

FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Third Semester B.Sc Degree Examination, November 2021**BCS3B04 - Data Structures**

(2019 Admission onwards)

Time: 2 hours

Max. Marks : 60

Part A**Answer all questions.****Each question carries Two marks.****Ceiling - 20 Marks**

1. Define Data Structure.
2. What is adjacency list?
3. What is chaining in hashing?
4. Define binary tree.
5. What are the limitations of a linear queue?
6. Give the node structure used in adjacency Multilist representation of a graph.
7. Write the node structure for single and doubly linked list.
8. What is double hashing?
9. What is balanced binary tree?
10. What are arrays?
11. What are the different variations of a deque?
12. What are contiguous and non contiguous data structures?

Part B**Answer all questions.****Each question carries Five marks.****Ceiling - 30 Marks**

13. Convert the expression $A * (B + C * D) + E$ to prefix form using stack.
14. Explain binary tree threading with an example.
15. Explain Depth First Search.
16. Explain open addressing with an example.
17. What are linked list? Write an algorithm to traverse a linked list.
18. Write down the algorithm for selection sorting.
19. Discuss Prim's Algorithm.

[P.T.O]

Part C

**Answer any one questions.
Each question carries Ten marks.**

- 20. Write a C program to implement stack using array.
- 21. What is collision? Discuss various collision resolution methods.

(1 x 10 = 10 Marks)

FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE
Third Semester B.Sc Degree Examination, November 2021
BCS3B05 - Operating System Concepts
(2019 Admission onwards)

Time: 2 hours

Max. Marks : 60

Part A

Answer all questions.
Each question carries Two marks.
Ceiling - 20 Marks

1. What is Context-Switch?
2. Write two algorithms for Deadlock Avoidance?
3. What is stack and buffer overflow attack?
4. What is POST?
5. What are the operating system functions?
6. What is a worm?
7. What is Direct Communication in Message passing system.
8. What is Worst-Fit Allocation?
9. What are the two types of Memory Allocations?
10. What is Trap Door?
11. What are the different File Allocation Methods?
12. What are the algorithms used for Deadlock Detection?

Part B

Answer all questions.
Each question carries Five marks.
Ceiling - 30 Marks

13. Write about Preemptive and Non-preemptive SJF scheduling.
14. Differentiate Protection and Security.
15. Write about any two ways of implementing the Free space List.
16. Explain TLB.
17. Explain the advantages and disadvantages of time sharing operating system.
18. Explain Program Threats.
19. Write about Deadlock Detection.

FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Third Semester B.Sc Degree Examination, November 2021**BCS3A11 - Numerical Skills**

(2019 Admission onwards)

Time: 2.5 hours

Max. Marks : 80

Part A**Answer all questions.****Each question carries Two marks.****Ceiling - 25 Marks**

1. Define Population.
2. What are the inverted AND and OR gates known as, draw the logic symbols.
3. What is a sequential circuit?
4. State the Associative law.
5. What do you mean by inferential statistics?
6. What is SOP?
7. What do you mean by average?
8. What is a decoder?
9. What is an AND gate?
10. List any two unweighted codes.
11. Determine the binary value for the following SOP expression $AB'C'D + A'BCD' = 1$.
12. What are registers?
13. Convert 100101 binary in to Gray code.
14. What is the BCD equivalent of 548?
15. Draw an inverter circuit using NAND gate.

Part B**Answer all questions.****Each question carries Five marks.****Ceiling - 35 Marks**

16. Convert the given decimal number into binary number : 512 ,786, 986
17. Realize the XONR Gate using AND, OR and NOT gates, Explain the design.
18. Write short note on k map
19. The following represents age distribution of students in an elementary class. Find the mode of the values: 7, 9, 10, 13, 11, 7, 9, 19, 12, 11, 9, 7, 9, 10, 11.
20. Realize the XNOR gate using NAND gates. Explain the design.
21. Find the value of F for all possible values of the variables for the Boolean function $F=AB+C$.

22. What do you mean by sequential circuits? Differentiate Combinational and sequential circuits
23. Describe half adder with the help of the logic diagram and truth table.

Part C

Answer any 2 questions.

Each question carries Ten marks.

