

SH-III/BCA-302/19

BCA 3rd Semester (Honours) Examination, 2019-20
BACHELOR OF COMPUTER APPLICATION

Course ID :

Course Code : BCA-302

Course Title : Computer Organization and Architecture

Time: 4 Hours

Full Marks : 80

*The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words
as far as practicable.*

Group-A

1. Answer *all* the questions: 1×10=10

- (i) The main virtue for using single bus structure is
 - (a) First data transfer
 - (b) Cost effective connectivity and speed
 - (c) Cost effective connectivity and ease of attaching peripheral device
 - (d) All of the above
 - (e) None of the above
- (ii) _____ format is usually used to stored data.
 - (a) BCD
 - (b) Decimal
 - (c) Hexadecimal
 - (d) Octal
 - (e) None of the above
- (iii) The ALU makes use of _____ to store the intermediate results.
 - (a) Register
 - (b) Accumulator
 - (c) Heap
 - (d) Stack
 - (e) None of the above
- (iv) The return address from the interrupt service routine is stored on the —
 - (a) System Heap
 - (b) Processor Register
 - (c) Processor Stack
 - (d) Memory
 - (e) None of the above

- (v) The addressing mode which makes use of in-direction pointer is
 - (a) Indirect addressing mode
 - (b) Index addressing mode
 - (c) Relative addressing mode
 - (d) Offset addressing mode
 - (e) None of the above

- (vi) Which method of representation of number occupies a large amount of memory than others?
 - (a) Sign magnitude
 - (b) 1's compliment
 - (c) 2's compliment
 - (d) 1's and 2's compliment
 - (e) None of the above

- (vii) The register used to store flag is called as —
 - (a) Flag register
 - (b) Status register
 - (c) Test register
 - (d) Log register
 - (e) None of the above

- (viii) The return address of the subroutine is pointed to by —
 - (a) IR
 - (b) Special memory register
 - (c) MAR
 - (d) PC
 - (e) None of the above

- (ix) The DMA transfer are performed by a control circuit called as —
 - (a) Device interface
 - (b) DMA controller
 - (c) Data controller
 - (d) Overlooker
 - (e) None of the above

- (x) To increase the speed of memory access in pipelining we make use of —
 - (a) Special memory location
 - (b) Special purpose register
 - (c) Cache
 - (d) Buffer
 - (e) None of the above

Group-B

2. Answer *any ten* questions: 2×10=20
- (i) What is Computer architecture?
 - (ii) Name different types of instructions with an example of each.
 - (iii) What are the different types of interrupts?
 - (iv) What is Snooping cache?
 - (v) What technique should be used to automatically moved program and data blocks into the physical main memory when they are required for execution?
 - (vi) Define horizontal format in context of microprogrammed control unit.
 - (vii) What do you mean by Direct addressing mode?
 - (viii) Define high impedance.
 - (ix) What does DMA stand for?
 - (x) What digital function should be used to convert the octal code to binary code?
 - (xi) Explain if the internal bus connects only register within CPU, how would you get data to and from memory.
 - (xii) Define hazard.
 - (xiii) Define vector interrupt. Give example.
 - (xiv) What is virtual memory in computer?
 - (xv) The CPU is busy but you want to stop and do some other task. How do you do it?

Group-C

3. Answer *any four* questions: 5×4=20
- (i) Explain what are the different types of hazards.
 - (ii) How many types of memory hierarchy in computer architecture? Briefly explain.
 - (iii) What are the different types of interrupts in a system? Explain.
 - (iv) Write down the difference between interrupt service routine and subroutine.
 - (v) What are the different types of fields that are part of an Instruction? Explain.
 - (vi) What are the steps involved in an Instruction cycle?

Group-D

4. Answer *any three* questions: 10×3=30
- (i) (a) Briefly discuss different types of addressing modes with example. 8+2=10
 - (b) What is subroutine?
 - (ii) (a) What is instruction pipeline? Explain it with example. 6+4=10
 - (b) Discuss bus based organization of CPU.

