



GANDHI INSTITUTE FOR TECHNOLOGY (GIFT)
(An Autonomous Institution)

Registration No:

2	2	0	1	2	9	8	*	2	3	0
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BTech
BTBS-T-BS-303

Total Number of Pages: 02

3rd Semester End Semester Examination: 2023-24

Subject Name: Mathematics for CSE

BRANCH (CSE ALL): BTech

Max Marks: 100

Time: 3 Hour

Q. Code: BT302

*Answer Question No. 1 (Part-I) which is compulsory, any eight from Part-II and any two from Part-III
The figures in the right hand margin indicate marks.*

Part - I		
01	Answer the following questions:	(16×2)
a)	Find Laplace transformation of the function π^{2t}	1 3
b)	Convert the function $f(t) = \begin{cases} t, & 0 \leq t \leq \pi \\ 2 \sin t, & \pi < t \leq 2\pi, \\ 0, & t > 2\pi \end{cases}$, into unit step function	1 2
c)	If $f(x) = 2 + \sum_{n=1}^{\infty} \frac{2}{n} \cos \frac{n\pi}{2} + \sum_{n=1}^{\infty} \frac{1}{n} \sin \frac{n\pi}{2}$ is Fourier series, find the full length of the period.	2 2
d)	Find Fourier series of the $f(x) = 2 \sin^2 2x - 4 \sin x \cos 3x$ in the 2π period	2 3
e)	Define On-to function with suitable example?	3 1
f)	Find R^2 , Where $R = \{(1,2), (2,2), (2,4), (4,1), (3,2)\}$	3 2
g)	Let R is a relation define over the set A . Convert the relation $R = \{(1,1), (1,2), (2,1), (2,3), (3,2)\}$ in to a matrix form.	3 2
h)	Find the Fibonacci number $f(2), f(3), f(4), f(5)$ using recursive definition?	4 3
i)	Let the recurrence relation $a_n - 5a_{n-1} = 2a_{n-2}$ with $a_0 = 1$, & $a_1 = 2$, then find a_5 ?	5 3
j)	Find the generating function of $\frac{1}{1+x}$?	- 6 2
Part-II		
Answer any eight questions		(06×08)
02	a) Evaluate $\int_0^{\infty} e^{2t} t \cos 3t dt$ by using Laplace transformation.	1 3
b)	Find Laplace transformation of the function $\frac{1-\cos t}{t}$	1 3
c)	Find Laplace inverse transformation of the function $\ln \frac{s^2+a^2}{s^2+9}$	1 3
d)	Find sine series of the periodic function $f(x) = x \sin x$, $0 \leq x \leq \pi$	2 3
e)	Fourier series of the periodic function $f(x) = x^2$, $0 \leq x \leq 2$	2 3
f)	Find Fourier transformation of the function $f(x) = 1 + x^2$, $0 < x < 1$	2 3
g)	Let $R = \{(1,1), (2,2), (2,3), (3,4)\}$ be a relation defined on the set $A = \{1,2,3,4\}$, Then write the symmetric closure of the relation R .	3 2
h)	Let $f: R \rightarrow R$ defined by $f(x) = 2x+3$ and $g: R \rightarrow R$ defined by $g(x) = x+2$, find gof and fog	3 3



Registration No:

