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S.No. : 31 BCS 3302

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B. Tech. Examination 2021-22

(Odd Semester)

OBJECT ORIENTED ANALYSIS AND DESIGN

(Using UML)

Time : Three Hours] *[Maximum Marks : 60*

Note :– Attempt all questions.

SECTION – A

1. Attempt all parts of the following : 8×1=8

   (a) Define the term UML and OOAD.

   (b) Define association and aggregation.

   (c) Define events and states.

   (d) List different kinds of relationships exist among objects.

[P. T. O.

(e) Define the architectural modeling.

(f) What are the purposes of interaction diagrams.

(g) Define object flow.

(h) What do you understand by deployment diagrams?

SECTION – B

2. Attempt any two parts of the following : 2×6=12

(a) Discuss clearly about different models of object oriented development with a neat sketch.

(b) Discuss the role of classes and objects in analysis and design.

(c) Draw the activity diagram for online shopping cart.

(d) Define state diagrams. Draw and explain sample state diagram for washing machine.

SECTION – C

Note :– *Attempt all questions. Attempt any two parts from each question.* 8×5=40

3. (a) Explain the phases of software development life cycle giving its salient features.

(b) Write the importance of modeling in object and discuss clearly about the modeling principles.

(c) Explain the conceptual model of UML architecture.

4. (a) How can you define the association and aggregation? Also define the association classes.

(b) Define the term interations. Explain interation diagrams and its types.

(c) Define the terms dependancy, generalisation and realization in terms of relationships.

5. (a) What is forking and joining in activity diagram? Explain with an example.

(b) What is meant by use cases? Explain about use case description with an example.

(c) Explain the concept of processes and threads in detail.

6. (a) Explain about the modeling techniques of events and signals.

(b) Define components? What are the differences between components and classes?

(c) Explain the concepts of deployment and deployment diagrams with examples.

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B. Tech. Examination 2021-22

(Odd Semester)

DISCRETE MATHEMATICS

Time : Three Hours] *[Maximum Marks : 60*

Note :– Attempt all questions.

SECTION – A

1. Attempt all parts of the following : 8×1=8

   (a) Define various types of function.

   (b) State pigion hole principles.

   (c) Define properties of ring.

   (d) Describe power set with example.

   (e) What is POSET?

[P. T. O.

(f) Show that the proposition $P \rightarrow Q$ and $\neg P \vee Q$ are logically equivalent.

(g) What is bipartite graph?

(h) What is binary search tree?

SECTION – B

2. Attempt any two parts of the following : 2×6=12

(a) Prove that $n! \geq 2^{n-1} \quad \forall\ n \geq 1$ by using mathematical induction.

(b) Show that $(z, *, \#)$ is a commutative ring with unity where operation $*$ and $\#$ are defined as :

$a * b = a + b - 1$ and $a \# b = a + b - ab$

where $a, b \in z$.

(c) Simplify the following Boolean function using three variables k-maps :

$$F(x, y, z) = \Sigma(0, 1, 5, 7)$$

(d) Show that following implications without constructing the truth table :

$$(P \wedge Q) \vee (P \wedge \neg Q) \vee (\neg P \wedge Q) \equiv (P \vee Q)$$

SECTION – C

Note :– Attempt all questions. Attempt any two parts from each question. 5×8=40

3. (a) Prove for any two sets A and B, that :

$$(A \cup B)' = A' \cap B'$$

(b) If $f : A \rightarrow B, g : B \rightarrow C$ are invertible functions then show that $g \circ f : A \rightarrow C$ is invertible and $(g \circ f)^{-1} = f^{-1} \circ g^{-1}$.

(c) In a group of 400 people 250 can speak English only and 70 can speak Hindi only.

(i) How many can speak English?

(ii) How many can speak Hindi?

(iii) How many can speak both English and Hindi?

