Total number of printed pages–19

3 (Sem–2/CBCS) CSC HG 1/2/3, RC

2024

COMPUTER SCIENCE
COMPUTER APPLICATION
INFORMATION TECHNOLOGY

(Honours Generic / Regular Core)

For Honours Generic
Answer the Questions from any one Option

OPTION – A

(Programming in C++)

Paper : CSC–HG–2016

OPTION – B

(Database Management System)

Paper : CSC–RC–2016 / CSC–HG–2026

OPTION – C

(Introduction to Programming in C)

Paper : CSC–HG–2036 / TCA–HG / RC–2016 / TIT–RC–2016

Full Marks : 60

Time : Three hours

The figures in the margin indicate full marks for the questions.

Contd.

OPTION – A

(*Programming in C++*)

Paper : CSC–HG–2016

1. Answer the following questions as directed : 1×7=7

(a) The extension of a C++ file is

(i) .cpt

(ii) .cpp

(iii) .cst

(iv) None of the above

(Choose the correct option)

(b) Which is the symbol at the beginning of the pre-processor directive ?

(i) #

(ii) $

(iii) *

(iv) & *(Choose the correct option)*

(c) State True ***or*** False :

|| is a logical operator.

(d) Which of the following functions is used to append one string to another ?

(i) strcmp

(ii) strcat

(iii) strlen

(iv) None of the above

(Choose the correct option)

(e) State True ***or*** False :

Constructor functions are inheritable.

(f) The _____ operator accepts one parameter and returns the size in bytes.

(Fill in the blank)

(g) _____ is an entry controlled loop.

(Fill in the blank)

2. Answer the following questions : 2×4=8

(a) What is *L*-value and *R*-value of an expression ?

(b) What are the benefits of a reference variable ?

(c) Define inline function.

(d) What do you mean by member function and data member ?

3. Answer ***any three*** questions from the following : 5×3=15

(a) What do you mean by friend function ? Explain with the help of a program in C++.

(b) What is destructor in C++ ? Explain the characteristics of destructors. How does it differ from constructor ?

(c) What is function overloading ? Write a program in C++ to describe function overloading.

(d) What do you mean by call by value and call by reference ? State the differences between two.

(e) Explain structure and union with suitable example.

4. Answer ***any three*** questions from the following : 10×3=30

(a) What is constructor ? How is constructor categorized ? Explain each category with example.

(b) Define a class student with the following specifications :

Private members of class student

sno	integer
sname	character
csca, phy, eng	float
total	float
ctotal	A function to calculate csca+phy+eng marks with float return type public member function of class student

Take ( ) function to accept values of sno, sname, csca, phy, eng and invoke ctotal ( ) to calculate the total.

Show data ( ) function to display all the data members on the screen.

(c) What is inheritance ? State the usefulness of inheritance. Describe the different types of inheritance.

(d) Differentiate between static and dynamic memory allocation. Write a program in C++ to multiply two (2×2) matrices.

(e) Discuss about different types of filestream in C++. Write a C++ program to read content from one file and write it into another file.

(f) What is polymorphism in C++ ? Explain different types of polymorphism.

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OPTION – B

(Database Management System)

Paper : CSC–RC–2016 / CSC–HG–2026

*Answer **either** in English **or** in Assamese.*
(ইংৰাজী অথবা অসমীয়াত উত্তৰ লিখিবা।)

1. Answer the following questions : 1×7=7
তলৰ প্ৰশ্নবোৰৰ উত্তৰ দিয়া ঃ

(a) What is a database ?

Database কি?

(b) Write a DDL statement in SQL.

SQL-ত এটা DDL statement লিখা।

(c) What is relation schema in relational model ?

Relational model-ৰ ক্ষেত্ৰত relation schema কি?

(d) Write *one* aggregate function used in SQL.

SQL-ত ব্যৱহৃত *এটা* এগ্ৰিগেট ফাংচন লিখা।

(e) What is data model ?

Data model কি?

(f) Define primay key.

Primary key-ৰ সংজ্ঞা দিয়া।

(g) BCNF stands for _____.
(Fill in the blank)

BCNF-ৰ অৰ্থ হ'ল _____। *(খালী ঠাই পূৰ কৰা)*

2. Write the answers of the following questions : 2×4=8

তলৰ প্ৰশ্নবোৰৰ উত্তৰ লিখা ঃ

(a) Diffentiate between physical data independence and logical data independence.

