the probability that either a double or a triple roll will appear.

\[
\frac{\sqrt{\frac{\theta^2}{\phi^2}}}{\cos(\lambda)} \quad \text{and} \quad \left( \frac{1}{x} \right)_{1-n} = z
\]

2

\text{(c) Gamma function.}

Evaluate the integral \( \int_{0}^{\infty} x^{q-1}e^{-\frac{x}{\phi}} \, dx \).

\[
q \in C, \quad q \neq 0
\]

For all \( q \), \( q \in C \), \( \Gamma(q+1) = q \cdot \Gamma(q) \).

2

\text{(a) If } G \text{ is a group with multiplication, then prove (compulsory question).}

\text{Compulsory question (carry equal marks).}

\text{From each unit, select one question.}

\text{Note: Attempt five questions in all, selecting one question from each unit.}

Maximum Marks: 40

Time: Three Hours

B.7.01

INFORMATION TECHNOLOGY III

MATHEMATICAL FOUNDATIONS OF

12605

BTIT/D-16

Total Pages: 04

ROLL NO.:

UNIT IV
Chapter 1

Unit I

1. \( H \cap J \neq \emptyset \) is also a subgroup of \( G \).
2. If \( H_1 \) and \( H_2 \) are two subgroups of \( G \), then prove a group with addition.

Unit II

1. Prove that set of all even integers excluding zero is

Unit III

1. Expand \( \cos x \) using Taylor theorem.
2. Show that

Unit IV

1. Independent events or not.
2. The event \( D \) on the die, check whether \( A \) and \( B \) are

Unit V

1. What is the probability that the student is selected at random. If he failed in English, student is selected at random. If he failed in English, 10% of the students failed in English and Math. A 15% of the students failed in Math and English. 20% of the students failed in English. In a certain school, 20% of the students failed in

Unit VI

1. Lagrange's method of multipliers.
2. Given the condition \( \frac{2}{x^2 + 2x + 1} \), find the extreme values of the function \( f(x) = x^2 + 2x + 1 \).
3. Find the maximum and minimum values of the function.
4. Show that none of the following sets form an integral domain:
Explain the parameters of a two-port network.

Unit I

2. (a) Justify the need of a DC coupled amplifier.
2. (b) Why are NMOS devices preferred over PMOS in ICs?
2. (c) Why are isolation bands required in IC fabrication?
2. (d) What are the advantages and uses of an emitter follower?

Compulsory Question

From each Unit, Q. No. 1 is compulsory.

Note: Attempt five questions in all. Selecting one question

Maximum Marks: 40

Time: Three Hours

BSTT-302
THEORY

ELECTRONIC CIRCUITS AND NETWORK

BSTT/D-16

Roll No. Total Pages: 03
Unit I

3. Define CMRR. Why is high value of CMRR preferred?

5. Discuss why are transistors in ICs used

6. Discuss different types of transistor structures used in ICs.

Unit II

3. After each step, draw cross-sectional view of monolithic integrated transistor.

4. Discuss the step by step process for fabricating a monolithic integrated transistor.

Unit III

3. Explain masking and etching technique used in ICs.

5. Discuss how passivation method used in ICs.

8. Discuss formation of a monolithic integrated circuit.
Unit I

Super Highway?

Why is ATM called as "Highway" of the Information

(d) Simpler and less expensive.

(c) Justify the statement that "Paging System is much
devised to make one-to-one communication possible.
(d) Discuss merits of switched network to connect

2 x 4 Telephone line.

Compare the error rate in computer-computer

81 (Compulsory Question)

Questions carry equal marks.

Note: Attempt Five questions in all selecting at least one

Maximum Marks : 40

Time: Three Hours

BSIT-303

TELECOMMUNICATION-I

BSIT/D-16

12607

Roll No. 03

Total Pages: 03
Unit III

8. Draw architecture of ISDN system with a PBX and explain division switches.

5. Discuss Time-Slot Interchange in TDS using suitable diagram.

Unit II

8. Discuss various ATM layers in detail.

9. Discuss various ATM layers in detail.

4. Discuss the Virtual Circuit Switching network. How is Frame Relay System superior than
(6) Discuss drawbacks of virtual-circuit switching
(8) (a) Discuss architecture of Frame Relay Network.