- (iii) (a) Briefly explain how does DMA transfer takes place.
(b) How do you remove hazards in instruction pipeline?
(c) Explain the timing of register transfer with example. 4+3+3=10
- (iv) (a) What do you mean by address sequencer?
(b) Explain the components of the Von-neumann architecture.
(c) How does vector interrupt works? 2+6+2=10
- (v) (a) Briefly discuss different types of micro-operations.
(b) Write the difference between memory mapped I/O and peripheral mapped I/O.
(c) Discuss on different types of read and write microoperations. 3+3+6=10
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SH-III/BCA-303/19

BCA 3rd Semester (Honours) Examination, 2019-20
BACHELOR OF COMPUTER APPLICATION

Course ID :

Course Code : BCA-303

Course Title : Object Oriented Programming using C++

Time: 4 Hours

Full Marks : 80

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

Group-A

1. Answer all the questions:

1×10=10

- (i) The explicit keyword is an optional decorations for the constructors that takes exactly _____ arguments.
- (a) No
 - (b) Two
 - (c) Three
 - (d) One
 - (e) None of the above
- (ii) Which of the following statements are not true about destructor?
- (a) It is invoked when object goes out of the scope.
 - (b) Like constructor, it can also have parameters.
 - (c) It can be virtual.
 - (d) It bears same name as class name and precedes a tilde (~) operator (sign).
 - (e) None of the above
- (iii) Assume class test which of the following statements is/are responsible to invoke copy constructor?
- (a) Test T2(T1)
 - (b) Test T4=T1
 - (c) T2=T1
 - (d) Both (a) and (b)
 - (e) None of the above
- (iv) A constructor does not have any parameters is called _____ constructor.
- (a) Custom
 - (b) Dynamic
 - (c) Static
 - (d) Default
 - (e) None of the above

- (v) Which of the following are true about constructors?
 - (a) A class can have more than one constructors.
 - (b) They can be inherited.
 - (c) Their address can be returned.
 - (d) Constructors cannot be declared in protected section of the class.
 - (e) Constructors cannot return values.

- (vi) If default constructor is not defined then how the objects of the class will be created?
 - (a) The compiler will generate error.
 - (b) Error will occur at run time.
 - (c) Compiler provides its default constructor to build the object.
 - (d) All of the above
 - (e) None of the above

- (vii) Which of the following type of class allows only one object of it to be created?
 - (a) Virtual class
 - (b) Abstract class
 - (c) Singleton class
 - (d) Friend class
 - (e) None of the above

- (viii) Which of the following is not type of constructor?
 - (a) Copy constructor
 - (b) Friend constructor
 - (c) Default constructor
 - (d) Parametarized constructor
 - (e) None of the above

- (ix) How many instances of an abstract class can be created?
 - (a) 1
 - (b) 5
 - (c) 13
 - (d) 0
 - (e) None of the above

- (x) Which of the following is an abstract data type?
 - (a) int
 - (b) double
 - (c) string
 - (d) class
 - (e) None of the above

Group-B

2. Answer *any ten* questions: 2×10=20
- (i) What is C++?
 - (ii) What is class?
 - (iii) What is function?
 - (iv) What is function overloading?
 - (v) Define implicit and explicit type conversion.
 - (vi) What is encapsulation?
 - (vii) What is message passing?
 - (viii) List down the application of OOP.
 - (ix) What is in line function?
 - (x) Define Enumerated data type.
 - (xi) What is abstract data type?
 - (xii) Write down the difference between while and do-while loop.
 - (xiii) Explain Public visibility.
 - (xiv) Write down the differences between Constructor and Destructor.
 - (xv) Define Polymorphism.

Group-C

3. Answer *any four* questions: 5×4=20
- (i) Write a class template to implement stack in C++. 5
 - (ii) State the difference between C and C++. 5
 - (iii) When I write a destructor, do I need to explicitly call the destructors for my member object? 5
 - (iv) Is there any different between List X and List X(): ? 5
 - (v) What do you mean by dynamic initialization of objects? Why do we need to do this? 3+2=5
 - (vi) (a) What are objects? How are they created?
(b) How is a member function of a class defined? 2½+2½=5

Group-D

4. Answer *any three* questions: 10×3=30
- (i) Write a program to check working of constructor and destructors in multiple inheritance. 10
 - (ii) (a) But operator overloading makes my class look ugly; is not it supposed to make my code clearer?
(b) What are some examples of operator overloading? 6+4=10
 - (iii) (a) What is the difference between `int * f()` and `int(* f)()`?
(b) Write down the effect of `* P + +` where `P` is a pointer to integer
(c) What is the difference between parameter and argument? 3+3+4=10