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	i)	Draw the Hasse diagram for the partial ordering set $\{(a,b) a \subseteq b\}$ on the power set $P(S)$ Where $S = \{a, b, c\}$	3	3
	j)	Solve the recurrence relation $a_n = 4(a_{n-1} - a_{n-2})$ with initial condition $a_0 = a_1 = 1$	4	3
	k)	Solve the recurrence relation $a_n = 6a_{n-1} - 11a_{n-2} + 6a_{n-3}$, with $a_0 = 2, a_1 = 5, a_3 = 15$	4	3
	l)	Solve the recurrence relation $a_n = a_{n-1} + n$ with initial condition $a_0 = 1$	4	3
		Part-III	CO	BTL
		Answer any Two questions from the Q-3 to Q-6	(16 x 2)	
03	a)	Solve the IVP $y'' - 4y = \sin 2t, y(0) = 1 \& y'(0) = 0$ by using Laplace transformation	1	3
	b)	Evaluate the integral equation $y(t) = \cos t + \int_0^t y(s) \sin(t-s) ds$	1	3
04	a)	Using Fourier integral, show that $\int_0^\infty \frac{\cos \omega x}{1+\omega^2} d\omega = \frac{\pi}{2} e^{-x}$, when $0 \leq x$	2	3
	b)	Find Fourier series of the periodic function $f(x) = x^2, -\pi \leq x \leq \pi$, hence show that $1 - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + \dots = \frac{\pi^2}{12}$	3	3
05	a)	Let $R = \{(1,2), (2,3), (3,1)\}$ and $A = \{1, 2, 3\}$, find the reflexive, symmetric and transitive closure of R , using <ul style="list-style-type: none"> (i) Composition of relation R. (ii) Composition of matrix relation R 	4	3
	b)	Use Warshall's algorithm to find the transitive closure of the relation $R = \{(1,1), (1,4), (2,1), (3,1), (3,2), (3,4), (4,2)\}$ on the set $\{1, 2, 3, 4\}$.	4	3
06		Solve the recurrence relation by using generating function $a_n = 5a_{n-1} - 6a_{n-2} + 7^n$ with initial condition $a_0 = 1, \& a_1 = -1$	6	4

x

** BTL: Bloom's Taxonomy Level

** CO: Course Outcomes



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Total Number of Pages: 02

BTech
BTBS-T-HS-301

3rd Semester End Semester Examination: 2023-24

Subject Name: Organizational Behaviour

BRANCH (CSE, CSE-AI, CSE-IOT): B.Tech

Max Marks: 100

Time: 3 Hour

Q. Code: BT305

Answer Question No. 1 (Part-I) which is compulsory, any eight from Part-II and any two from Part-III
The figures in the right hand margin indicate marks.

Part - I			(16 x 2)	CO	BTL
01	Answer the following questions:				
a)	Why is the study of OB important for organizations?			2	4
b)	Define Locus of Control?			2	1
c)	What do you mean by "Self-Monitoring"			3	1
d)	Define Self Efficacy.			3	1
e)	Define "Trait Theory".			4	1
f)	Define Metamorphosis Stage			6	1
g)	What do you mean by Organizational Climate			6	1
h)	State the factors responsible for influencing perception of an individual.			2	2
i)	Differentiate between formal and informal group.			3	2
j)	Differentiate between Verbal and Non-Verbal communication.			5	2
Part-II			(06 x 08)	CO	BTL
Answer any eight questions					
02	a)	Explain the scope of OB?		2	2
	b)	List three factors that can influence an individual's personality in an organizational setting.		3	3
	c)	Explain different Stages of Group Development		5	2
	d)	Name three factors that can affect the organizational Climate.		6	2
	e)	Describe the Change process, including its stages.		6	3
	f)	Introvert people stay away from socialising. Do you think it is bad? Justify.		2	4
	g)	State the difference between a leader and a manager.		4	2
	h)	"Models of OB are framework to manage behaviour of people in organisations."		2	4
	i)	Explain the models.			
	j)	Explain Managerial Grid Theory.		4	2
	k)	Differentiate between Proactive and Reactive change in organizations.		6	3
	l)	Describe Vroom's Expectancy theory of motivation.		2	3
		Describe the Learning process and its stages.		4	4
Part-III			(16 x 2)	CO	BTL
Answer any Two questions from the Q-3 to Q-6					
03	a)	Compare and Contrast the Classical Management model and the Human Relations model of organizational behaviour.		2	4



Registration No:

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	b)	Elaborate the Iceberg Model of personality, including its visible and hidden components, and how it applies to organizational behaviour.	3	3
04	a)	Discuss the importance of conflict resolution skills for managers and their role in maintaining a harmonious work environment.	5	4
	b)	Analyse the factors affecting organizational climate and how they can impact employee morale and job satisfaction.	6	4
05	a)	Compare and contrast between need hierarchy theory and dual factor theory.	2	4
	b)	"Beauty lies in the eyes of the beholder". Justify this statement by providing sufficient information in accordance to perceptual process.	2	4
06	a)	Explain MBTI.	2	2
7	b)	Explain the various types of communication.	5	2