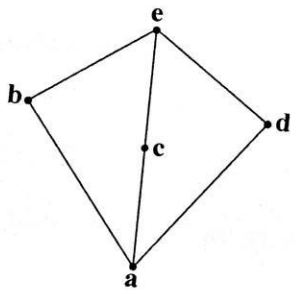
4. (a) Let G be the set of all non-zero real numbers and let $a * b = ab/2$. Show that $(G, *)$ be an Abelian group.

(b) Determine the directed graph and hasse diagram of the relation $A = \{a, b, c, d, e\}$ whose matrix is shown below :

$A =$

	a	b	c	d	e
a	1	0	1	1	1
b	0	1	1	1	1
c	0	0	1	1	1
d	0	0	0	1	0
e	0	0	0	0	1

(c) Consider the hasse diagram of POSET given below and check whether it is hattice or not :



5. (a) Are the following arguments valid? If valid, construct a formula proof; if not, explain why ?

"For students to do well in discrete mathematics, it is necessary that they study hard. Students who do well in courses do not skip classes. Student who study hard do well in course. Therefore students who do well in discrete mathematics, do not skip classes."

(b) Construct the truth table for the following statements :

$$P \leftrightarrow (P \not\rightarrow Q')$$

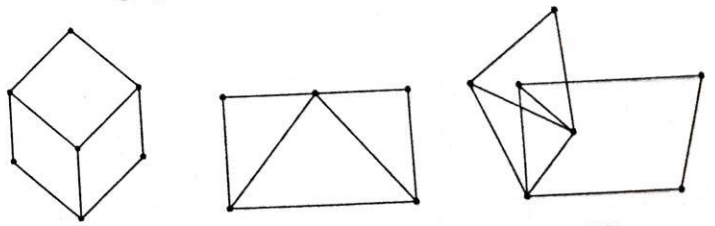
(c) Write short note on algebra of propositions.

6. (a) Draw binary tree using preorder and inorder traversal given below :

Inorder	14	21	24	32	53	56	65
Preorder	53	21	14	32	24	65	56

Determine the tree T and its post order.

(b) Find the chromatic number of the following graphs :



(i) (ii) (iii)

(c) Solve the recurrence relation by the method of generating functions :

$a_n = 7\,a_{n-1} - 10\,a_{n-2}$ for $n \geq 2$ and $a_0 = 3, a_1 = 3$.

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B. Tech Examination 2021-22

(Odd Semester)

COMPUTER CONCEPTS AND PROGRAMMING IN 'C'

Time : Three Hours] *[Maximum Marks : 60*

Note :– Attempt all questions.

SECTION–A

1. Attempt all parts of the following : $8 \times 1 = 8$

   (a) Write difference between algorithm and flowchart.

   (b) Explain the importance of C language.

   (c) What is format specifier?

   (d) Define keyword, constant and variable.

   (e) Write a short note on type casting.

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(f) Explain size of() with example. Why do we u
header files?

(g) Define exit and return statement.

(h) What is the output of this program :

```
void main ()
{
    int a =b= c=10;
    a=b=c=50;
    Printf("\n %d %d %d", a, b,c);
}
```

SECTION – B

2. Attempt any two parts of the following : $2 \times 6 = 12$

(a) Discuss about the following operators in C language with example :

(i) Bitwise operators

(ii) Increment and decrement operators

(iii) Logical operators

(b) Study the following C program :

```
Void main ()
{
Int a =0;
For ( ; a ;);
a++;
}
```

(c) Difference between union and structure.

(d) Explain scanf(); and printf(); with example.

SECTION – C

Note:- Attempt all questions. Attempt any two parts from each questions. $8 \times 5 = 40$

3. Attempt any two parts of the following:

(a) Determine the value of each of following expression int i=8, j=5;

(i) (3*i-2*j) % (2* d-c)

(ii) (i >0) && (j<5)

(b) Explain different data types used in C language.

(c) Explain the difference between '=' and '==' operator explain with example.

4. Attempt any two parts of the following:

(a) Write a program to find largest between two numbers.

(b) Write a short note precedence and order of evaluation.

(c) Explain the following function :

(i) getch() and (ii) clrscr().

5. Attempt any two parts of the following:

(a) What is the difference between call by reference and call by value? Explain with example.

