Seat No. : 00670

NE-103

November-2019

BCA., Sem.-III

CC-205 : Statistical Methods (New)

Time : 2:30 Hours] [Max. Marks : 70

Instruction : Use of Scientific Calculator is allowed.

1. (A) (i) A shopkeeper has 50 cold drink bottles. Some of the bottles are 1-liter and some are 2-liter bottles. The average cold drink of the bottles is 1200 ml. Find the number of 2-liter bottles. (1 liter = 1000 ml) 7

(ii) A car driver covers a distance of 143 kilometers from Delhi to Agra rate of 50 kilometers per hour. In return journey he covers the distance at the rate of 100 kilometers per hour. Find the average speed of the journey to and from. 7

OR

(i) Calculate median and mode of the following data.

Production per day (in tons)	21-22	23-24	25-26	27-28	29-30
No. of days	7	13	22	10	8

(ii) Statistics are like clay of which you can make a God or Devil as you please. Explain.

(B) Attempt any **four** : 4

(1) If $\sum_{i=1}^{10} (x_i - 50) = 100$, then sample mean will be

(a) 10 (b) 50

(c) 60 (d) 100

(2) If the mode and mean of a moderately asymmetrical series is 80 and 68, what will be the most probable median ?

(3) State whether the given statement is True / False.
"Harmonic mean is used when the data are given in terms of rates."

(4) State which average will be appropriate in the following case ?
"Where the data is qualitative."

(5) Harmonic mean is lower value than _____.

(a) Arithmetic mean (b) Geometric mean

(c) Both (a) & (b) (d) None

(6) If in a discrete series 75% values are less than 30, then :

(a) $Q_3 < 30$ (b) $Q_3 < 75$

(c) $Q_3 = 30$ (d) $Q_3 > 30$

2. (A) (i) In a study on patient, the following data was obtained. Find the standard deviation of the data. 7

Age in years :	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89
No. of cases :	1	0	1	10	17	38	9	3

(ii) A sample of 35 values has mean 80 and standard deviation 4. A second sample of 65 values from the same population has mean 70 and standard deviation 3. Find the mean and the standard deviation of the combined sample of 100 values. 7

OR

(i) Sample of polythene bags from two manufactures, A and B, are tested by a prospective buyer for bursting pressure and the results are as follows :

Bursting Pressure (lb)	No. of bags	
	A	B
5.0 – 9.9	2	9
10.0 – 14.9	9	11
15.0 – 19.9	29	18
20.0 – 24.9	54	32
25.0 – 29.9	11	27
30.0 – 34.9	5	13

Which set of bags has more uniform pressure ?

(ii) Age distribution of 200 employees of a firm is given below. Calculate Quartile Deviation and co-efficient of Quartile Deviation.

Age in years :	25	30	35	40	45	50	55
No. of employees :	10	25	75	130	170	189	200

(B) Attempt any **four**. 4

(1) Positive square root of mean of squared deviations of some observations from their arithmetic mean is called _____.

(a) Standard Deviation (b) Variation

(c) Median (d) Mode

(2) _____ is used to the criterion of consistency i.e. for consistent performance.

(a) Range (b) Standard Deviation

(c) Co-efficient of Variation (d) Mean Deviation

(3) If mean absolute deviation of set of observations is 8.5 then value of quartile deviation is

(a) 7.08 (b) 9.08

(c) 10.2 (d) 11.2

(4) The measures used to calculate the variation present among the observations in the unit of the variable is

(a) relative measure of dispersion

(b) coefficient of variation

(c) absolute measure of dispersion

(d) None

(5) The measures of dispersion can never be :

(a) Positive (b) Zero

(c) Negative (d) Equal to 2

(6) The variance of 19, 21, 23, 25 and 27 is 8. The variance of 14, 16, 18, 20 and 22 is :

(a) greater than 8 (b) 8

(c) less than 8 (d) $8 - 5 = 3$

3. (A) (i) A bag contains 6 red and 5 blue balls and another bag contains 5 red and 8 blue balls. A ball is drawn from the first bag and without noticing its colour is put in the second bag. A bag is then drawn from the second bag. Find the probability that the ball drawn is blue in colour. 7

(ii) The overall percentage of failure in certain examination is 30. What is the probability that out of a group of 6 candidates at least 4 passed the examination ? 7

OR

(i) A manufacturing firm produces steel pipes in three plants with daily production volume of 500, 1000 and 2000 units respectively. According to past experience it is known that the fraction of defective output produced by the three plants are respectively 0.005, 0.008 and 0.010. If a pipe is selected from a day's total production and found to be defective. What is the probability that it came from the first plant ?