** BTL: Bloom's Taxonomy Level

** CO: Course Outcomes



Registration No:

2 | 2 | 0 | 1 | 2 | 9 | 8 | 2 | 3 | 0 |

Total Number of Pages: 02

BTech
BTCS-T-ES-301

3rd Semester End Semester Examination: 2023-24

Subject Name: OOPs using Java

BRANCH(S): BTech

Max Marks: 100

Time: 3 Hour

Q. Code: BT317

*Answer Question No. 1 (Part-I) which is compulsory, any eight from Part-II and any two from Part-III
The figures in the right hand margin indicate marks.*

Part - I			
	(10 x 2)	CO	BTL
01	Answer the following questions:		
a)	What do you know by java byte code?	1	2
b)	Why is the main method static in Java?	1	2
c)	What happens when a class doesn't contain any constructor? How its data members are initialized?	2	2
d)	Write difference between final and finally keyword in java?	2	2
e)	Differentiate between compile-time and runtime polymorphism.	3	2
f)	Explain equals() and compareTo() methods of String class.	3	2
g)	Find output. String s1="125",s2="251"; int n1=Integer.parseInt(s1),n2= Integer.parseInt(s2); System.out.println(s1+s2); System.out.println(n1+n2+Integer.parseInt(s1+s2));	4	2
h)	Define the term package. Name any 5 java library packages.	4	2
i)	Differentiate between sleep() and wait() method in multithreading in java.	5	2
j)	Explain the role of the "TextField" class in AWT.	6	2
Part-II			
Answer any eight questions (06 x 08)			CO
02	a)	Explain instance variables, local variables and argument variables with suitable example.	2
	b)	Write a java program to print the greatest and smallest of N integers.	1
	c)	Write a java program that defines a class 'Rectangle' with instance variables for length and width. The class also contains a parameterized constructor and methods to display the instance variables and also a method to compare length and width of a rectangle.	2
	d)	Write a Java program to calculate the ratio of male to female voters among N voters of class "Voter" with instance variables 'name' and 'gender'.	2



Registration No:

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c)	Write an example program to show constructor overloading in a class 'Employee' with instance variables name and age.	3	3
f)	Write a Java program that takes a string as input and counts the total number of alphabets, digits and special symbols present in it.	3	4
g)	Explain the concept of Wrapper classes, boxing and unboxing in java.	4	3
h)	Provide an example of creating and using a custom package.	4	3
i)	Define the term "thread priority" in Java. How can you assign and get the priority of a thread.	5	3
j)	What do you know by thread synchronization? How can you achieve it?	5	3
k)	How do you use try-catch blocks for handling exceptions in Java?	6	3
l)	Write a java program to design a Login frame using awt components.	6	3

Part-III

Answer any Two questions from the Q-3 to Q-6 (16 x 2)

CO BTL

03	a)	Write a Java program to print the common elements present in two different arrays of integers.	1	3
	b)	Imagine you have an abstract class called "Bank" that offers functionality to determine the rate of interest through the method interest Rate(). Generate subclasses named SBI, ICICI, and AXIS banks. These subclasses should specify interest rates of 8%, 7.5%, and 9%, respectively. Write a java program for it.	2	4
04	a)	Write a program to overload a method sum() as follows: i) int sum(int n)- To calculate and return sum of all multiples of 3 up to n. ii) int sum(int m , int n)- To calculate and return sum of all numbers between m and n which are divisible by 3 or 5.	3	3
	b)	Write a Java program to provide an example of using an interface to achieve multiple inheritances.	3	4
05	a)	Design a frame in java to accept students Name, Roll No, Branch , Year, CGPA and Grade by using Label, text Field and a suitable layout manager.	6	3
	b)	Define inheritance. Explain different types of inheritance by taking real world examples.	4	3
06	a)	Describe the various states a thread can be in during its lifecycle in Java.	5	3
	b)	Write a program to accept a number and print whether or not it is a lead number. A number is said to be a lead number if its sum of even digits is same as sum of odd digits. Eg. 72344 $7+3=2+4+4$	1	3