- (iv) (a) What is the difference between class and structure?
(b) What is difference between `realloc ()` and `free ()`?
(c) Explain public, private and protected access specifier with example. 3+3+4=10
- (v) (a) What is the difference between operator `new` and `new operator`?
(b) What happens to the member function in the class when copy constructor is invoked?
(c) What is the difference between block structured language and highly block structured language?
(d) How you will detect if there is memory leak in your C++ program. 4+2+2+2=10
- (vi) Write short notes on *any two*: 2×5=10
(a) Exception handling
(b) History of C++ language
(c) Memory holes
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SH-III/BCA-304/19

BCA 3rd Semester (Honours) Examination, 2019-20
BACHELOR OF COMPUTER APPLICATION

Course ID :

Course Code : **BCA-304**

Course Title : Mathematics-III

Time: 4 Hours

Full Marks : 80

The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words
as far as practicable.

Group-A1. Answer *all* the questions:

1×10=10

- (i) The number of significant digits in $4 \cdot 560 \times 10^4$ is
- (a) 2
 (b) 3
 (c) 4
 (d) 5
 (e) None of the above
- (ii) The polynomial (interpolation formula) of degree three relevant to the data
- | | | | | | |
|---------|----|---|---|----|----|
| $x:$ | -1 | 0 | 1 | 2 | |
| $f(x):$ | 1 | 1 | 1 | -5 | is |
- (a) $-x^2 - x + 1$
 (b) $-x^3 - x + 1$
 (c) $-x^3 + x + 1$
 (d) $-x^3 - x - 1$
 (e) None of the above
- (iii) The coefficient of the range for the following observations:
 20, 10, 37, 15, 90, 58, 60 is
- (a) 0.6
 (b) 0.7
 (c) 0.8
 (d) 0.9
 (e) None of the above

- (iv) The mean of $1, 2, 3, \dots, 2m (m \geq 2)$ is
- (a) $m(m + 1)/2$
 - (b) $2m(2m + 1)/2$
 - (c) $(2m + 1)/2$
 - (d) $(m + 1)/2$
 - (e) None of the above
- (v) The Newton's Raphson's method fails when
- (a) $f'(x)$ is $(-)\vee e$
 - (b) f' is $(+)\vee e$
 - (c) $f'(x)$ is too $\log e$
 - (d) $f'(x)$ is zero
 - (e) None of the above
- (vi) In the case of Bisection method, the convergence is
- (a) linear
 - (b) quadratic
 - (c) very slow
 - (d) non-linear
 - (e) None of the above
- (vii) The probability of 54 Sunday in a leap year is
- (a) $1/7$
 - (b) $2/7$
 - (c) $3/7$
 - (d) $4/7$
 - (e) None of the above
- (viii) Let $f(x)$ is given by
- | | | | |
|---------|---|-----|-----|
| $x:$ | 0 | 0.5 | 1 |
| $f(x):$ | 1 | 0.8 | 0.5 |
- Then using Trapezoidal rule the value of $\int_0^1 f(x)dx$ is
- (a) 0.775
 - (b) 0.755
 - (c) 0.577
 - (d) 0.557
 - (e) None of the above
- (ix) Let A and B be two independent events with $P(A \cup B) = 0.58$ and $P(A \cap B) = 0.12$, the possible value of $P(A)$ is
- (a) 0.3
 - (b) 0.4
 - (c) Both (a) and (b)
 - (d) 0.5
 - (e) None of the above

- (x) In the Newton's forward interpolation formula the value $u = \frac{x-x_0}{u}$ lies between
- (a) 1 and 2
 - (d) -1 and 1
 - (c) -1 and -2
 - (d) 0 and α
 - (e) None of the above

Group-B

2. Answer any ten questions:

2×10=20

- (i) What do you mean by 'statistical regularity'?
- (ii) What is probability density function?
- (iii) Define 'Random variable' and 'Random experiment'.
- (iv) Define 'Inherent Error' with example.
- (v) What is 'Histogram'?
- (vi) Define 'Absolute Error' and 'Relative Error'.
- (vii) Compute the percentage error in the time period $T = 2\pi\sqrt{l/g}$ for $l = 1m$ if the error in the measurement of l is 0.01 .
- (viii) Prove that the second order forward difference are zero for the function $f(x) = 2x + 5$.
- (ix) State geometrical significance of Trapezoidal Rule.
- (x) What do you mean by likelihood function?
- (xi) Show that probability of complementary events \bar{A} of the even A is given by $P(\bar{A}) = 1 - P(A)$.
- (xii) Write geometrical representation of Newton-Raphson method.
- (xiii) Define Regula Falsi method to find the root of an equation.
- (xiv) Show that $P(AB) \geq P(A) + P(B) - 1$.
- (xv) What do you mean by 'confidence intervals'?