(ii) A contractor spends ₹ 3,000 prepaid for a bid on a construction project which after deductions manufacturing expenses and cost of bidding, will yield a profit of ₹ 25,000, if the bid is won. If the chance of winning is ten percent, compute his expected profit and state the likely decision on whether to bid or not to bid.

(B) Attempt any **three** : 3

(1) In a Binomial Distribution, if p, q and n are probability of success, failure and number of trails respectively then variance is given by

(a) np (b) npq

(c) np^2q (d) npq^2

(2) You toss a coin and roll a die. What is the probability of getting a tail on coin and 4 on a die ?

(a) $\frac{1}{2}$ (b) $\frac{1}{6}$

(c) $\frac{1}{12}$ (d) $\frac{1}{8}$

(3) Probability of second event in situation. If first event has been occurred is classified as

(a) series probability (b) conditional probability

(c) joint probability (d) dependent probability

(4) In probability theories, events which can never occur together are classified as

(a) collectively exclusive events

(b) mutually exclusive events

(c) mutually exhaustive events

(d) collectively exhaustive events

(5) Method in which previously calculated probabilities are revised with new probabilities is classified as

(a) updating theorem (b) Bayes theorem

(c) revised theorem (d) dependency theorem

4. (A) (i) The following data relate to the score obtained by 9 salesmen of a company in an intelligence test and their weekly sales (₹ in 1000's) 7

Salesmen :	A	B	C	D	E	F	G	H	I
Test Scores :	50	60	50	60	80	50	80	40	70
Weekly Sales :	30	60	40	50	60	30	70	50	60

Find : (a) The regression equation of sales on intelligence test scores of the salesmen.

(b) If the intelligence test score of a salesman is 65, what would be his expected weekly sales.

(ii) Find the correlation between age and playing habit of the following students : 7

Age :	15	16	17	18	19	20
No. of students :	250	200	150	120	100	80
Regular players :	200	150	90	48	30	12

OR

(i) The two regression lines obtained in a correlation analysis of 60 observations are $5x = 6y + 24$ and $1000\ y = 768x - 3708$.
What is the correlation coefficient and what is the probable error ?

(ii) From the following data of the marks obtained by 10 students in Mathematics and Statistics. Calculate the correlation coefficient by the rank method.

Roll No.	1	2	3	4	5	6	7	8	9	10
Marks in Mathematics :	20	25	60	45	80	25	55	65	25	75
Marks in Statistics :	52	50	55	50	60	70	72	78	80	63

(B) Attempt any **three** : 3

(1) The correlation coefficient is used to determine _____.

(a) a specific value of y – variable given a specific value of x – variable.

(b) a specific value of x – variable given a specific value of y – variable.

(c) The strength of the relationship between x and y variables.

(d) None of these

(2) In regression analysis, the variable that is being predicted is the _____.

(a) response, or dependent variable

(b) independent variable

(c) intervening variable

(d) is usually x

(3) The slope of the regression line of Y on X is called the _____.

(a) Correlation coefficient of X on Y.

(b) Correlation coefficient of Y on X.

(c) Regression coefficient of X on Y.

(d) Regression coefficient of Y on X.

(4) If the value of any regression coefficient is zero, then two variables are _____.

(a) qualitative (b) correlation

(c) dependent (d) independent

(5) The highest strength of association is reflected by which of the following correlation coefficient ?

(a) –1.0 (b) –0.95

(c) 0.1 (d) 0.85

Time : 2:30

Instructio

1. (A)

Seat No. : _____

NE-103

November-2019

BCA., Sem.-III

CC-205 : Statistical Computing (Old)

Time : 2:30 Hours] **[Max. Marks : 70**

Instruction : Use of Scientific Calculator is allowed.

1. (A) (i) The frequency distribution of weight in grams of mangoes of a given variety is given below : Calculate the arithmetic mean, median and mode. 7

Weights (gms)	No. of mangoes	Weights (gms)	No. of mangoes
410-419	14	450-459	45
420-429	20	460-469	11
430-439	42	470-479	7
440-449	54		

(ii) An aeroplane flies around a square sides of which measure 100 km each. The aeroplane covers at a speed of 100 km per hour the first side, at 200 km per hour the second side, at 300 km per hour the third side and at 400 km per hour the fourth side. Use the correct mean to find average speed around the square. 7

OR

(i) The following incomplete table gives the number of students in different age-groups of a town. If the median of the distribution is 11 years, find the missing frequencies.

Age group	0-5	5-10	10-15	15-20	20-25	25-30	Total
No. of students	15	125	?	66	?	4	300

(ii) Calculate median for the following distribution :

Production per day (in tons)	21-22	23-24	25-26	27-28	29-30
No. of day	7	13	22	10	8

(B)

(B) Attempt any **four** : 4

(1) Arithmetic mean is nor dependent of choice of origin and scale.
(True / False)

(2) State which average is appropriate : "if the data is qualitative".

