



Rangamati Science and Technology University

Second Year First Semester Mid-Term 01 Examination-2021

Department of Computer Science and Engineering

Course Title: Data structure

Session: 2019-2020

Course Code: CSE-2101

Time: 01 Hour Marks: 15

1.
 - a) Define Data Structure operations. 1
 - b) As per COVID-19 rules, your CSE department is taking online classes. Your professor takes class from *Start_Time(hh:mm-09:00)* to *End_Time(hh:mm-09:45)*. He uses a chrome extension to track when a student joins the class and leaves the class with their *Student ID*. He stores it in a student tracker file and then circulates it in your batch group. Now, your teacher is very strict. He wants to take attendance at a moment when the number of students (40, 34, 14, 24, 43, 10, 33, 40, 19) present in the class is minimum. If there are multiple such times he can choose a time with equal probability and will take the attendance. Now, you know your teacher's Linear Algorithm and Search **the time(moment)** when your teacher would take the attendance as you have access to the student tracker file.
Note: Each student can join the class at multiple intervals (Nine intervals 5 minutes apart). 4
2.
 - a) The card game '*Call Bridge*' usually follows an algorithm, what is it? 1
 - b) *Priyotoma* likes stones very much. As she is fond of collecting beautiful stones, every day she finds some of the stones beautiful and put a name then collects it in her bottle. She collected number of stones and the name of those stones as follows:
A, B, C, D, G, I, K, L, M, O, P, Q, R, S, T, U, W, Z.
Find the stone 'B' through Binary Search and show that how many steps are required to find the desired stone. 4
3.
 - a) State floor and ceiling function with example. 2
 - b) Describe different types of Complexity of algorithms. 3



Rangamati Science and Technology University
Department of Computer Science and Engineering
2nd Year 1st Semester BSc (Engg.) Mid Term-1 Examination, 2021
Session: 2019-2020

Course Title: Numerical Analysis

Course Code: CSE-2103

Time: 1 Hour

Full Marks: 15

- NB: 1. Answer all the questions from the following
2. Figures in the right margin indicate marks of each question
3. All parts of a question must be answered serially

1. a) State Taylor's theorem. **01**
b) Use Taylor series expansion to approximate $f(x) = \cos x$ at $x_i + 1 = \pi/3$ **04**
with $n = 0$ to 6 on the basis of the value of $f(x)$ and its derivatives at $x_i = \pi/4$ which implies that $h = \pi/3 - \pi/4 = \pi/12$.
2. a) Write the types of Number Systems. Convert the following base-2 **2.5**
numbers to base-10: 1011001 and 110.00101
b) Convert $(1011111101111001)_2$ to base-16 and Convert $(0.14)_{10}$ to **03**
base-8
3. a) Determine the absolute and relative errors involved if $x = 2/3$ is **02**
represented in normalised decimal form with 6 digits by (a) round-off
(b) truncation.
b) The inverse of a matrix exists only if determinant is not zero. Prove it **2.5**
with its requirements.

Rangamati Science and Technology University
Department of Computer Science and Engineering
2nd Year 1st Semester B.Sc. (Engg.) Midterm-1:- 2021

Session: 2019-2020

Course Title: Basic Electronic Devices and Circuits

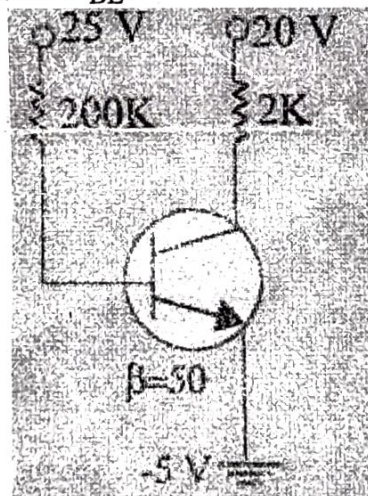
Course Code: EEE 2106

Time: 1 hr

Full Marks: 15

[Answer all the questions given below. Figures in the right-hand margin indicate full marks.]