24. What are Universal gates? Realise AND, OR and NOT gates using both NAND and NOR gates.
25. The marks obtained by Sam in an examination are given below:
Subject : Marks Obtained
English : 90 French : 60 Maths: 75 Science: 135 Total Marks : 360
Represent the above data by a pie chart.
26. Explain the working of JK flip flop .
27. Simplify using K Map

$$Y = A'B'C'D' + A'B'CD' + A'BCD' + A'BCD + AB'C'D' + ABCD' + ABCD$$

(2 x 10 = 20 Marks)

FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Third Semester B.Sc Degree Examination, November 2021

BCS3A12 - Web Designing

(2019 Admission onwards)

Time: 2.5 hours

Max. Marks : 80

Part A**Answer all questions.****Each question carries TwoMark****Ceiling - 25 Marks**

1. What is the purpose of publish icon?
2. What is a WordPress theme?
3. What are the different types of operators in javascript?
4. What are the different ways of including javascript into HTML page?
5. What is a webpage?
6. What do you mean by Joomla! Extension?
7. What do you mean by Joomla! community?
8. What is WordPress admin bar?
9. Which are the different control flow statements in javascript?
10. What is the use of Joomla! Categories?
11. What do you mean by section manager in Joomla!.
12. What do you mean by front page manager in Joomla!.
13. What do you mean by empty tag?
14. What is the difference between bulleted list and numbered list?
15. Differentiate visual editor and HTML editor?

Part B**Answer all questions.****Each question carries Five marks.****Ceiling - 35 Marks**

16. Briefly explain about WordPress General settings.
17. Briefly explain about the Joomla! Global configuration.
18. Briefly explain lists with examples.
19. How contents are managed in Joomla!?
20. Differentiate WordPress post and WordPress page.
21. Explain the basic formatting elements of HTML with example?
22. Explain the different data types in javascript
23. Explain in detail about logical operators in javascript.

Part C

Answer any 2 questions.

Each question carries Ten marks.

24. Explain different conditional statements in javascript with examples.
25. Explain the different ways of installing a new WordPress theme.
26. Explain Joomla! article manager in detail.
27. Create a static webpage for the department of computer science using HTML (List and Table should be used).

(2 x 10 = 20 Marks)

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(Pages : 2)

Reg. No:.....

Name:

FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE
Third Semester B.Sc Degree Examination, November 2021
BMT3C03 - Mathematics - 3
(2019 Admission onwards)

Time: 2 hours

Max. Marks : 60

Section A

All questions can be attended.
Each question carries 2 marks.

1. Find the vector function that describes the curve C of intersection of the plane $y = 2x$ and the paraboloid $z = 9 - x^2 - y^2$.
2. Define Tangential and Normal Components of Acceleration.
3. If $z = u^2v^3w^4$ and $u = t^2, v = 5t - 8, w = t^3 - t$. Find dz/dt .
4. Find the directional derivative of $f(x, y) = 2x^2y^3 + 6xy$ at $(1, 1)$ in the direction of a unit vector whose angle with the positive x -axis is $\pi/6$.
5. State Stoke's theorem.
6. Compute all the roots of $8^{\frac{1}{3}}$ and sketch these roots on an appropriate circle centered at origin.
7. Find the circulation and net flux for the flow $f(z) = 2z$ where C is the circle $|z| = 1$.
8. Show that the function $f(z) = 4z - 6\bar{z} + 3$ is not analytic at any point.
9. Find the first partial derivatives of $z = \frac{4\sqrt{x}}{3y^2+1}$.
10. Compute $\nabla f(x, y)$ for $f(x, y) = 5y - x^3y^2$.
11. Find the directional derivative of the function $f(x, y) = 5x^3y^6$ at the point $(1, 1)$ in the direction $\theta = \frac{\pi}{6}$.
12. Find the level curve of $f(x, y) = -x^2 + y^2$ passing through $(2, 3)$. Graph the gradient at the point.