Registration No:

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BTech
BTCS-T-PC-301

Total Number of Pages: 03

3rd Semester End Semester Examination: 2023-24

Subject Name: Database Management System

BRANCH (CSE, CSE-AI, CSE-IOT): BTech

Max Marks: 100

Time: 3 Hour

Q. Code: BT307

*Answer Question No. 1 (Part-I) which is compulsory, any eight from Part-II and any two from Part-III
The figures in the right hand margin indicate marks.*

Part - I		CO	BTL
01	Answer the following questions:		
a)	Define data independence and Explain the difference between logical and physical data independence	1	2
b)	What are DDL and DML in Database Management system?	1	1
c)	What is recursive relationship? Give an example	2	1
d)	Which one is correct? Explain with reason (A) Primary key \subseteq Super key \subseteq Candidate key (B) Candidate key \subseteq Super key \subseteq Primary key (C) Primary key \subseteq Candidate key \subseteq Super key (D) Super key \subseteq Primary key \subseteq Candidate key	2	2
e)	Write the general form of selection (σ) operations in relational algebra.	2	2
f)	What is partial dependency? Explain with suitable example	3	2
g)	Given R(A,B,C) and FD set F={AB \rightarrow C, C \rightarrow B}. Is R is in BCNF? Justify your answer.	3	3
h)	Consider the following schema: Student(Sid,Name,age) Write a query in SQL to increment the age from 16 to 18 of a student whose student Id (Sid) is 63?	4	3
i)	What is binary lock in concurrency control?	5	1
j)	Consider the given transaction T1, that follows 2-phase Locking protocol: T1 1. Read – Lock(X) 2. Read – item (X) 3. Write – Lock(Y) 4. Unlock(X) 5. Read – item(Y) 6. Y = X + Y 7. Write – item(Y) 8. Unlock(Y) Which records are in growing phase and which are in shrinking phase?	5	3



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Part-II

(06 x 08)

CO BTL

Answer any eight questions																														
02	a) Discuss different types of Users in a Database System: i) DBA ii) Database Designer iii) End Users	1	2																											
	b) Differentiate between (with example): i. Single valued and multivalued ii. Stored and Derived iii. Simple and Composite	2	2																											
	c) Discuss participation constraint and cardinality ratio with example.	2	2																											
	d) Differentiate between Natural join and Equi join.	2	2																											
	e) Explain Cartesian product operation in relational algebra? Below Given two relation instances R and S :	2	3																											
	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td>R</td><td>A</td><td>B</td></tr> <tr> <td>1</td><td>X</td><td></td></tr> <tr> <td>2</td><td>Y</td><td></td></tr> <tr> <td>3</td><td>Z</td><td></td></tr> </table> <table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td>S</td><td>C</td><td>D</td></tr> <tr> <td>1</td><td>S</td><td></td></tr> <tr> <td>0</td><td></td><td></td></tr> <tr> <td>2</td><td>I</td><td></td></tr> <tr> <td>0</td><td></td><td></td></tr> </table> Find $R \times S$	R	A	B	1	X		2	Y		3	Z		S	C	D	1	S		0			2	I		0				
R	A	B																												
1	X																													
2	Y																													
3	Z																													
S	C	D																												
1	S																													
0																														
2	I																													
0																														
	f) Let R(A, B, C, D, E, P, G) be a relational schema with the following FDs: $AB \rightarrow CD$, $DE \rightarrow P$, $C \rightarrow E$, $P \rightarrow C$ and $B \rightarrow G$. Is R is in 2NF? Justify your answer.	3	3																											
	g) What is Join dependency hence define 5NF	3	1																											
	h) Explain trigger with example.	4	2																											
i)	Consider the following tables: Employee (Emp_no, Name, Emp_city) Company (Emp_no, Company_name, Salary) a) Write a SQL query to display Employee name and company name. b) Write a SQL query to display employee name, employee city ,company name and salary of all the employees whose salary >10000	4	3																											
j)	What are the different type query optimization algorithms explain briefly?	5	1																											
k)	What is database recovery? What are the different causes of failure?	5	1																											
l)	Check whether the following schedules are conflict serializable or not: (i) Read1(x); Write2(x); Write2(y); Read3(y); Read3(z); Write1(z) (ii) Read3(y); Read3(z); Read1(x); Write1(x); Write3(y); Write3(z); Read2(z); Read1(y); Write1(y); Read2(y); Write2(y); Read2(x); Write2(x)	5	2																											
03	Part-III Answer any Two questions from the Q-3 to Q-6		(16 x 2)																											
a)	Discuss the 3-schema architecture with a neat diagram.	1	2																											
b)	Briefly discuss the various database languages.	1	2																											
04	a) Consider the following relation schemas Sailor (sid, sname, age, rating) Boat (bid, bname, color) Reserve (sid, bid, date)	2	3																											