(b) What is an array indexing explain with an example?

(c) Write a C program to calculate factorial of a given number using recursion.

6. Attempt any two parts of the following:

(a) Write a C language program to check whether the string is palindrome or not.

(b) Explain any three of the following with example :

(i) fprintf()

(ii) fscanf()

(iii) getc()

(iv) feof()

(c) What is pointer? What is the use of pointer in C ?

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B. Tech. Examination 2021-22

(Odd Semester)

COMPLEX ANALYSIS AND INTEGRAL TRANSFORMS

Time : Three Hours] *[Maximum Marks : 60*

Note :– Attempt all questions.

SECTION–A

1. Attempt all parts of the following : 8×1=8

   (a) Define analytic function.

   (b) Show that function :

   $$u = x^4 - 6x^2y^2 + y^4$$

   is harmonic.

   (c) Define singular point.

[P. T. O.

(d) Find the residue of :

$$f(z) = \frac{z^3}{z^2 - 1} \text{ at } z = \infty$$

(e) Find the Laplace transform of $\cos^2 t$.

(f) State convolution theorem.

(g) Define Fourier sine integral.

(h) Define Z-transform.

SECTION – B

2. Attempt any two parts of the following : 2×6=12

(a) Show that the function $z|z|$ is not analytic any where.

(b) Evaluate the residue of

$$\frac{z^2}{(z-1)(z-2)(z-3)} \text{ at } z = 1, 2, 3$$

and infinity and show that their sum is zero.

(c) Solve the simultaneous equation :

$$\frac{dx}{dt} + y = \sin t, \quad \frac{dy}{dt} + x = \cos t$$

given that : $x = 2, y = 0$ at $t = 0$.

(d) Express the function :

$$f(x) = \begin{cases} 1 & \text{when } |x| \le 1 \\ 0 & \text{when } |x| > 1 \end{cases}$$

as a Fourier integral. Hence evaluate :

$$\int_0^\infty \frac{\sin\lambda \cdot \cos\lambda x}{\lambda} \, d\lambda$$

SECTION – C

Note :– All questions of this section are compulsory. Attempt any two parts from each question. 10×4=40

3. (a) Define a harmonic function. If $u(x, y) = 2x(1 - y)$ then find the harmonic conjugate function.

(b) State Cauchy integral theorem and find the integral :

$$\int_C \frac{3z^2 + 7z + 1}{z + 1} \, dz$$

where C is circle $|z| = \frac{1}{2}$.

(c) State and prove fundamental theorem of algebra.

4. (a) Expand the function $f(z) = \frac{1}{z}$ about $z = 2$ in Taylor's series.

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(b) Find the residue of $\frac{1}{(z^2+1)^3}$ at $z = i$.

(c) Evaluate the integral :

$$\int_0^{2\pi} \frac{d\theta}{5-3\cos\theta}$$

5. (a) Find the Laplace transform of :

$$f(t) = t\,e^{-t}\sin 2t$$

(b) Find the inverse Laplace transform of :

$$\frac{s+1}{s^2-6s+25}$$

(c) Using Laplace transform, find the solution of the initial value problem :

$$y'' + 9y = 6\cos 3t,\ y(0) = 2,\ y'(0) = 0$$

6. (a) Find the Fourier sin integral for $f(x) = e^{-\beta x}$.

Hence prove that :

$$\frac{\pi}{2}e^{-\beta x} = \int_0^{\infty} \frac{\lambda \sin \lambda x}{\beta^2+\lambda^2}\,d\lambda$$

(b) Find the Fourier transform of a^{-ax^2}, $a > 0$.

(c) Find the Z-transform of :

$$\left\{\left(\frac{1}{2}\right)^{|k|}\right\}$$

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B. Tech Examination 2021-22

(Odd Semester)

INDUSTRIAL SOCIOLOGY

Time : Three Hours] *[Maximum Marks : 60*

Note :– Attempt all questions.

SECTION – A

$8 \times 1 = 8$

1. Attempt all parts of the following :

(a) What do you mean by domestic system?