Physical data independence আৰু logical data independence-ৰ মাজত পাৰ্থক্য দিয়া।

(b) What is union compatibility? Why do the UNION, INTERSECTION and DIFFERENCE operations require that the relations on which they are applied be union compatible?

Union compatibility কাক কয়? যিবোৰ relation ত UNION, INTERSECTION আৰু DIFFERENCE প্ৰয়োগ কৰা হয় সেইবোৰ কিয় union compatible হ'ব লাগে?

(c) What are the different relational constraints?

বিভিন্ন ধৰণৰ relational constraints বোৰ কি কি?

(d) Define stored and derived attributes? Give one example of each.

Stored and derived attributes-ৰ সংজ্ঞা দিয়া। প্ৰতিটোৰে এটাকৈ উদাহৰণ দিয়া।

3. Answer ***any three*** questions from the following : 5×3=15

তলৰ পৰা *যিকোনো তিনিটা* প্ৰশ্নৰ উত্তৰ কৰা ঃ

(a) Describe the various DBMS languages.

বিভিন্ন DBMS ভাষাৰ বৰ্ণনা কৰা।

(b) What is entity? How does it differ from entity type? What are weak and strong entity types?

Entity কি? Entity type ৰ পৰা ই কিদৰে পৃথক? দুৰ্বল আৰু শক্তিশালী entity type কি?

(c) Explain the different types JOIN operations with examples.

উদাহৰণৰ সৈতে বিভিন্ন ধৰণৰ JOIN অপাৰেচনৰ বিষয়ে ব্যাখ্যা কৰা।

(d) What are different symbols and terminologies used in ER diagram?

ER diagram-ত ব্যৱহৃত হোৱা বিভিন্ন চিহ্ন আৰু পৰিভাষাসমূহ কি কি?

(e) Describe the different types of attributes used in ER model with examples.

ER model-ত ব্যৱহৃত হোৱা বিভিন্ন ধৰণৰ attribute সমূহ উদাহৰণৰ সৈতে বৰ্ণনা কৰা।

4. Answer ***any three*** questions from the following : 10×3=30

তলৰ *যিকোনো তিনিটা* প্ৰশ্নৰ উত্তৰ দিয়া ঃ

(a) Consider the *two* tables *T*1 and *T*2

*T*1 আৰু *T*2 টেবুল *দুখন* বিবেচনা কৰা

*T*1

P	*Q*	*R*
10	*a*	5
15	*b*	8
25	*a*	6

*T*2

A	*B*	*C*
10	*b*	6
25	*c*	3
10	*b*	5

and show the result of the following operations :

আৰু তলত দিয়া কার্য্যসমূহৰ ফলাফলসমূহ দেখুওৱা ঃ

(i) $\Pi_{P,R}(T1)$

(ii) $T1 \cup T2$

(iii) $T1 \cap T2$

(iv) $T1 - T2$

(v) $T1 \times T2$

(b) Define the following terms used in EER modeling with examples :

EER মডেলিঙত ব্যৱহৃত তলৰ শব্দসমূহৰ উদাহৰণসহ সংজ্ঞা দিয়া ঃ

(i) Subclass

(ii) Specialization

(iii) Generalization

(iv) Category

(v) Specific attribute

(c) Consider the universal relation

$$R = \{A, B, C, D, E, F, G, H, I, J\}$$

and set of functional dependencies

$$F = \{\{A, B\} \rightarrow \{C\}, \{A\} \rightarrow \{D, E\}, \{B\} \rightarrow \{F\},$$

$$\{F\} \rightarrow \{G, H\}, \{D\} \rightarrow \{I, J\}\}$$

What is the key for *R*? Decompose *R* into 2*NF*, then into 3*NF* relations.

