(Please write your Exam Roll No.) *Exam Roll No. .....*

END TERM EXAMINATION

FIRST SEMESTER [BCA] NOV.-DEC.-2019

Paper Code: BCA101 ***Subject: Mathematics-I***

Time: 3 Hours ***Maximum Marks: 75***

Note: Attempt five questions in all including Q. No. 1, which is compulsory. Select one question from each unit.

Q1 **(5x5=25)**

a) Define symmetric and skew symmetric matrix with an example. Express

$$A = \begin{bmatrix} 1 & 3 & 5 \\ -6 & 8 & 3 \\ -4 & 6 & 5 \end{bmatrix}$$

as a sum of symmetric and skew symmetric matrices.

b) Find the value of 'a' if

$$f(x) = \begin{cases} 2x-1, & x<2 \\ a, & x=2 \\ x+1 & x>2 \end{cases}$$ is continuous at x=2

c) If $x^y = y^x$, find $\frac{dy}{dx}$

d) Find the n^{th} derivative of $e^x \sin x$

e) Prove that $\Gamma(1/2) = \sqrt{\pi}$ where Γ denotes Gamma function

UNIT I

Q2. (a) Solve the following system of equations using Cramer's Rule **(6)**

$5x-7y+z = 11$
$6x-8y-z = 15$
$3x+2y-6z = 7$

(b) Find the characteristic roots and characteristic vectors of the matrix **(6.5)**

$$A = \begin{bmatrix} 3 & 1 & 4 \\ 0 & 2 & 6 \\ 0 & 0 & 5 \end{bmatrix}$$

Q3. (a) Test the consistency of the given system of linear equations using rank of matrices **(6)**

$x + y + z = 6$
$x + 2y + 3z = 14$
$x + 4y + 7z = 30$

(b) Find the characteristic equation of the matrix **(6.5)**

$$A = \begin{bmatrix} 1 & 2 & -2 \\ 1 & 1 & 1 \\ 1 & 3 & -1 \end{bmatrix}.$$ Hence find A^{-1}

[P.T.O.]

BCA-101
P1/2

UNIT II

Q4.a) Evaluate $\lim_{x\to 0}\frac{\sqrt{1+x}-\sqrt{1-x}}{\sin^{-1}x}$ **(6)**

b) Discuss the nature of discontinuity of **(6.5)**

$$f(x)=\begin{cases}\frac{\sin[x]}{[x]}, & x\neq 0\\ 0, & x=0\end{cases}$$ at x=0

Q5.a) Show that the function **(6)**

$$f(x)=\begin{cases}\frac{e^{1/x}-1}{e^{1/x}+1}, & x\neq 0\\ 0, & x=0\end{cases}$$ is discontinuous at x = 0.

b) Evaluate (i) $\lim_{x\to 0}\frac{\log x-\log 5}{x-5}$ (ii) $\lim_{x\to 0}\frac{x^2-4}{x^2+7x+12}$ **(6.5)**

UNIT III

Q6. (a) Find the maximum value of f(x) = $\frac{\log x}{x}, x>0$ **(6)**

(b) Find all the asymptotes of the curve $y^3+x^2y+2xy^2-y+1=0$ **(6.5)**

Q7. (a) Verify Rolle's theorem for f(x) = $e^x \cos x$ on $\left[\frac{-\pi}{2},\frac{\pi}{2}\right]$ **(6)**

(b) Evaluate (i) $\lim_{x\to 0}(\cot x)^x$ (ii) $\lim_{x\to 0} x\log x$ **(6.5)**

UNIT IV

Q8. (a) Integrate (i) $\int\frac{2x}{(x^2+1)(x^2+3)}dx$ (ii) $\int\log x\,dx$ **(6)**

(b) Express $\int_0^2\sqrt{x}(4-x^2)^{-1/4}dx$ as beta function. **(6.5)**

Q9. (a) Obtain the reduction formula for $\int\sin^n x\cos^m x$. Hence evaluate **(6)**

$\int_0^{\pi/2}\sin^7 x\cos^4 x\,dx$

(b) Evaluate $\int_1^4 x\,dx$ as the limit of sum. **(6.5)**

****

BCA-101
P2/2

(Please write your Exam Roll No.) *Exam Roll No. .....*

END TERM EXAMINATION

FIRST SEMESTER [BCA] DECEMBER-2019

Paper Code: BCA103 ***Subject: Technical Communication***

Time: 3 Hours ***Maximum Marks: 75***

Note: Attempt all questions as directed. Internal choice is indicated.

Q1 Explain ***any five*** of the following: **(5x5=25)**

a) 7Cs of effective communication
b) Process of technical writing
c) Layout of the report
d) Negotiation process
e) Art of listening
f) Business Etiquette

UNIT I

Q.2a) What is the significance of communication? Discuss the factors responsible for the growing importance of communication. **(12.5)**

OR

2b) "Communication is a two way process". Explain the elements of communication process in this context.