(3) The value of mode and median for a moderately skewed distribution are 64.2 and 68.6 respectively. Find the value of the mean.

(4) Define : Arithmetic mean.

(5) Give formula to find Mode in case of continuous data.

(6) For a set of two observations, $GM^2 = AM \times HM$ (True / False) 3.

2. (A) (i) Calculate the mean deviation of the marks of 39 students in Statistics given below : 7

Marks	0-5	5-10	10-15	15-20	20-25	25-30
No. of students	4	6	8	12	7	2

(ii) The prices of shares X and Y are given below, state which share is more stable in value ? 7

X	55	54	52	53	56	58	52	50	51	49
Y	108	107	105	105	106	107	104	103	104	101

OR

(i) Calculate the mean and standard deviation from the following data :

Age	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60
F	20	26	44	60	101	109	84	66	10

(ii) Find range, coefficient of range, quartile deviation and coefficient of quartile deviation. 15,20,15,22,16,14,21,17

(B) Attempt any **four** : 4

(1) State the empirical relationship between Mean deviation, Standard deviation and Quartile deviation.

(2) Relative measure of dispersion is independent of units of measurement. (True / False)

(3) The range of given distribution is less than standard deviation. (True / False)

(4) The variance of sample is (–20). (True / False)

(5) The standard deviation of one observation is 1. (True / False)

(6) The variance of first 13 natural number is 13. (True / False)

3. (A) (i) Consider the table that contains the probability mass function of the discrete random variable X is 7

x	0	1	2	3
P (x)	0.1	0.5	0.2	0.2

Calculate E(3), E(3x), E(4+x), E(4+3x), V(x)

(ii) A man is known to speak truth 2 out of 3 times. He throws a die and reports that number obtained is a four. Find the probability that the number obtained is actually a four. 7

OR

(i) Two cards are drawn from a pack of 52 cards and is thrown away, then another card is drawn from the remaining 50 cards. Find the probability that it is an ace.

(ii) Two groups of children contain 3 girls and 1 boy, 2 girls and 2 boys respectively. A child is selected from first group and transferred into second group. Then a child is selected from second group. Find the probability that he is a boy ?

(B) Attempt any **three** :

(1) A number between 0 and 1 that is use to measure uncertainty is called _____.

(a) Random variable (b) Trial

(c) Simple event (d) Probability

(2) A letter is chosen from the word "Statistics". The probability of getting a vowel is _____.

(a) 1/10 (b) 2/10

(c) 3/10 (d) 4/10

(3) If the probability of A failing in an exam is 0.2 and of B failing is 0.3, then what is the probability of either A failing, or B failing ?

(4) From a set of 17 balls marked 1, 2, 3, ... 17; one ball is drawn at random. What is the chance that its number is either multiple of 3 or 7.

(5) If $V(x) = 5$, then find $V(2x - 3)$.

4. (A) (i) Calculate the correlation coefficient between height and weight from the following table : 7

Height	Weight				
	80-90	90-100	100-110	110-120	120-130
50-55	1	3	7	5	2
55-60	2	4	10	7	4
60-65	1	5	12	10	7
65-70	–	3	8	6	3

(ii) Using following information obtain regression line Y on X. 7

$N = 10, \Sigma X = 424, \Sigma XY = 12815, \Sigma X^2 = 21926, \Sigma Y = 363, \Sigma Y^2 = 15123$

OR

(i) What is the correlation between these two variables :

Stress	4	10	12	5	7	6	2	14
Sense of humor	2	8	11	3	8	7	3	13

(ii) The sales of a company (in million dollars) for each year are shown in the table below :

x (year) :	2005	2006	2007	2008	2009
y (sales) :	12	19	29	37	45

(a) Find the least square regression line $y = ax + b$.

(b) Use the least squares regression line as a model to estimate the sales of the company in 2012.

(B) Attempt any **three** : 3

(1) What is the range of correlation coefficient ?

(2) Comment on the statement : "Coefficient of regression of Y on X is 4.2 ; and coefficient of regression of X on Y is 0.5."

(3) The two regression lines are mutually perpendicular if X and Y are independent. (True / False)

(4) All data points falling along straight line is called _____.

(a) linear relationship (b) nonlinear relationship

(c) residual (d) scatter diagram

(5) In simple regression equation, the number of variables involved are ____.