(b) What do you mean by attribution error?

(c) Who gave the concept of capitalism?

(d) Write the name of forms of grievances.

(e) What is bureaucracy?

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(f) What do you understand by the term 'Division of labour'?

(g) What is lockout?

(h) Write any two types of bargaining.

SECTION – B

2. Attempt any two parts of the following : $2 \times 6 = 12$

(a) What are the main causes of strikes? Also explain its type.

(b) Explain the features of industrial society and pre-industrial society.

(c) What is industrialization? Explain the main causes and consequences of industrialization.

(d) Explain the concept of consumer society. What are the pros and cons of consumerism?

SECTION – C

Note:- *Attempt all questions. Attempt any two parts from each questions.* $5 \times 8 = 40$

3. Attempt any two parts of the following:

(a) Examine the importance of industrial sociology in resolving the problem of industry.

(b) Define social change. Discuss its main factors in detail.

(c) Differentiate between human resource management and personnel management.

4. Attempt any two parts of the following:

(a) Define attribution. Explain its type in detail.

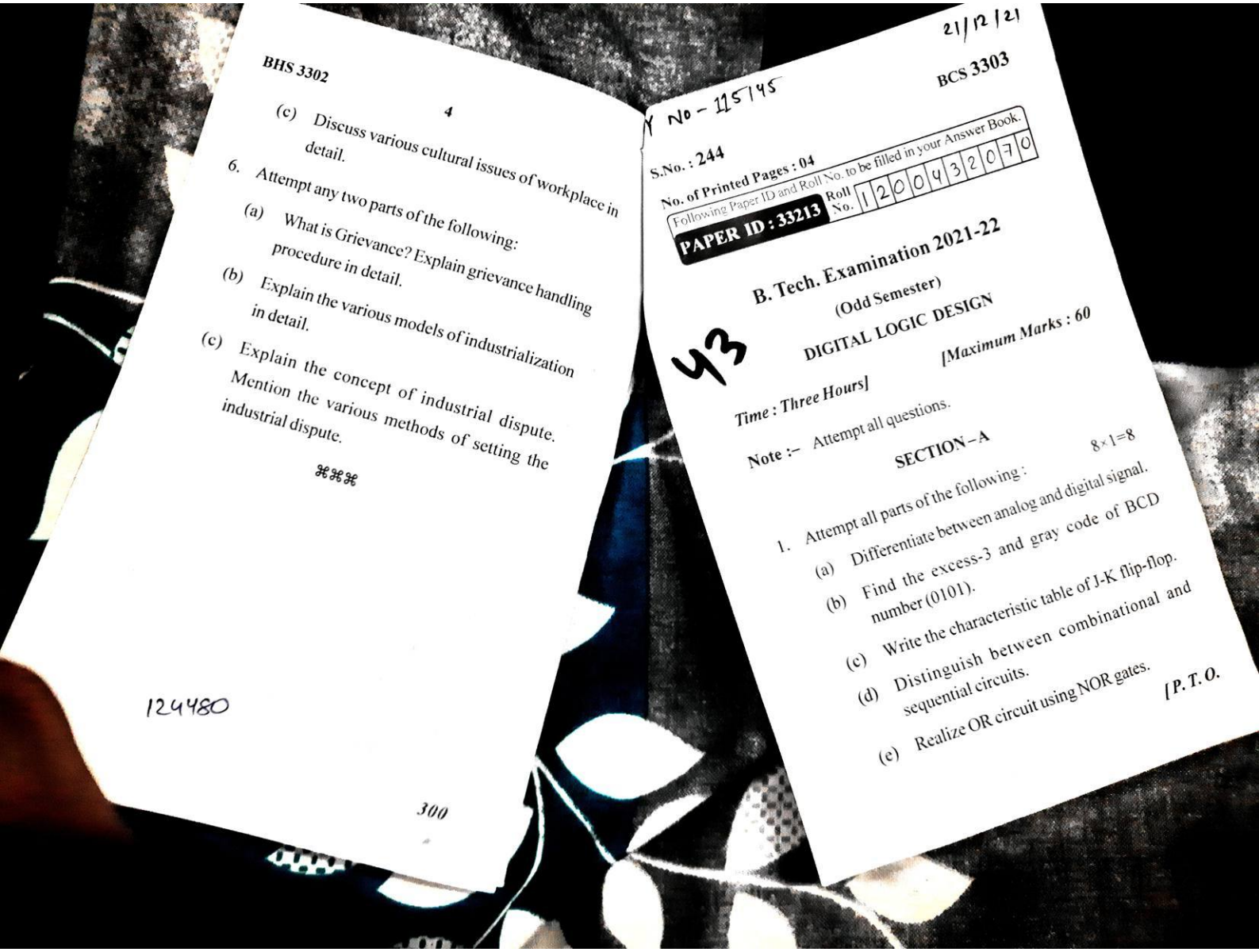
(b) What is collective bargaining? Explain its process in detail.