Unit I

8. Write a detailed note on Personal Communications System.

4. Explain the operation of Improved Mobile Telephone
4. Discuss the Various Generations of cordless Telephone

5. Discuss the Various Generations of Cordless Telephone

6. Discuss the Various Generations of Cordless Telephone

5. Discuss the various generations of portable/satellite phone systems
1. Explain EL and DI instruction.
2. Explain DAW instruction.
3. What do you mean by RRC instruction?
4. The positive clock edge occurs halfway through.

(Compulsory Question)

Questions carry equal marks.

Note: Attempt five questions in all, selecting at least one from each unit.

Maximun Marks: 40

Time: Three Hours

BSIT-304
PROGRAMMING I
MICROPROCESSOR ARCHITECTURE AND
12608
BSIT/ D-16
Roll No. 03

Total Pages: 03
4. What do you mean by fetch-execute overlap of a microprocessor?

6. Draw and discuss the architecture of the 8085 microprocessor.

Unit III

4. Draw a diagram of the memory map that copies these bytes at address 0000H to 90FFH.
   Suppose that 256 bytes of data are stored in memory between addresses 0000H to 50FFH. Write a program
   that copies these bytes at address 0000H to 90FFH.

5. Discuss PUSH and POP instructions in detail.

Unit IV

4. Explain CALL and RET instructions with example.
   (i) CALL instruction and no INR
   (ii) CALL instruction and no INR
   (iii) CALL instruction and no DCR
   (iv) CALL instruction and no DCR
   series I+2+4+8+16+32

6. Write a program in 8085 to find the sum of a

Unit II

4. Write a program in 8085 to find the sum of a
   list of numbers stored at address 3000H.
   (i) Is HZNZ and Hand assemble this program starting
   at address 3000H. Add a delay approximately 500 microsec if the clock frequency
   is 1MHZ and Hand assemble this program starting at address 3000H. Add a delay approximately 500 microsec if the clock frequency
The functions of Operating System

2. (a) Explain.

Unit I

What do you mean by Verification in Deadlock?

8 (d) What do you mean by Synchronization?

(c) Identify IPC. How do processes communicate using

(b) Explain Process Control Block

Soil Real Time System

1. (a) Differentiate between Hard Real Time System and

(Compulsory Question)

Questions carry equal marks

Note: Attempt Five questions in all, selecting at least one

Maximum Marks: 40

3.05

OPERATING SYSTEM-I

BSET/D-16

BSET-305

Total Pages: 03

Roll No.
UNIT IV

8. Define Deadlock Prevention and Deadlock Avoidance

7. Explain producer consumer synchronization problem with

6. Write short notes on the following:

UNIT III

5. What do you mean by Schedulers? Difference between

4. (a) Preemptive and Non-preemptive Scheduling

3. (a) Scheduling Algorithms

2. Cooperative Processes

1. Message Passing System

UNIT II

3. (a) Operation System Call and explain various types of

2. Operating System

1. Define Booting Process
Chapter I

Unit 1

1. Discuss the two main components of programming.
   (a) Data structures, control, and communication with example.
   (b) Use of switch statement.
   (c) Write a program to show difference between do-while and while loop with example.
   (d) While a program to find multiplication table for 2.

Unit II

1. Write operators used in C with their precedence.
   (a) Introduce operators, arithmetic, and comparison.
   (b) Discuss and compare input/output and comments in C.
   (c) Write a program to print the structure of C program.
   (d) Write char types used in C.
   (e) Define features of C language.

Unit III

1. Discuss library functions in C.
   (a) Write a program to find even-odd of any number using if statement.
   (b) Write a program to find a program to find even-odd of any number using if statement.