(a) 0 (b) 1

(c) 2 (d) 3

Seat No. : 670

NC-114

November-2019

BCA, Sem.-III

CC-203 : Object Oriented Concepts and Programming

(New Course)

Time : 2:30 Hours] [Max. Marks : 70

1. (A) Answer the following :
   (1) Explain function overloading in depth. 7
   (2) List features of object oriented programming and explain any three in depth. 7

OR

Answer the following :
(1) Attempt following :
   (i) Difference between POP and OOP
   (ii) Arrow operator
(2) Explain inline function with all its limitations. 4

(B) State **true** or **false** : (any **four**)
   (1) The 'this' pointer is always a constant pointer.
   (2) Static member function cannot access non-static data member.
   (3) Reference variable is a reference to an existing variable.
   (4) All the members of class are public by default.
   (5) A function defined within class is treat as an inline function by default.
   (6) Object is class type variable.

2. (A) Answer the following :
   (1) Explain friend function with all its features. 7
   (2) How dynamic memory can be allocated and deallocated ? Write advantages of dynamic memory allocation. 7

OR

Answer the following :
(1) List different options to avoid name collision of classes. Explain any one in depth.
(2) Write features of constructor and explain different types of constructor. 4

(B) Attempt following : (any **four**)
   (1) The syntax to create array of five objects of Student class is _____.
      (a) Student s[5] (b) int Student[5]
      (c) Student s[4] (d) int s[5]
   (2) In class we can create, _____ destructor(s).
      (a) 1 (b) 2
      (c) 3 (d) N

(3) A class within a class is called _____.
(a) Nested class (b) Enclosing class
(c) Outer class (d) None of the above

(4) Dynamic memory allocated at _____.
(a) Compile time (b) Run time
(c) Any time (d) None of the above

(5) At the maximum, how many parameters can a destructor accept ?
(a) 0 (b) 1
(c) 2 (d) N

(6) Function can _____.
(a) Take object as an argument (b) Return object
(c) Both of the above (d) None of the above

3. (A) Answer the following :
(1) Explain different forms of inheritance. 7
(2) How virtual function supports dynamic polymorphism ? Explain in depth. 7

OR

Answer the following :
(1) What is inheritance ? Write advantages of inheritance and explain function overriding.
(2) Differentiate virtual and pure virtual function and explain abstract class in depth.

(B) State **true** or **false** : (any **three**) 3
(1) Private members are never inherited.
(2) Virtual function is called do-nothing function.
(3) Destructor cannot be virtual.
(4) Only one object can be created of an abstract class.
(5) Inheritance provides re-usability.

4. (A) Answer the following :
(1) Write rules for operator overloading. 7
(2) Explain class hierarchy for handing stream. 7

OR

Answer the following :
(1) Explain class template in depth.
(2) Explain type conversion.

(B) Fill in the blanks : (any **three**) 3
(1) Text mode file output is possible with _____ operator.
(2) Obj2=10+obj1; is permissible only when implemented with _____ function.
(3) To overload binary operator with member function the number of arguments required are _____.
(4) cin is an object of _____ class.
(5) Generic function can be created with use of _____.

_____

Seat No. : _____

NC-114

November-2019

BCA, Sem.-III

CC-203 : Object Oriented Concepts and Programming

(Old Course)

Time : 2:30 Hours] [Max. Marks : 70

1. (A) Answer the following :
   (1) Explain inline function in depth. 7
   (2) Explain following : 7
      (i) Reference Variable
      (ii) Scope Resolution Operator

OR

Answer the following :
   (1) Explain function overloading in depth.
   (2) Write differences :
      (i) C and C++
      (ii) Class and Object

(B) Define following terms : (any **four**) 4
   (1) Encapsulation
   (2) Private access specifier
   (3) Data type : bool
   (4) Arrow operator
   (5) POP
   (6) Comments in C++

2. (A) Answer the following :
   (1) Write characteristics of constructor and write difference between constructor and destructor. 7
   (2) Explain dynamic memory allocation and set_new_handler function. 7

OR

Answer the following :
   (1) Explain 'friend' keyword.
   (2) Explain different types of constructors with its characteristics.

(B) State **true** or **false** : (any **four**)

(1) Only one copy of static member data is created in the memory.

(2) Mutable means never constant.

(3) Destructors can be overloaded in the class.

(4) Constructors are used to de-allocate the memory.

(5) Class name collision can be avoided with use of nested class.

(6) Friend function can access private data member of class.

3. (A) Answer the following :

(1) Explain virtual base class. 7

(2) Explain inheritance using different access specifiers. 7

OR

Answer the following :

(1) What is inheritance ? Write advantages of inheritance and explain function overriding.

(2) Explain VTBL and VPTR.

(B) Attempt following : (any **three**) 3

(1) What is 'protected' ?

(2) What is multilevel inheritance ?

(3) What is abstract class ?

(4) Which function support late binding ?

(5) What is do nothing function ?