UNIT II

Q.3a) What is a business letter? Explain the layout of a business letter. **(12.5)**

OR

3b) Write a job application and draft your resume for the post of software engineer in a multinational company.

UNIT III

Q.4a) What are the various barriers to listening? Discuss the principles of good listening. **(12.5)**

OR

4b) Discuss the various types of meetings. Explain the planning and organization of a meeting.

UNIT IV

Q.5a) Explain Kinesics and Proxemics with examples. Also explain their importance. **(12.5)**

OR

5b) How can one improve one's language skills? Explain the guidelines for sentence construction.

****

BCA-103

P

(Please write your Exam Roll No.) Exam Roll No. .....

END TERM EXAMINATION

FIRST SEMESTER [BCA] NOV.-DEC. - 2019

Paper Code: BCA105 *Subject: Introduction to Programming Languages Using C*

Time: 3 Hours *Maximum Marks: 75*

Note: Q. No. 1 is compulsory. Attempt one question from each unit.

Q1 Answer briefly (**Any Five**):- **(5x5=25)**

a) Discuss pre processor directives in c.
b) What do you understand by dynamic memory allocation? Explain malloc(), calloc(), realloc() and free() functions with their syntax and a suitable example.
c) Write a short note on storage classes in c.
d) Discuss the various operators in c.
e) Explain the different loop structures in c through suitable examples.
f) Distinguish between a structure and a union through a suitable example.

UNIT I

Q2. a) Explain the if..else statement with all its variations. Compare it with switch..case. Write a c program that demonstrates the difference between the two. **(7)**

b) Write a c program to test whether a given integer is a prime number or not. Display an appropriate message in the output. **(5.5)**

Q3.a) What do you understand by type casting? Why is it required? Explain using an example. **(6)**

b) Write a C program to display the following pattern (for n lines): **(6.5)**

```
1
1   2
1   2   3
1   2   3   4
1   2   3   4   5
```

UNIT II

Q4.a) Write a short note on recursion. **(5.5)**

b) Write a complete c program that displays the first n Fibonacci numbers through a recursive function Fibonacci. **(7)**

Q5.a) Differentiate between call by value and call by reference methods of passing parameters to functions using an appropriate example. **(7)**

b) Write a c function that searches for an element x in an array of integers. **(5.5)**

UNIT III

Q6.a) What are structures and what are Bit Field structures? How are they different from Unions? **(4)**

b) Explain how structures can be passed as parameters to functions, by value and by reference? And how they can be returned from function? **(6)**

c) What do you understand by pointers to structures? How can we access the elements of a structure through a pointer to the structure? **(2.5)**

[P.T.O.]

BCA105
D 18

Q7.a) Write a c program that creates and displays a text file on screen. **(7.5)**

b) Discuss the following file handling functions, through syntax and examples: **(5)**

i) fopen()
ii) fclose()
iii) fseek()
iv) fwrite()
v) fread()

UNIT IV

Q8. a) Write a c program that counts the number of occurrences of a character in a given string without the use of any string handling library functions. **(7.5)**

b) Explain any five string handling functions from string.h with syntax and example. **(5)**

Q9. a) Write a short note on header files. **(2.5)**

b) Explain any two functions each from the following header files:
Stdio.h, math.h, stdlib.h, ctype.h, string.h **(10)**

****

BCA-105
P2/D2

(Please write your Exam Roll No.) Exam Roll No. .....

END TERM EXAMINATION

FIRST SEMESTER [BCA] NOV.-DEC. - 2019

Paper Code: BCA107 **Subject: Introduction to Computers & IT**

Time: 3 Hours **Maximum Marks: 75**

Note: Q. No. 1 is compulsory. Attempt one question from each unit.

Q1 Attempt the following:- **(5x5=25)**

a) Define Computers. Explain the various characteristics of Computer System.

b) What are Registers? Explain different types of CPU Registers.

c) Convert $(295)_{10}$ to Binary and BCD.

d) Differentiate between multiprogramming and time-sharing operating system.

e) What is an instruction set? Explain various types of addressing modes.