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		Express the following queries in relational algebra i. Find the name of the sailor whose rating is more than 6. ii. Find the name of the sailor who has reserved boat on 27th Jan 2016. iii. Find the name of the sailor who has reserved all the boats.																				
b)	Develop the ER diagram for the following: The company is organized into departments. Each department has a unique name, a unique number, and a particular employee who manages the department. We keep track of the start date when that employee began managing the department. A department may have several locations. A department controls a number of projects, each of which has a unique name, a unique number, and a single location. We store each employee's name, aadhar no, address, salary, gender, and birth date. An employee is assigned to one department, but may work on several projects, which are not necessarily controlled by the same department. We keep track of the current number of hours per week that an employee works on each project. We also keep track of the direct supervisor of each employee (who is another employee). We want to keep track of the dependents of each employee for insurance purposes. We keep each dependent's first name, gender, birth date, and relationship to the employee	2	3																			
05	a) Define and explain 2NF and 3NF with suitable example.	3	2																			
b)	Consider the following schemas EMPLOYEE <table border="1"><tr><td>Fname</td><td>Minit</td><td>Lname</td><td>Ssn</td><td>Bdate</td><td>Address</td><td>Sex</td><td>Salary</td><td>Supr_ssn</td><td>Dno</td></tr></table> DEPARTMENT <table border="1"><tr><td>Dname</td><td>Dnumber</td><td>Mgr_ssn</td><td>Mgr_start_date</td></tr></table> PROJECT <table border="1"><tr><td>Pname</td><td>Pnumber</td><td>Plocation</td><td>Dnum</td></tr></table> Write SQL and relational algebra queries for the following i. Retrieve the name and address of all employees who work for the 'Research' department ii. For every project located in 'Stafford', list the project number, the controlling department number, and the department manager's last name, address and birth date	Fname	Minit	Lname	Ssn	Bdate	Address	Sex	Salary	Supr_ssn	Dno	Dname	Dnumber	Mgr_ssn	Mgr_start_date	Pname	Pnumber	Plocation	Dnum	4	3	
Fname	Minit	Lname	Ssn	Bdate	Address	Sex	Salary	Supr_ssn	Dno													
Dname	Dnumber	Mgr_ssn	Mgr_start_date																			
Pname	Pnumber	Plocation	Dnum																			
06	a) Discuss various states of transaction with suitable state transition diagram.	5	2																			
	b) Discuss the basic 2-phase locking protocol with suitable example	5	2																			

** BTL: Bloom's Taxonomy Level

** CO: Course Outcomes



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Registration No :

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Total Number of Pages: 02

BTech
BTSC-T-SC-301

3rd Semester End Semester Examination: 2023-24

Subject: EET

BRANCH(S) : All

Time: 3 Hour

Max Marks: 100

Q. Code : BT323

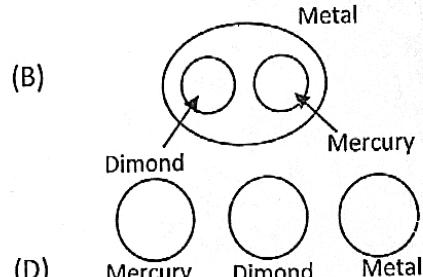
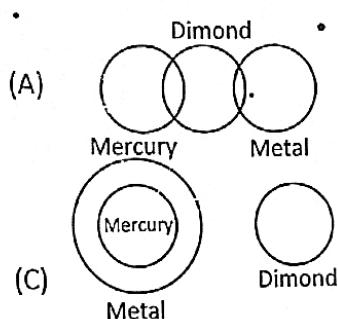
Answer Question No. 1 (Part-I) which is compulsory, any eight from Part-II and any two from Part-III
The figures in the right hand margin indicate marks.