4. (A) Answer the following :

(1) Explain class template in depth. 7

(2) Explain type conversion. 7

OR

Answer the following :

(1) Write rules for operator overloading.

(2) Explain any three cases of order of invocation of constructors.

(B) State **true** or **false** : (any **three**) 3

(1) To overload binary operator member function requires two argument.

(2) Obj1=5+obj2; here operator overloading is possible with friend function only.

(3) Template provides generic data type.

(4) Operator overloading is type of polymorphism.

(5) Scope resolution (::) operator can be overloaded with member function only.

Seat No. : 670

NA-104

November-2019

BCA., Sem.-III

CC-201 : Computer Organization
(New Course)

Time : 2:30 Hours] [Max. Marks : 70

1. (A) Answer the questions in details.

6 (1) Explain AND, OR, XOR, NOT and NAND gate with block diagram and truth table. 7

5 (2) Explain SR flip-flop with logic diagram and truth table. 7

OR

(1) Explain half adder with block diagram, logic diagram and truth table.

(2) What is multiplexer ? Draw block diagram, circuit diagram and truth table for 4 × 1 multiplexer.

(B) Answer the questions : (any **four**) 4

(1) Flip-flop is used to store one bit of data. (T/F)

(2) In shift register, each bit is updated on a clock transition by copying state of

(a) it's neighbour (b) itself

(c) input (d) voltage supply

(3) An area of a computer that temporarily holds data waiting to be processed is

(a) CPU (b) Storage

(c) Memory (d) File

(4) Decoders and Encoders are doing reverse operation. (T/F)

(5) PROM stands for _____.

(6) The smallest unit of data in computer is _____.

(a) Byte (b) Bit

(c) Nibble (d) KB

(B) State **true** or **false** : (any **four**)

(1) Only one copy of static member data is created in the m

(2) Mutable means never constant.

(3) Destructors can be overloaded in th

(4) Constructors are used to d

(5) Class name collisi

(6) Friend fu

3. (A)

2. (A) Answer the questions in details :

(1) Perform binary subtraction using 1's complement

(i) 11001 – 10011 (ii) 1010 – 1100 (iii) 1001 - 1101

(2) Explain binary adder with diagram.

OR

(1) Explain parity bits, generator and checker with diagram in error detection.

(2) Perform binary subtraction using 2's complement.

(i) 11010 – 10000 (ii) 1010 – 1011 (iii) 1001 – 1111

(B) Answer the questions : (any **four**)

(1) In computers, subtraction is carried out generally by _____.

(a) 2's complement method (b) 1's complement method

(c) signed magnitude method (d) BCD subtraction method

(2) $(2FAOC)_{16}$ is equivalent to _____.

(a) $2\,(195\,084)_{10}$ (b) Both (a) and (c)

(c) $(0010111110100000\,1100)_2$ (d) None of these

(3) A floating point number that has a 0 (zero) in the MSB of mantissa is said to have underflow. (T/F)

(4) Components that provide internal storage to the CPU are registers. (T/F)

(5) An arithmetic shift left multiplies a signed binary number by 2. (T/F)

(6) Arithmetic operations with fixed point numbers take longer time for execution as compared to with floating point numbers. (T/F)

3. (A) Answer the questions in details :

(1) Explain computer registers with diagram.

(2) Explain interrupt cycle with flowchart.

OR

(1) List various types of addressing modes and explain any three addressing modes.

(2) List types of computer instruction and draw format of it.

(B) Answ

(1)

(2)

(3)

(4)

4. (A)

(B) Answer the questions : (any **three**) 3

(1) A stack organized computer uses instruction of zero addressing. (T/F)

(2) Address in the main memory is called as physical address. (T/F)

(3) If the value V (x) of the target operand is contain in the address field itself, the addressing mode is

(a) Immediate (b) Indirect

(c) Implied (d) Direct

(4) A group of bits tells computer to perform a specific operation is called

(a) micro-operation (b) instruction code

(c) accumulator (d) register

(5) Stack pointer contains address of top element of stack. (T/F)

4. (A) Answer the questions in details :

(1) Explain daisy chain priority with diagram. 7

(2) Define main memory. Explain RAM and ROM chip with diagram. 7

OR

(1) Explain source initiated handshaking with diagram.

(2) Explain associative memory with block diagram.