1.	Explain the characteristics curve of common base configuration with their operating regions.	4
2.	What is amplification factor? Relate the amplification factor for common base and common emitter configuration.	3
3.	A particular configuration has base current 50 mA, collector current 5.202 mA and reverse saturated current 2 mA. Find the value of α , β and I_E .	3
4.	For the circuit given below, find the value of I_B , I_C , I_E and V_{CE} . Consider $\beta=50$ and neglect V_{BE} .	5





Rangamati Science and Technology University
Department of Computer Science and Engineering

2nd Year 1st Semester B.Sc. (Engg.) Midterm-1:- 2021

Session: 2019-2020

Course Title: Basic Electronic Devices and Circuits

Course Code: EEE 2106

Time: 1 hr

Full Marks: 15

[Answer all the questions given below. Figures in the right-hand margin indicate full marks.]

1.	Explain the characteristics curve of common base configuration with their operating regions.	4
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The circuit diagram shows a BJT in common emitter configuration. The base is biased by a 25V DC source through a 200K resistor. The collector is connected to a 20V DC source through a 2K resistor. The emitter is connected to a -5V DC source. The BJT is labeled with $\beta = 50$.



Rangamati Science and Technology University

Department of Computer Science and Engineering

Mid Term-1, Session: 2021-22

Course Title: Vector Calculus, Linear Algebra and Complex variable, Course Code: Math 2108

Time: 1 Hour

Full Marks: 15

Answer any 3(three) questions. Figures in the right margin indicates marks.

1. What is directional derivative? Find the directional derivative of $\phi = x^2yz + 4xz^2$ at $(1, -2, 1)$ in the direction $2\mathbf{i} - \mathbf{j} - 2\mathbf{k}$. 5
2. (a) A vector V is called irrotational if $\text{curl } V = 0$. Find constants a, b, c so that $V = (x + 2y + az)\mathbf{i} + (bx - 3y - z)\mathbf{j} + (4x + cy + 2z)\mathbf{k}$ is irrotational. 5
(b) Show that V can be expressed as the gradient of a scalar function.
3. Evaluate $\int \vec{A} \cdot d\vec{r}$ along the curve $x^2 + y^2 = 1, z = 1$ in the positive direction from $(0, 1, 1)$ to $(1, 0, 1)$ if $\vec{A} = (yz + 2x)\mathbf{i} + xz\mathbf{j} + (xy + 2z)\mathbf{k}$. 5
4. If $\vec{F} = 4xz\mathbf{i} - y^2\mathbf{j} + yz\mathbf{k}$, evaluate $\iint \vec{F} \cdot \hat{n} ds$ where S is the surface of the cube bounded by $x = 0, x = 1, y = 0, y = 1, z = 0, z = 1$. 5
5. Find the volume of the region common to the intersecting cylinders $x^2 + y^2 = a^2$ and $x^2 + z^2 = a^2$. 5



Rangamati Science and Technology University

Department of Computer Science and Engineering

2nd year 2nd semester, Mid-term 1

Course code: Eco 2109

Course Title: Engineering Economics

Full Marks: 15

Time: 1 Hours

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1. Define microeconomics and macroeconomics. Discuss the three problems of economic organization. 2+3=5
 2. What do you mean by production function? Briefly discuss about the law of diminishing marginal utility. 2+3=5
 3. Write short notes on-
market demand, marginal cost, price elasticity of demand, equilibrium, efficiency. 1*5=5



Rangamati Science and Technology University

Second Year First Semester Mid-Term 02 Examination-2021

Department of Computer Science and Engineering

Course Title: Data structure

Session: 2019-2020

Course Code: CSE-2101

Time: 01 Hour Marks: 15

1. a) Define Data Structure. [1]
b) Suppose the following numbers are stored in an array A. Now apply the bubble sort to the array A and discuss each pass separately.