Group-C

3. Answer any four questions:

5×4=20

- (i) Write a program to implement Simpson's Rule to evaluate to integral $\int_0^1 \frac{dx}{x^2-2x+3}$ using sub-intervals. 5
- (ii) When two events are independent? If two events A and B are independent show that A and \bar{B} are independent and hence show that \bar{A} and \bar{B} are independent.
- (iii) Determine the value of the constant K s. t $f(x)$ is defined by

$$f(x) = Kx(1-x), 0 < x < 1$$

$$= 0, \text{ elsewhere}$$
 is a probability density function and find the corresponding distribution function and $P(X \geq \frac{1}{3})$.

- (iv) A and B are two events associated with the some experiment E and $P(A + B) = 7/8$, $P(AB) = 1/4$ and $P(\bar{A}) = 5/8$. Find $P(A)$, $P(B)$ and $P(A\bar{B})$ and find out whether the events A and B are independent to each other.
- (v) Given that $\frac{dy}{dx} = x^2 + y^2$, $y(0) = 0$, compute $y(0.15)$ by Euler method correct up to four decimal places taken up step length $h = 0.05$.
- (vi) Using the Newton's forward interpolation formula from the following table:

Years	1998	2000	2002	2004	2006
Sales (Rs.)	40	43	48	52	57

Group-D

4. Answer *any three* questions:

10×3=30

- (i) Find $f(102)$ from the following table:

x :	93.0	96.2	100.0	104.2	108.7
$y = f(x)$:	11.38	12.80	14.70	17.07	19.91

- (ii) Deduce Fourth order Runge-Kutta method and give advantage and disadvantage of this method.
- (iii) Solve by Gauss-Elimination method.
- $$3x + 9y - 2Z = 11, 4x + 2y + 13Z = 24, 4x - 2y + Z = -8$$
- (iv) Define correlation coefficient between two random variables. If $a(\neq 0)$, $c(\neq 0)$, b, d are constant, then show that $\rho(aX + b, cY + d) = \frac{ac}{|a||c|}\rho(X, Y)$ and also show that $-1 \leq \rho(X, Y) \leq 1$.
- (v) Using Newton-Raphson method, find a real root to the equation $x^4 - x - 10 = 0$ which is nearer to $x = 2$ correct up to three place of decimals.
- (vi) Calculate the arithmetic mean, median and mode for the following frequency distribution:

Height:	56-60	61-65	66-70	71-75	76-80
No. of Persons:	7	25	43	28	7

SH-III/BCA-305/19

BCA 3rd Semester (Honours) Examination, 2019-20
BACHELOR OF COMPUTER APPLICATION

Course ID :

Course Code : BCA-305

Course Title : Unix and Shell Programming

Time: 4 Hours

Full Marks : 80

*The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words
as far as practicable.*

Group-A

1. Answer all the questions:

1×10=10

- (i) Which command is used to terminate a process?
- (a) shutdown
 - (b) haltsys
 - (c) cancel
 - (d) kill
 - (e) None of the above
- (ii) The field separator in cut command is specified with the option
- (a) *-a*
 - (b) *-d*
 - (c) *-r*
 - (d) *-x*
 - (e) None of the above
- (iii) Which of the following command is used to display the directory attribute rather than its contents?
- (a) *ls -l -d*
 - (d) *ls -F -l*
 - (c) *ls -X -a*
 - (d) *ls -D -l*
 - (e) None of the above

- (iv) Which command is used to display the top of the file?
- (a) cat
 - (d) more
 - (c) head
 - (d) grep
 - (e) None of the above
- (v) Which of the following is *not* a communication command?
- (a) write
 - (d) mesg
 - (c) mail
 - (d) grep
 - (e) None of the above
- (vi) Which command is used to remove a directory?
- (a) rd
 - (d) rmdir
 - (c) dldir
 - (d) rdir
 - (e) None of the above
- (vii) Which symbol will be used with grep command to match the pattern pat at the beginning of a line?
- (a) ^Pat
 - (d) \$Pat
 - (c) Pat\$
 - (d) Pat^
 - (e) None of the above
- (viii) Which command is used to extract specific columns from the file?
- (a) cat
 - (d) find
 - (c) grep
 - (d) paste
 - (e) None of the above
- (ix) Which command will be used with vi editor to insert text to left of cursor?
- (a) A
 - (d) :W
 - (c) :X
 - (d) esc
 - (e) None of the above