(B) Answer the questions : (any **three**) 3

(1) Memory unit access by content is called

(a) read only (b) programmable memory

(c) associative memory (d) virtual memory

(2) Cache is the fastest memory in computer memory hierarchy. (T/F)

(3) Mutable means never constant.
(4) Destructors can be overloa
(5) Constructors are us
(6) Class name

(3) An interface that provides a method for transferring binary information between internal storage and external device is called

(a) I/O interface
(b) Output
(c) I/O bus
(d) Input

(4) An interface that provide i/o transfer of data directly to and from the memory unit and peripherals is termed as DMA. (T/F)

(5) Virtual memory consists of static RAM. (T/F)

Seat No. : _____

NA-104

November-2019

BCA., Sem.-III

CC-201 : Computer Organization & Advanced Microprocessor
(Old Course)

Time : 2:30 Hours] [Max. Marks : 70

1. (A) Answer the questions in details.

(1) Explain Von Neumann architecture with diagram. 7

(2) Explain interrupt with its types. 7

OR

(1) Define bus and discuss types of bus.

(2) Define device controller and explain device interface signals.

(B) Answer the questions : (any **four**) 4

(1) Each device controller that controls devices of computer system has device drivers. (T/F)

(2) An exception condition in a computer system caused by an event external to the CPU is called _____.

(a) Interrupt (b) Wait

(c) Halt (d) Process

(3) CPU gets the address of next instruction to be processed from

(a) MAR (b) IR

(c) PC (d) MBR

(4) Control unit coordinates various operations using timing signals. (T/F)

(5) A digital computer on single chip is called _____.

(6) Full form of RTL is _____.

(2) Only one copy of static member data is
(3) Mutable means never const
(4) Destructors can b
(5) Constru

2. (A) Answer the questions in details.

(1) What is Demultiplexer ? Draw circuit and write truth table for 1×4 Demultiplexer.

(2) Draw the block diagram, schematic diagram and write truth table for half adder.

OR

(1) Explain JK flip flop.

(2) Explain normalized floating point number with example.

(B) Answer the questions : (any **four**) 4

(1) Output will be a LOW for any case when one or more inputs are zero

(a) AND (b) OR

(c) NOT (d) NOR

(2) CARRY in half adder can be obtained using _____ gate.

(3) Multiplexer is used to produce one output from many inputs. (T/F)

(4) In D flip-flop, D means data. (T/F)

(5) Operation carried out by a NOT gate are also termed as inverting. (T/F)

(6) _____ produces many output from one input.

3. (A) Answer the questions in details.

(1) List cache replacement algorithms and explain any three of them. 7

(2) Explain Direct mapping with diagram. 7

OR

(1) Explain instruction prefetch and write buffer techniques.

(2) Explain Cache coherence with example.

(B) Answer the questions : (any **three**) 3

(1) In the memory hierarchy the fastest memory is _____.

(2) Address in the main memory is called as physical address. (T/F)

(3) Mapping function determines cache location of

(a) Cache size (b) Cache design

(c) Cache memory (d) Block

(4) A combination of direct mapping and associative mapping is _____.

(5) If a CPU searches for an item in the cache memory and if it finds the item then it will be considered as _____.

4. (A) Answer the questions in details.

(1) Explain RISC and CISC microprocessor. 7

(2) Draw pin diagram for maximum mode of 8086 and explain function of pins. 7

OR

(1) List addressing modes of 8086. Explain any three of them.

(2) Explain with diagram BIU and BU of 8086.

(B) Answer the questions : (any **three**) 3

(1) In 8086 microprocessor, the address bus is _____ bits wide.

(2) Full form of SP is _____.

(3) The register AX is formed by grouping _____.

(a) AH & AL (b) BH & BL

(c) CH & CL (d) DH & DL

(4) The BIU prefetches the instruction from memory and store them in queue. (T/F)

(5) Virtual memory consists of static RAM. (T/F)

(6) Full form of RISC is _____.

Seat No. : 670

NB-116

November-2019

BCA., Sem.-III

CC-202 : Data Structures

(Old & New Course)

Time : 2:30 Hours] [Max. Marks : 70

1. (A) Answer the following.

(1) What is searching ? List methods of searching. Explain linear search with algorithm. 7

(2) What is doubly linked list ? Write an algorithm to insert an element at front in doubly linked list. 7

OR

(1) Explain classification of data structure in detail.

(2) Explain merge sort with algorithm and example.

(B) Attempt any **four**. 4

(1) _____ search can be implemented only on the sorted data.

(2) In a circular linked list, the last node contains a pointer to the _____ node of the list.

(3) A _____ matrix has relatively few non-zero elements.

(4) Quick sort is also known as _____.

(5) _____ data structure has fixed size.

(6) The term _____ means sorting the two sub-arrays recursively using merge sort.

2. (A) Answer the following.

(1) Convert following infix expression using postfix expression using stack.
(A+B*C) – (D/E*F) + (G*H)

(2) List and explain types of queue with example.

OR

(1) Write an algorithm to insert and delete an element in the simple queue.

(2) List and explain operations of a stack with algorithm.