Array A: 100 15 12 18 0 17 [4]

2. a) What do you mean by algorithm? [1]
b) *Yasin* is in a relationship with a sweet girl and his girlfriend loves arrays that are sorted in non-increasing order. Today is her birthday. *Yasin* wants to give her some sorted arrays on her birthday. But the shop has only unsorted arrays. So, *Yasin* bought *T* unsorted arrays and is trying to sort them. But he doesn't have much time to sort the arrays manually as he is getting late for the birthday party. So, he asked you to solve the problem because only you know the Selection sort strategies to **sort the *T* arrays in non-increasing order**. Help him, or his girlfriend will kill him! [4]

The	sight	of	lovers	feedeth	those	in	love
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3. a) State Stacks with example. [1]
b) Explain and draw the schematic diagram of the recursive solution of Tower of Hanoi problem when $n=3$. [4]



Rangamati Science and Technology University

Department of Computer Science and Engineering

2nd Year 1st Semester, Mid Term-2 Examination-2021

Course Title: Numerical Analysis

Course Code: Math-2103

Session: 2019-2020

Time: 1 Hours

Full Marks: 15

[Answer all the following questions. Figures in the right-hand margin indicate full marks.]

1. a) What is Gauss Elimination Method? Show how it reduces the coefficient matrix into an upper triangular matrix? 03
- b) Solve the following equations by Gauss-Seidal method. 02
$$\begin{aligned}8x + 2y - 2z &= 8 \\ x - 8y + 3z &= -4 \\ 2x + y + 9z &= 12\end{aligned}$$
2. a) The method of False Position (also called the Regular Falsi method, and the linear interpolation method) is another well-known bracketing method. 03
- b) Using the False Position method, find a root of the function $f(x) = e^x - 3x^2$ to an accuracy of 5 digits. The root is known to lie between 0.5 and 1.0. 02
$$e^x - 3x^2$$
3. a) What is the drawback of Newton-Raphson Method? Write the steps of its algorithm. 02
- b) Use Newton-Raphson method to find the real root near 2 of the equation $x^4 - 11x + 8 = 0$ accurate to five decimal places. 03
$$x^4 - 11x + 8$$



Rangamati Science and Technology University
Department of Computer Science and Engineering
2nd Year 1st Semester B.Sc. (Engg.) Midterm-2: - 2021
Session: 2019-2020

Course Title: Basic Electronic Devices and Circuits

Course Code:EEE 2106

Time: 1 hr

Full Marks: 15

[Answer all the questions. Figures in the right-hand margin indicate full marks.]

1.	Write down the basic differences between BJT and FET.	2
2.	What do you mean by Pinch off voltage? Explain the conditions and working process of a n-channel FET to reach the voltage level.	5
3.	Illustrate the transfer curve of any JFET from drain characteristics and explain briefly.	4
4.	Prove the conditions of a FET using Shockley's Equation.	4



Rangamati Science and Technology University

Department of Computer Science and Engineering

Mid Term-2, Session: 2019-2020

Course Title: Vector Calculus, Linear Algebra and Complex variable, Course Code: Math -2108

Time: 1 Hour

Full Marks: 15

Answer any 3(three) questions. Figures in the right margin indicates marks.

1. State Green's theorem? Verify Green's theorem in the plane for $\oint_C (xy + y^2) dx + x^2 dy$ where C 5
is the closed curve of the region bounded by $y = x$ and $y = x^2$.
2. Verify the divergence theorem for $\vec{F} = 2x^2 y \vec{i} - y^2 \vec{j} + 4xz^2 \vec{k}$ taken over the region in the 5
first octant bounded by $y^2 + z^2 = 9$ and $x = 2$.
3. Verify Stokes' theorem for $\vec{F} = xz \vec{i} + y \vec{j} + x^2 y \vec{k}$ where S is the surface of the region bounded 5
by $x = 0$, $y = 0$, $z = 0$, $2x + y + 2z = 8$ which is not included in the xz plane.
4. What is analytic function? Derive the necessary conditions for $f(z)$ to be analytic. 5
5. Derive the analytic function $w = u + iv$ if $v = \log(x^2 + y^2) + x - 2y$. 5



Rangamati Science and Technology University

Department of Computer Science and Engineering

2nd Year 2nd Semester B. Sc. (Engg.), Mid-term-2

Course code: ECO-2109

Course Title: Engineering Economics

Time: 1 Hour

Full Marks: 15

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1. What do you mean by imperfect competition? Discuss on monopoly market as an imperfectly competitive market structure. 1+4=5
 2. Define unemployment. Discuss about the economic and social impacts of unemployment in an economy. 1+4=5
 3. What is inflation? Briefly discuss about the economic impacts of inflation. 1+4=5