Part -I

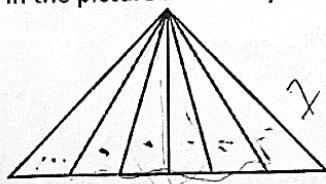
(2 x 10)

Q1. Answer the following questions:

- a) This of the following Venn diagram best represents the relation.



- b) Find the day of the date 4th January 1246?
 c) Find the unit digit of 3^{442} .
 d) Price of an article first increase by 10% then reduces by 10%. What is the net percentage change in the price of the article?
 e) Population of a city increase by 10% every year. What is the percentage change in the population after 3 years?
 f) Find the compound interest on Rs. 4000 in 3 years, rate of interest being 10% per annum.
 g) In a chess board how many square are there?
 h) $100!$ Ends with how many zeros?
 i) In the picture how many triangles are there?



- j) What is the unit digit of $1! + 2! + 3! + \dots + 1777!$?

Part -II

(6 x 8)

2. Answer any eight out of twelve.

- a) Find the last two digits of 25^{12} ?
 b) A man invests Rs. 80,000 in two different banks. One bank is offering 10% SI and other is offering 10% CI. The end of two year total investment received from both the banks is Rs. 16400. Find the ratio of investment in both the banks.
 c) Find the difference between SI and CI in 4 years on Rs. 15000, rate of interest being 8% per annum.



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- d) Population of city increase by 10% in the 1st year 20% in the second year and 30% in the 3rd year, Present population is 80000. What was the approximate population 3 years back?
- e) There is a cube of size 8cm x 8 cm x 8cm. All the 6 faces are painted Red colour and core is white. Then it is cut into 512 small cubes of size 1 x 1 x 1. How many small cubes are there having 1 side red painted?
- f) What is the unit digit of $3^{544} \times 5^{544} \times 6^{544} \times 7^{544}$?
- g) HCF of two numbers is 13 and LCM is 1690. If one of the numbers is 130 then what is the other number?
- h) ~~TEN~~
- TEN
- TEN
- TEN
- ONE
(TEN + TEN + TEN + TEN = ONE)
If each letter stands for a different digit, then TEN stands for what.
- i) A car covered a distance of 200 km. During the journey 5 wheels are used. If every wheel covered equal distance then find the distance covered by each wheel?
- j) Which of the following are Prime number and why? And also which are not prime number and why ? 493, 621, 667, 247, 131, 233.
- k) What is the unit digit of $(2343)^{523} \times (724)^{245} \times (933)^{244}$.
- l) One day a man added all the page numbers of a booklet. He got the answer as 2000. But he realized that by mistake he has skipped one page number. Find the missing page number.

Part -III

(16x 2)

Answer any two out of four.

~~3~~ In statements followed by 4 conclusions. Identify which conclusion can be derived from the given statements
(draw the appropriate Venn diagram)

- A) St-1 : All doctors are clever.
St-2 : All cleavers are rich.

Conclusion:

- 1) Some clever are rich. 2) Some doctors are rich. 3) Some doctors are not rich.
4) Some rich are doctors.

- B) St-1 : Some poor are intelligent. St-2 : Some intelligent are rich.

Conclusion:

- 1) Some poor are rich. 2) Some rich are intelligent 3) Some poor may be rich
4) Some intelligent are poor

4. (A) Find the digit in the tens place and unit place last two digits of $(41)^{293}$.

(B) If 4th January 1976 was on a Thursday, then what is the day of the date 15th Aug 1947?

5. (A): HCF of two numbers is 17 and LCM is 2210. How many such pairs exist?

(B): What is the remainder when 27! Is divided by 10^7 .