(B) Attempt any **four**.

(1) Queue is also known as _____ data structure.

(2) The postfix expression of (A + B) * (C – D) is _____.

(3) The _____ operation inserts an element into stack.

(4) Reverse polish notation is the other name of _____ expression.

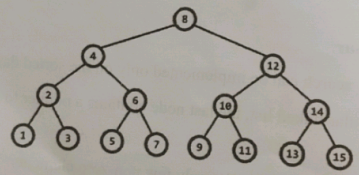
(5) Elements are processed based on priority in _____ queue.

(6) The _____ type of dequeue allows deletion operation from one end only.

3. (A) Answer the following.

(1) What is AVL tree ? Explain it with its types and rotations. 7

(2) Write the sequence for in-order, pre-order and post-order traversal of a binary tree. Give in-order, pre-order, post-order for the given binary tree. 7



OR

(1) Write a short note on heap tree with its types.

(2) Define BST and binary tree. Create BST for the following data :
50, 32, 10, 60, 58, 5, 20, 75, 62, 40

(B) Attempt any **three**. 3

(1) Degree of a leaf node is _____.

(2) Nodes at the same level that share same parent are called _____.

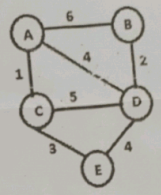
(3) All leaf nodes in a _____ are at the same level.

(4) A _____ is also called a fully threaded binary tree.

(5) The sequence for in-order traversal is _____.

4. (A) Answer the following.

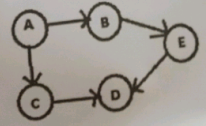
(1) Define MST. Write Prim's algorithm. Find MST for the given graph using Prim's algorithm. 7



(2) What is a graph ? List and explain method of graph representation with example. 7

OR

(1) Write an algorithm for Depth First Search (DFS) traversal. Implement DFS on following graph.



(2) Explain Kruskal's algorithm with example.

(B) Attempt any **three**. 3

(1) The term _____ means shortest, cheapest and fastest.

(2) An edge that has same end-points is called a _____.

(3) _____ vertices are a part of minimum spanning tree.

(4) _____ algorithm is an example of greedy algorithm.

(5) A graph is a collection of _____ and _____.

Seat No. : _____

ND-103

November-2019

BCA., Sem.-III

CC-204 : Fundamentals of Operating System

(Old Course)

Time : 2:30 Hours] **[Max. Marks : 70**

1. (A) Answer the following :

   (i) What is Operating system ? Explain the different types of Operating systems. **7**

   (ii) Discuss : Process Control Block **7**

   OR

   (i) Discuss : Semaphores in detail.

   (ii) What is deadlock ? Discuss deadlock prevention and avoidance strategies.

   (B) Answer any **4** : **4**

   (1) Process scheduler is also known as _____.

   (2) _____ is a portion of process that can run independently.

   (3) A _____ is a nonnegative integer variable that is used as a flag to provide mutual exclusion.

   (4) When two or more CPU's share the same main memory, most I/O devices and the same control program routines, it is known as _____.

   (5) The sections of incoming job are called _____.

   (6) _____ is the combination of batch and interactive system.

2. (A) Answer the following :

   (i) Explain the seven cases of deadlock. **7**

   (ii) How does communication among devices takes place ? **7**

   OR

   (i) How does the device manager mange the I/O requests among various devices ?

   (ii) What is meant by Starvation ? Discuss The Dining philosophers problem in detail.

(B) Answer any **4** :

(1) RAID stands for : _____

(2) _____ is a condition for deadlock in which only one process is allowed to have access to a resource.

(3) _____ is an I/O technique that allows a control unit to directly access main memory.

(4) _____ are the temporary storage areas residing in main memory, channel and control units.

(5) _____ are programmable units placed between the CPU and the control units.

(6) The predetermined policy that the device handler uses to allocate access to device among the many processes is known as _____.

3. (A) Answer the following :

(i) Discuss : Relocatable dynamic partition. **7**

(ii) Explain in detail: Single user Contiguous Scheme and Fixed Partition Scheme. **7**

OR

(i) Write a detailed note on : Paged memory allocation

(ii) Explain in detail : Demand Paging

(B) Answer any **3** : **3**

(1) _____ is the process of freeing an allocated resource whether memory space, a device, a file or a CPU.

(2) _____ is a technique that allows programs to be executed even though they are not stored entirely in memory.

(3) A phenomenon in a virtual memory where excessive amount of page swapping is done between main memory and secondary storage resulting in higher overheads is called _____.

(4) _____ is a situation in dynamic memory allocation creates unusable fragments of free memory between memory blocks of busy or allocated memory.

(5) _____ is a variable size of user's job that contains a logical grouping of code.