- (x) Which command is used to count just the number of characters in a file?
- (a) wc -l
 - (d) wc-w
 - (c) wc-c
 - (d) wc-r
 - (e) None of the above

Group-B

2. Answer *any ten* questions:

2×10=20

- (i) What is unix?
- (ii) What is shell?
- (iii) How do you switch from any user type to a super user type?
- (iv) What is pid?
- (v) What is parsing?
- (vi) Describe the term directory in UNIX?
- (vii) What is kernel?
- (viii) Write the exact command to display system year on screen.
- (ix) Describe fork () system call.
- (x) What is piping?
- (xi) Write two internal command with it's function.
- (xii) Write a shell script to display a full calendar year on the screen for a given year.
- (xiii) Why banner command is used?
- (xiv) Write difference between who, who am I.
- (xv) Write the function of the command PWD.

Group-C

3. Answer *any four* questions:

5×4=20

- (i) What is wild-card interpretation? Explain with example.
- (ii) What are the main features of Unix?
- (iii) What are the responsibilities of a shell?
- (iv) Discuss the difference between swapping and paging.
- (v) Write the difference between multiuser and multitasking operating system.
- (vi) Describe the various mode of vi editor.

Group-D

4. Answer *any three* questions:

10×3=30

- (i) What is the use of chmod command? Differentiate absolute and symbolic modes with example. Write a shell script to display file's group permission, File name is an input from keyboard.

2+4+4=10

- (ii) Write a shell script to display Fibonacci series upto n terms n is the keyboard input. Write a shell script to convert Fahrenheit temperature to celcius temperature. The temperature is a command line input. 6+4=10

 - (iii) Write a shell script to display all the file types and file permissions in the current directory. Explain unix command line arguments and the way to handle all special shell variables with a suitable example. 4+6=10

 - (iv) Explain the unix architecture with a neat diagram. Write a shell script to find the number of occurrences of a particular character in a given string. 6+4=10

 - (v) Write the logical operators used in unix for number and string. Write a shell script to print all prime numbers between m and n where ($m < n$). 5+5=10

 - (vi) Write short note on (*any two*): 5
 - (a) grep
 - (b) The letel stab file
 - (c) fdisk
 - (d) man
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SH-III/BCA-306/19

BCA 3rd Semester (Honours) Examination, 2019-20
BACHELOR OF COMPUTER APPLICATION

Course ID :

Course Code : BCA-306

Course Title : Software Lab-IV (Programming in C++)

Time: 4 Hours

Full Marks : 70

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

Group-A

Answer *any one* questions:

35×1=35

1. (i) Write a C++ program to create class complex-number. Overload '+' operator for adding two complex numbers.
- (ii) Write a C++ program to create a class account to manage the bank accounts. This class should have details of account holder including home address, account number as data member and display basic information of the account holders.
- (iii) Create a student class with basic data member functions and constructor.
- (iv) Define proper destructor with appropriate message about its execution for employee class. You are free to make necessary assumption.
- (v) Write a C++ program to find the area of the following shapes. Use function overloading to implement this program (i) circle (ii) Rectangle.
- (vi) Write a C++ program to add two matrices. Define proper class and constructor in this class. Define method to display the sum of two matrices.
- (vii) Write a program in C++ to check a number is palindrome or not.
- (viii) Write a C++ program to create student class. Define constructor for this class. Also define a method to display the student details and name of five subjects taken by him/her in the current semester. Make necessary assumption.
- (ix) Write a C++ program to find $a + b$, $a - b$, $a \times b$ and a/b where a and b are two numbers. Implement proper mechanism to handle exception(s) in this program.
- (x) Using pointer create a class and display them in sorted order.