6.

(A): A mixture contains milk and water in the ratio 80% and 20% another mixture contain milk and water in the ratio 30% and 70 %. In what ratio they must be added so that ratio between milk and water is the resulting number is 1: 1?

(B): In a certain code

0 is written as β

1 is written as ψ

2 is written as $\psi\beta$

3 is written as $\psi\psi$

4 is written as $\psi\beta\beta$

What is the value of $\psi\psi\beta\beta\psi\psi$



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Registration No:

2 2 0 1 2 9 8 1 8 6

Total Number of Pages: 02

BTech
BTEC-T-OE-301

3rd Semester End Semester Examination: 2023-24

Subject Name: Digital Logic Design

BRANCH (CSE, CSE-AI, CSE-IOT): BTech

Sonali Priyadarshini Max Marks: 100
Q. Code: BT312

Time: 3 Hour

Answer Question No. 1 (Part-I) which is compulsory, any eight from Part-II and any two from Part-III
The figures in the right hand margin indicate marks.

Part - I		Shree Jagannatha	
01	Answer the following questions:	(16 x 2)	CO BTL
a)	Determine the octal equivalent of $(A.C)_{16}$	1	2
b)	Which gates are called as the universal gates? What are its advantages?	1	2
c)	Define Minterm & Maxterm ?	1	1
d)	Design a full adder using two Half-adders.	2	2
e)	What is meant by parity bit?	2	1
f)	Construct 2:1 multiplexer?	2	1
g)	Prove the Boolean law : $AB + A'C = (A + C)(A' + B)$	2	3
h)	Draw the state diagram of a JK flip-flop.	3	2
i)	Define the Static RAM and Dynamic RAM	4	1
j)	List the major differences between PLA and PAL	4	2
Part-II		CO	BT
Answer any eight questions		(06 x 08)	
a)	Realize all logical gates with NOR gates.	1	2
b)	Subtract $(111001)_2$ from $(101011)_2$ using 1's complement?	1	2
c)	Design the circuit by Using NAND gates $F = ABC' + DE + AB'D'$	2	3
d)	Simplify and implementation the following SOP function using NOR gates (L3) (5M) $F(A,B,C,D) = \sum m(0,1,4,5,10,11,14,15)$	2	3
e)	Minimize $F(A,B,C,D) = \sum m(0,1,2,3,4,5) + d(10,11,12,13,14,15)$ using K-map.	3	3
f)	Design a 3-bit asynchronous down counter.	3	3
g)	Determine the type of Hazard and Design a hazard free circuit for the given function : $Y = AB + B'C$	4	2
h)	Explain a 4 X 2 priority encoder.	2	2
i)	Design and implement the circuit using basic gates which has 3 inputs (A,B,C) and one output Z. The output is HIGH, when the input is less than 3, otherwise 0.	3	2
j)	Design and draw the 3 bit up-down synchronous counter?	4	3
k)	Write the VHDL code for a demultiplexer.	4	3
l)	Design the following functions using PLA : $Y_1 = \sum m(4,5,7)$ and $Y_2 = \sum m(3,5,7)$.	4	3
Part-III		CO	BT
Answer any Two questions from the Q-3 to Q-6		(16 x 2)	
03	Explain various number systems and codes and their conversion with examples for each.	1	2



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	b)	Simplify the following Boolean expressions to a minimum number of literals (i) $ABC + A'B + ABC'$ (ii) $xy + x(wz + wz')$	1	3
04	a)	Draw the multiple level NAND circuit for the following expression: $(AB' + CD'E + BC(A+B))$	2	3
	b)	Show that the dual of the exclusive OR is also its compliment.	2	2
05	a)	For the given state diagram i) Find the output sequence and state sequence for the input sequence 10110010. ii) Reduce the no. of states and do state assignment. iii) Draw the reduced state diagram.	4	3
	b)	Design a full adder using demultiplexer.	2	3
06	a)	Design 4-bit shift register using D flip-flops and explain its working with the help of timing diagrams	3	3
	b)	Design a counter with the following repeated binary sequence: 0,1,2,3,4,5,6, use JK flip-flops.	3	3