(Ceiling 20 Marks)

Section B

All questions can be attended.
Each question carries 5 marks

13. A projectile is launched from ground level with an initial speed $V_0 = 768$ ft/s at an angle of elevation $\theta = 30^\circ$. Find
- the vector function and parametric equations of the projectile's trajectory,
 - the maximum altitude attained,
 - the range of the projectile, and
 - the impact speed.
14. Verify that the given function $u = \cos at \cdot \sin x$ satisfies Wave equation, $a^2 \frac{\partial^2 u}{\partial x^2} = \frac{\partial^2 u}{\partial t^2}$.
15. Define length of a space curve. Find the length of the space curve traced by the vector function $r(t) = a \cos t \mathbf{i} + a \sin t \mathbf{j} + at \mathbf{k}$, $0 \leq t \leq 2\pi$.
16. Determine whether the vector field $F(x, y) = (x^2 - 2y^3)\mathbf{i} + (x + 5y)\mathbf{j}$ is conservative.
17. State and prove Cauchy's inequality.
18. Show that $\cos\left(\frac{\pi}{2} + i \ln 2\right) = -\frac{3}{4}$
19. Show that $f(z) = e^z$ is nowhere analytic.

(Ceiling 30 Marks)

Section C

Answer any One question. Each question carries 10 marks

20. (a) Find parametric equations for the normal line to the surface $z = \frac{1}{2}x^2 + \frac{1}{2}y^2 - z + 4$ at the point $(1, -1, 5)$.
- (b) Find the points on the surface $x^2 + y^2 + z^2 = 7$ at which the gradient is parallel to the plane $2x + 4y + 6z = 1$.
21. (a) Show that the line integral $\int_C (y + yz)dx + (x + 3z^3 + xz)dy + (9yz^2 + xy - 1)dz$ is independent of the path C between $(1, 1, 1)$ to $(2, 1, 4)$.
- (b) Evaluate $\int_{(1,1,2)}^{(2,1,4)} F \cdot dr$

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(Pages : 2)

Reg. No:.....

Name:

FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE
Third Semester B.Sc Degree Examination, November 2021
BPH3C03 – Mechanics, Relativity, Waves & Oscillations
(2019 Admission onwards)

Time: 2 hours

Max. Marks : 60

Section A

**Answer all questions. Answer in two or three sentences.
Each correct answer carries a maximum of two marks.**

1. Explain what is inertial frames
2. Show that even if no external force is acting, a particle will experience a force in an accelerated frame
3. What is meant by centrifugal force?
4. State work - energy principle
5. Show that the curl of a conservative force vanishes
6. What are non conservative forces? Give two examples.
7. Explain proper time & proper length.
8. Give the relativistic relation between momentum and energy.
9. Write the expression for mass energy relation and explain the symbols.
10. What is the Schrodinger's postulate?
- 11 Graphically represent the variation of P.E. and K.E. of a simple harmonic oscillator.
When are they equal?
- 12 Explain what is meant by an harmonic oscillations.

(Ceiling: 20 Marks)

Section B (Paragraph/Problem)

(Answer all questions in a paragraph of about half a page to one page.

Each correct answer carries a maximum five marks)

13. A mass of 1 kg is thrown horizontally due north with a velocity 500m/s at latitude 30° .
Obtain the magnitude of Coriolis force.
14. Show that the law of conservation of linear momentum is invariant under Galilean transformation.
15. Form the potential energy function $U = U_0 + Px + Qx^2$, find the restoring force and hence the force constant.
16. Find the centre of mass of a system of masses m_1, m_2 and m_3 placed at (x_1, y_1, z_1) , (x_2, y_2, z_2) and (x_3, y_3, z_3) respectively.
17. Show that the law of addition of velocity predicts the constant value of the velocity of light in all the inertial frames.
18. Define wave function. Give its significance and write conditions for a wave function to be well behaved.
19. A particle of mass 1 g moves in a P.E. well given by $U = U_0 + 6x + x^2$. Find
 - (a) the force constant
 - (b) the frequency of oscillation and
 - (c) the position of stable equilibrium.

(Ceiling:30Marks)

Section C (Essay)

Answer anyone in about two pages .Each question carries ten marks)

20. Derive Galilean transformations. Show that length and acceleration are invariant under Galilean transformation.
21. Explain the principle of rocket. Derive expression for the final velocity of rocket.

(1x10=10 Marks)