Group-B

2. Answer *any one* questions:

35×1=35

- (i) Write a program to check a number is a prime or not.
 - (ii) Write a program using polymorphism to calculate the square of any two numbers of type int, float, double and long.
 - (iii) Write a C++ program to convert a string of numbers to integer.
 - (iv) Write a C++ program to find the power of a number using loop.
 - (v) Write a C++ program to find LCM of two numbers.
 - (vi) Write a C++ program to multiply two numbers without using multiplication operator.
 - (vii) Write a C++ program to find presence of a number X in the array recursively.
 - (viii) Write a program to find last occurrence of a number using recursion in an array.
 - (ix) Write a program in C++ to print the size of different types of point along with values and address.
 - (x) Write a C++ program to implement multilevel inheritance.
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SH-III/BCA-307/19

BCA 3rd Semester (Honours) Examination, 2019-20
BACHELOR OF COMPUTER APPLICATION

Course ID :

Course Code : BCA-307

Course Title : Software Lab-IV (Unix and Shell Programing)

Time: 4 Hours

Full Marks : 70

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

Perform *one* experiment from each Group.

Group-A

Answer *any one* question.

35×1=35

1. Write a shell script to display odd numbers between m and n . ($m < n$)
2. Write a shell script to find the largest number among 3(three) numbers.
3. Write a shell script to find a^b , where a and b are the values from keyboard.
4. Write a shell script to find the sum of the digits of a number.
5. Write a shell program to do the Arithmetic operation sum, subtraction, multiplication, division.
6. Write a shell script to find the sum of a Fibonacci series upto n terms.
7. Write a shell script to check the given number is Armstrong or not.
8. Write a shell script to find the smallest digit from a_1 number.
9. Write a shell script to exchange the values of two variables without using temporary variable.
10. Write a shell script to find H.C.F. of two number.

Group-B

Answer *any one* question:

35×1=35

1. Write a shell script to execute the following task in unix.
 - (a) Create two files.
 - (b) Combine the two files into third file.
 - (c) Search a specific file from a directory.
 - (d) Display the content of the file.

2. Write a shell script to execute the following task in unix.
 - (a) Display the calendar.
 - (b) Display the Date and time.
 - (c) Display the current working directory.
 - (d) Display your user name.

3. Write a shell script to do the following operation.
 - (a) Create a directory.
 - (b) View all files in the current directory.
 - (c) Rename a directory you created.
 - (d) View all files starting with a specific character.

4. Write a shell script to do the following operation.
 - (a) Create a directory with the name exam.
 - (b) Change the exam directory as working directory.
 - (c) Create a file called exam.txt in the directory.
 - (d) View the content of exam.txt file.

5. Write a shell script to execute the following task.
 - (a) Create two files.
 - (b) Display the content of both the file.
 - (c) Count the no. of character in the second file.
 - (d) Combine the two file into third file.

6. Write a shell script that computes the gross salary of a employee according to the following rules.
 - (a) if basic salary is <1500 then HRA=10% of the basic and DA=90% of basic.
 - (b) if basic salary is >1500 then HRA=500 and DA=98% of basic.

7. Write an interactive shell program for copying, removing, renaming a given file as input.

8. Write a shell script which will receive two file name as command line argument, then it should check whether two file contents are same or not. If they are same then delete the second file.

9. Write a shell script which displays “Good morning”, “Good afternoon”, “Good evening” depending on the time of running script.

10. Write a shell script series to find the sum of the following series upto n terms.

$$1 + \frac{1}{2}! + \frac{1}{3}! + \frac{1}{4}! \dots \frac{1}{n}!$$

SH-III/BCA-301/19

BCA 3rd Semester (Honours) Examination, 2019-20
BACHELOR OF COMPUTER APPLICATION

Course ID :

Course Code : BCA-301

Course Title : Operating System

Time: 4 Hours

Full Marks : 80

*The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words
as far as practicable.*

Group-A

1. Answer all the questions:

10×1=10

- (i) Which one is the reasons behind the increase of throughput?
 - (a) Multiprogramming
 - (b) Multitasking
 - (c) Time Sharing Job
 - (d) All of the above
 - (e) None of the above
- (ii) In the memory hierarchy of operating system, _____ is the fastest accessible memory.
 - (a) CPU Register
 - (d) Disk
 - (c) Main Memory
 - (d) Cache Memory
 - (e) None of the above
- (iii) The surface of floppy disk is made of concentric circles are called
 - (a) Sector
 - (d) Records
 - (c) Blocks
 - (d) Tracks
 - (e) None of the above
- (iv) A Thread is a
 - (a) Task
 - (d) Process
 - (c) Programme
 - (d) Lightweight Process
 - (e) None of the above