(c) What is ownership? Explain the difference between public and private limited company.

5. Attempt any two parts of the following:

(a) Define globalization. Explain the advantages and disadvantages in current scenario.

(b) What is sociological concern? Explain general outline of the fields of sociology.



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(c) Discuss various cultural issues of workplace in detail.

6. Attempt any two parts of the following:

(a) What is Grievance? Explain grievance handling procedure in detail.

(b) Explain the various models of industrialization in detail.

(c) Explain the concept of industrial dispute. Mention the various methods of setting the industrial dispute.

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PAPER ID : 33213 Roll No. 1 2 0 0 4 3 2 0 7 0

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B. Tech. Examination 2021-22

(Odd Semester)

DIGITAL LOGIC DESIGN

Time : Three Hours] *[Maximum Marks : 60*

Note :- Attempt all questions.

SECTION – A 8×1=8

1. Attempt all parts of the following :

(a) Differentiate between analog and digital signal.

(b) Find the excess-3 and gray code of BCD number (0101).

(c) Write the characteristic table of J-K flip-flop.

(d) Distinguish between combinational and sequential circuits.

(e) Realize OR circuit using NOR gates.

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(f) Simplify the following function :

$$F(A, B, C, D) = \overline{(\bar{A} + C)\ (B + \bar{D})}$$

(g) Explain the meaning of FANOUT.

(h) What is the difference between PAL and PLA?

SECTION – B

2. Attempt any two parts of the following : 2×6=12

(a) Explain the Karnaugh map method and simplify the following Boolean expression using K-map :

$$F(A, B, C, D, E) = \Sigma m(0, 2, 4, 6, 9, 11, 13, 15, 17, 21, 25, 27, 29, 30, 31)$$

(b) Draw and explain the function of 2 : 1 multiplexer. Write applications of multiplexer.

(c) Explain the difference between latch and flip-flop. Draw and explain the operation of D flip-flop.

(d) Implement the circuit of a PLA with 3 input, 2 output and 4 product terms :

$$F(A, B, C) = \Sigma(3, 5, 6, 7)$$

SECTION – C

Note :– Attempt all questions. Attempt any two parts from each question. 8×5=40

3. (a) Explain cyclic code with example. Convert decimal number 3452 to BCD Code.

(b) Define the terms logic gate and universal logic gate. Explain various basic gates with their symbols and truth table.

(c) Design the circuit using NAND gates for following functions :

$$F = A\,B\,C' + D\,E + A\,B'\,D'$$

4. (a) What is a decoder? Draw and explain 3 : 8 decoder.

(b) Explain half adder circuit and implement full adder circuit using two half adder.

(c) Explain the difference between encoder and multiplexer.

5. (a) Draw and explain the operation of ring counter.

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(b) Given a universal shift register speech its diagram only for left shift operation and explain its working.

(c) Explain the operation of SR laten with circuit diagram, function table and lining diagram.

6. (a) Explain the operation of 3 bit asynchronous up counter.

(b) Write short notes on any one of the following :

(i) CPLD

(ii) PLA

(c) Design PAL for a combinational circuit that squares a 2 bit numbers.

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