UNIT I

Q2. a) What is generation in Computer terminology? List various computer generations along with the key characteristics of hardware and software technologies in each generation. **(6.5)**

b) What are Input and Output devices? Discuss any 3 of each in detail **(6)**

OR

Q3.a) What do you mean by computer organization? Explain the basic organization of a computer system with the help of a block diagram **(5)**

b) Differentiate the following: **(7.5)**

i) Static and Dynamic RAM

ii) Magnetic Disk and Magnetic Tape

iii) PROM and EPROM

UNIT II

Q4.a) Define Operating System. Discuss two primary objectives of an Operating System. Explain various functions provided by most of the operating system. **(6.5)**

b) Define Algorithm with characteristics. Write an algorithm using flowchart and Pseudocode to find the maximum of N numbers. **(6)**

OR

Q5. Write short notes for the following: **(12.5)**

i) Types of Operating System

ii) Loader and Linker

iii) Process Control Block (PCB)

iv) Flowchart and Pseudocode

v) Multiprocessor Operating System and its advantages

UNIT III

Q6.a) What is the significance of Base in number system? Distinguish among bindary, octal and hexadecimal number system with examples. **(4.5)**

b) Perform the following operations. For subtraction use complement's method: **(8)**

i) $(1100011)_2 - (10111)_2$

ii) $(11001)_2 - (11110)_2$

iii) $(36)_{10} - (87)_{10}$

iv) $(110011)_2 + (11111)_2$

[P.T.O.]

P 1/5

Q7.a) Explain the following with example: (any 3). **(4.5)**
i) ASCII Code ii) Unicode iii) BCD iv) Grade code
b) Convert the following: **(8)**
i) $(8B5A)_{16}$ = ( )$_{10}$
ii) $(125.75)_{10}$ = ( )$_2$
iii) $(1765)_8$ = ( )$_2$
iv) $(10111.101)_2$ = ( )$_{10}$

UNIT IV

Q8. a) Explain various types of computer network topologies along with their advantages and disadvantages. **(6.5)**
b) Write short notes on any 3 from the following. **(6)**
i) FTP ii) WWW iii) Client Server Architecture iv) Digital and Analog Signals

Q9. a) What are the main components of a data communication system. Explain different types of transmission media used in data communications along with their advantages and disadvantages. **(8.5)**
b) Distinguish between Intranet and Extranet with example. **(4)**

****

(Please write your Exam Roll No.) *Exam Roll No. .....*

END TERM EXAMINATION

FIRST SEMESTER [BCA] DEC.-2019

Paper Code: BCA109 ***Subject: Physics***

Time: 3 Hours ***Maximum Marks: 75***

Note: Attempt any five questions including Q. No. 1 is compulsory. Attempt one question from each unit.

Q1 a) Define angle of repose and angle of friction.
b) State Newton's 2nd law and derive the relation between force & momentum.
c) State & prove Lami's theorem
d) State & prove work energy theorem
e) State & prove Gauss's theorem
f) Why two electric field lines cannot intersect each other
g) Define Kirchhoff's first & second law
h) State and explain Coulomb's law.
i) What is Bohr's atomic model?
j) What is doping of an intrinsic semiconductor? Name the charge carries in p-type semiconductors? **(2.5x10=25)**

UNIT I

Q2. a) What do you mean by banking of road? Calculate the angle of banking so that a vehicle of mass m can go with velocity v on a curved road of radius r without skidding. **(5)**
b) Calculate the weight of a body of mass m placed in lift, when the lift:
i) Moves vertically upward with acceleration a.
ii) Moves vertically downward with acceleration a.
iii) Moves with constant velocity v.
iv) At rest. **(7.5)**

Q3. a) What is meant by limiting friction? Explain the Laws of friction. **(5)**
b) Two masses m1 & m2 are connected by a light string which passes over a frictionless pulley such that mass m2 move vertically downward and m1 move vertically upward, calculate acceleration and tension in the string. **(7.5)**

UNIT II

Q4. a) Prove that total energy of falling freely body under gravity will remains same at all points on its path. **(5)**
b) Define conservative force. Prove that gravitational force is a conservative force. Also write the properties of conservative force. **(7.5)**

Q5. a) What is Hooke's Law? Calculate the Potential Energy of a spring when it is pulled to a displacement x from its mean position. **(5)**
b) Show that when two bodies of equal masses suffer elastic collision in 1-dimension, they will exchange their velocities. **(7.5)**

UNIT III

Q6. a) Obtain the expression for capacitance of parallel plate capacitor with dielectric slab. **(5)**
b) Define electric field intensity. Calculate electric field intensity at any point on the axis of uniformly charged circular ring. **(7.5)**

[P.T.O.]

P 1/2

Q7. a) Find the total resistance when a number of resistances are connected in series and in parallel. **(5)**

b) Define Ohm's law. Explain the construction, working and principle & proof of wheat stone bridge with diagram in detail. **(7.5)**

UNIT IV

Q8. a) Distinguish between insulators, conductors and semi-conductors in terms of their energy band diagrams. **(5)**

b) Explain briefly Rutherford's alpha scattering experiment and the atomic model based on the result of this experiment. **(7.5)**

Q9. a) What is p-n junction diode? Explain the action of forward bias. **(5)**

b) What is a transistor? Explain construction and working n-p-n & p-n-p transistor with diagrams. **(7.5)**

****