- (v) Which scheduling algorithm is inherently pre-emptive?
 - (a) FCFS
 - (d) SJF
 - (c) RR
 - (d) Priority Scheduling
 - (e) None of the above

- (vi) The optimal scheduling algorithm is
 - (a) FCFS
 - (d) SJF
 - (c) RR
 - (d) Priority Scheduling
 - (e) None of the above

- (vii) Thrashing is
 - (a) reduce page I/O.
 - (d) decrease the degree of multiprogramming.
 - (c) implies excessive page I/O.
 - (d) improves the system performance.
 - (e) None of the above

- (viii) Fork is
 - (a) the creation of a new job.
 - (d) the dispatching of a task.
 - (c) increasing the priority of a task.
 - (d) the creation of new task.
 - (e) None of the above

- (ix) The mechanism that bring a page into memory only when it is needed, is called
 - (a) Segmentation
 - (d) Fragmentation
 - (c) Demand Paging
 - (d) Page Replacement
 - (e) None of the above

- (x) PCB stands for
 - (a) Program Control Block
 - (d) Process Control Block
 - (c) Process Communication Block
 - (d) Program Counter Block
 - (e) None of the above

Group-B

2. Answer *any ten* questions: 2×10=20
- (i) What is a process?
 - (ii) What is Starvation? Explain your answer.
 - (iii) What do you mean by Turn Around Time?
 - (iv) What are the basic operation of binary semaphore?
 - (v) What do you mean by distributed OS?
 - (vi) What is the latency time in the context of disk scheduling?
 - (vii) Define Page fault?
 - (viii) What is Preemptive resource?
 - (ix) Define spooling?
 - (x) Define Page frame.
 - (xi) What is I/O bound process?
 - (xii) Write the difference between program and process.
 - (xiii) Write the difference between user level thread and kernel level thread.
 - (xiv) What is a file?
 - (xv) What is the objective of disk scheduling?

Group-C

3. Answer *any four* questions: 5×4=20
- (i) Discuss different state of process using a block diagram.
 - (ii) Discuss the role of OS as a resource manager.
 - (iii) Discuss the first fit, best fit and worst fit technique in the context of memory allocation.
 - (iv) Discuss the producer-consumer problem.
 - (v) Distinguish between 'Starvation' and 'Deadlock'.
 - (vi) Describe Inverted page table techniques briefly.

Group-D

4. Answer *any three* questions: 10×3=30
- (i) (a) Explain the PCB.
 - (b) Suppose that the following process arrive for execute at the time indicated:

Process	Arrival time	Burst time
P ₀	0	5
P ₁	2	7
P ₂	3	9
P ₃	3	4
P ₄	4	3

Draw the Gantt chart and calculate:—

- (I) Average waiting time in SJF Scheduling.
- (II) Calculate the response time for process P₃ in FCFS Scheduling.
- (III) Average Turn around time in RR Scheduling if time slice is 3ns. 4+6=10

(ii) (a) Define Deadlock.

(b) Consider the following table:

Process	Allocation	Max	Available
	A B C D	A B C D	A B C D
P ₀	1 0 0 2	2 3 5 3	1 2 3 3
P ₁	0 0 2 0	2 1 3 5	
P ₂	1 0 3 0	1 2 3 2	
P ₃	1 2 3 4	2 3 3 6	
P ₄	1 0 0 3	2 4 5 6	

(I) Check the system is in Safe State or not.

(II) If process P₁ request (0, 4, 2, 0), can the request be granted immediately? What is the safe sequence if it can be granted. 2+4+4=10

(iii) (a) What is sector and track?

(b) Discuss SCAN Scheduling and SSTF Scheduling in brief. 2+4+4=10

(iv) (a) How does spooling improve efficiency of any OS?

(b) Consider the following page references:

3, 2, 1, 2, 6, 1, 2, 1, 3, 6, 7, 1, 2, 7, 3

How many page fault would occur for the following page replacement algorithms, assuming frame size – 4

(I) LRU page replacement

(II) FIFO page replacement

(III) Optimal page replacement 1+9=10

(v) (a) Differentiate between process switching and context switching.

(b) Explain with example how critical section problem arise when two or more process try to access a shared variable concurrently. 3+7=10

(vi) (a) What is FAT? Explain.

(b) Discuss different attributes of a file?

(c) What is virtual memory? 2+6+2=10