Universal relation

$R = \{A, B, C, D, E, F, G, H, I, J\}$ আৰু functional dependency সমূহ

$$F = \{\{A, B\} \rightarrow \{C\}, \{A\} \rightarrow \{D, E\}, \{B\} \rightarrow \{F\},$$

$$\{F\} \rightarrow \{G, H\}, \{D\} \rightarrow \{I, J\}\}$$

বিবেচনা কৰা।

R-ৰ বাবে চাবি কি? R ক 2NF আৰু তাৰ পিছত 3NF লৈ বিভাজন কৰা।

(d) Explain the following terms with examples :

তলত দিয়াসমূহ উদাহৰণেৰে বুজাই দিয়া ঃ

(i) Candidate key

(ii) Degree of a relation

(iii) Cardinality of a relation

(iv) Weak entity

(v) Unary relationship

(e) Explain the different types of DBMS users.

বিভিন্ন ধৰণৰ DBMS ব্যৱহাৰকাৰীৰ বিষয়ে ব্যাখ্যা কৰা।

(f) Consider the following relation schemas :

তলৰ relation আচনিসমূহ বিবেচনা কৰা ঃ

STUDENT (STD_ID, STD_NAME, DATE_OF_ADMISSION, COURSE_ID, DEPT_ID)

COURSE (C_ID, C_NAME, C_DURATION, DEPT_ID)

DEPARTMENT (D_ID, D_NAME, FACULTY_STRENGTH)

Write SQL statements for the following :

তলত উল্লেখ কৰা সমূহৰ বাবে SQL বিবৃতি লিখা ঃ

(i) Display the IDs, names and dates of admission of all the students.

সকলো ছাত্ৰ-ছাত্ৰীৰ ID, নাম আৰু নাম ভর্তিৰ তাৰিখসমূহ প্ৰদৰ্শন কৰা।

(ii) Display the IDs of the students who are studying the course "B.Sc. Computer Science".

"B.Sc. Computer Science" পাঠ্যক্ৰম অধ্যয়ন কৰি থকা ছাত্ৰ-ছাত্ৰীসকলৰ ID সমূহ প্ৰদৰ্শন কৰা।

(iii) Display the courses offered by the Computer Science department.

Computer Science বিভাগে আগবঢ়োৱা পাঠ্যক্রমসমূহ প্রদর্শন কৰা।

(iv) Display the total number of students studying under the English department.

ইংৰাজী বিভাগৰ অধীনত অধ্যয়নৰত মুঠ ছাত্র-ছাত্রীৰ সংখ্যা প্রদর্শন কৰা।

(v) Display the name of the department having the maximum faculty strength.

সর্বোচ্চ facultry শক্তি থকা বিভাগটোৰ নাম প্রদর্শন কৰা।

OPTION - C

(Introduction to Programming in C)

Paper : CSC-HG-2036 / TCA-HG / RC-2016 / TIT-RC-2016

1. Answer the following questions as directed : 1×7=7

(a) Which of the following is not a keyword ?

(i) for

(ii) void

(iii) when

(iv) char

(b) The size of a char data type is

(i) 2 bytes

(ii) 1 byte

(iii) 4 bytes

(iv) 8 bytes

(c) State True ***or*** false :

strlen ( ) is a library function.

(d) Which of the following is the assignment operator ?

(i) ==

(ii) !=

(iii) =

(iv) =!

(e) Which of the following is not iterative statement ?

(i) if

(ii) if-else

(iii) for

(iv) while

(f) Static variables are not initialized only once. *(State True **or** False)*

(g) State True **or** False :

A pointer variable stores the value of the other variable.

2. Define the following terms : 2×4=8

(a) Variable

(b) Structure

(c) Pointer

(d) Array

3. Answer ***any three*** of the following questions : 5×3=15

(a) Write a function to find the factorial value of an input integer.

(b) Explain how for loop is different from do-while loop with a suitable example.

(c) Explain various data types in C.

(d) Explain different relational and logical operators in C.

(e) What do you mean by function call ? Explain how function call by value is different from function call by reference.

4. Answer ***any three*** of the following questions : 10×3=30

(a) Write a C program to find maximum and minimum values of N input numbers using array.

(b) Write a C program to add two matrices.

(c) What is recursion ? Write a recursive function to find Fibonacci series of any input n number.

(d) What do you mean by library function ? How does it differ from user defined function ? Explain briefly the following library functions :

(i) Strlen ( )

(ii) Sqrt ( )

(iii) fopen ( )

(iv) pow ( )

(v) sin ( )

(e) Write any sort algorithm to sort ascending order of N input numbers.

(f) Write short notes on :

(i) Structure and union in C

(ii) Switch statement in C

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