(A) Answer the following :

(i) What are the responsibilities of file manager ? Also discuss Typical Volume Configuration. 7

(ii) Explain Contiguous Storage and Non-contiguous storage allocation. 7

OR

(i) Discuss : Access Control Matrix, Access control lists and Capability lists.

(ii) Discuss the different types of security breaches.

(B) Answer any **3** : 3

(1) A _____ is defined as a small program written to alter the way a computer operates without the permission or knowledge of user.

(2) _____ is the software responsible for creating, deleting, modifying and controlling access to files.

(3) _____ is a sequence of letters and/or numbers provided by users to prevent unauthorised tampering with files.

(4) A _____ hides important network information from outsiders by making the network invisible.

(5) _____ file contains instructions for the computer.

Seat No. : 670

ND-103

November-2019

BCA., Sem.-III

CC-204 : Fundamentals of Operating System

(New Course)

fill in the Blanks - 7

Time : 2:30 Hours] [Max. Marks : 70

1. (A) Answer the following :

(i) What is Operating system ? Explain the different types of Operating systems. 7

(ii) Explain in detail Relocatable Dynamic Partition. 7

OR

(i) Explain in detail: Segmented memory allocation.

(ii) Given the following reference string

a b a c a b d b a c d

With memory of 3 page frames, do trace analysis using the following page replacement Policies.

(1) FIFO (2) LRU

Also find the success rate and failure rate with number of page faults.

(B) Answer any **4** : 4

(1) _____ is the concept of loading only a part of the program into memory for processing.

(2) The memory allocation scheme based on the concept of dividing a user's job into pages of equal size to allow for non-contiguous program storage allocation is known as _____.

(3) _____ is the process of freeing an allocated resource whether memory space, a device, a file or a CPU.

(4) _____ is the software that manages all the resources of a computer system.

(5) _____ systems are used for space flights and airport traffic control.

(6) _____ is a table in main memory that contains vital information for each page - the page number and its corresponding page frame memory address.

2. (A)

2. (A) Answer the following :

(i) Discuss : Process Control Block. 7

(ii) What is meant by Process Scheduling ? Explain the different types of schedulers used for process scheduling. 7

OR

(i) State and explain the different types of process scheduling policies. Also explain the scheduling criteria's for the policies.

(ii) Given the following information. All the jobs arrive at time same time 0

JOB NUMBER	CPU CYCLE
P1	8
P2	4
P3	9
P4	5

Draw a timeline for each of the following scheduling algorithm. Also calculate the average turnaround time and average waiting time.

(a) FCFS (b) SJN (c) Round Robin (Time quantum = 4ms)

(B) Answer any **4** : 4

(1) The period of time assigned to a process for execution before it is pre-empted is known as _____.

(2) Process scheduler is also known as _____.

(3) _____ is a portion of process that can run independently.

(4) The state transition of a process from READY to RUNNING is handled by _____ scheduler according to some predefined algorithms.

(5) _____ is an instance of execution of program that is identifiable and controllable by the operating system.

(6) The time required to execute a job and return output to the user is known as _____.

3. (A) Answer the following :

(i) Explain 4 cases of deadlock. 7

(ii) Explain strategies for deadlock detection and Recovery from deadlock. 7

OR

(i) Discuss : Loosely coupled configuration and Symmetric configuration of parallel processing.

(ii) Explain Producers and Consumers problem in detail.

(B) Answer any **3** : 3

(1) _____ is a type of shared data item that may contain either binary or non negative integer values and is used to provide mutual exclusion.

(2) When two or more CPU's share the same main memory, most I/O devices and the same control program routines, it is known as _____.

(3) _____ is a part of a program that must complete execution before other processes can have access to the resources being used.

(4) _____ is a problem occurring when the resources needed by some jobs to finish execution are held by other jobs, which in turn are waiting for other resources to become available.

(5) _____ is the result of conservative allocation of resources in which a single job is prevented from execution because it is kept waiting for resources that never becomes available.

4. (A) Answer the following :

(i) How is management of I/O requests handled by the device manager ? 7

(ii) How does communication among devices takes place ? 7

OR

(i) Discuss : Access Control Matrix, Access control lists and Capability lists.

(ii) Explain Contiguous Storage and Non-contiguous storage allocation.

(B) Answer any **3** : **3**

(1) _____ is a sequence of letters and/or numbers provided by users to prevent unauthorised tampering with files.

(2) _____ is the software responsible for creating, deleting, modifying and controlling access to files.

(3) The predetermined policy that the device handler uses to allocate access to device among the many processes is known as _____.

(4) _____ is an I/O technique that allows a control unit to directly access main memory.

(5) _____ is a technique used to save space in files.