APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FIRST SEMESTER REGULAR MCA DEGREE EXAMINATION

RLMCA101- PROBLEM SOLVING AND COMPUTER PROGRAMMING

MODEL QUESTION PAPER

Duration: 3 Hours **Max Marks: 60**

PART A

Answer All Questions

Each question carries 3 marks

1. What is the purpose of the do - while statement? How does it differ from the while statement? Explain with example.
2. What is recursion? Illustrate with an example.
3. Describe the output generated by the following program.

```
#include <stdio.h>
main ( )
{ int a, b = 0;
static int c[10] = (1, 2, 3, 4, 5 , 6, 7, 8 , 9, 0);
for (a = 0; a < 10; ++a)
if ((c[a] % 2) == 0) b += c[a];
printf('%d', b);
}
```

4. Explain self-referential structures.
5. What is a pointer? What are the operation performed on pointers?
6. Write down the output of the following program.

```
#include<stdio.h>
int main()
{ int i_array[3] = {4,9,3};
int *ptr1,*ptr2,*ptrs[3];
ptr1 = &i_array[2];
ptr2 = &i_array[0];
ptrs[0]=ptr1;
ptrs[1]=ptr2;
```

```
ptrs[2]=ptr1;
ptrs[2][0]=-13;
printf("The values are %d %d %d\n",ptrs[0][0],*ptrs[1],*ptrs[2]);
return 0;}
```

7. What is a stream pointer? What is the relationship between a stream pointer and a buffer area?
8. What are enumeration variables? How are they declared?

PART B

Answer any one question from each module. Each question carries 6 marks

MODULE I

9. Write an algorithm and C program which reads a +ve integer n. It then calculates the sum of the integers between 1 and n which are divisible by either 3 or 6 but not by 12.

OR

10. Name and describe the four basic types of constants in C. Summarize the rules that apply to all numeric-type constants

MODULE II

11. What is the purpose of the control string in a scanf function? How can the maximum field width for a data item be specified within a scanf function? Write with examples.

OR

12. What is an operator? Describe several different types of operators that are included in C.

MODULE III

13. Write a function with prototype that takes a positive integer argument representing a calendar year and returns integer 1 if it is a leap year else 0. [Hint. A year is a leap year if (i) it is divisible by 4 but not divisible by 100 or (ii) divisible by 400.]

OR

14. Explain about different storage classes in C.

MODULE IV

15. Write a C program that reads several different names and addresses into the computer, rearranges the names into alphabetical order, and then writes out the alphabetized list. Make use of structure variables within the program.

OR

16. Differentiate between structure and union. Use proper examples.

MODULE V

17. Write a program to pass an integer array to a function as a pointer to array and sort the list of numbers in ascending order.

OR

18. Why pointer is used in 'C' programming? What is the difference between array of pointer and pointer to array?

MODULE VI

19. Describe two different approaches to updating a data file. Which approach is better, and why?

OR

20. Write a program which accepts integer data through command line and write it to a file named 'INTDATA.txt'.

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FIRST SEMESTER REGULAR MCA DEGREE EXAMINATION

RLMCA103-DISCRETE MATHEMATICS

MODEL QUESTION PAPER

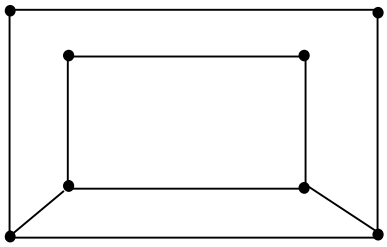
Duration: 3 Hours **Max Marks: 60**

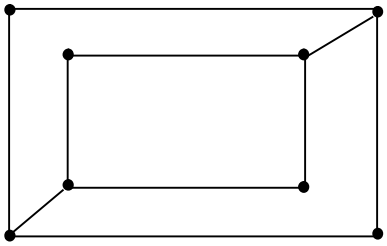
PART A

Answer All Questions

Each question carries 3marks

1. Give an example of a relation on {a,b,c} which is i) not reflexive and not irreflexive ii) symmetric, transitive but not reflexive.
2. Show that congruence modulo n is an equivalence relation.
3. How many 10-letter patterns can be formed from the letters of the word "BASKETBALL"?
4. From a group of 7 men and 6 women, five persons are to be selected to form a committee so that at least 3 men are there in the committee. In how many ways can it be done?
5. Define Eulerian and Hamiltonian graphs. Give an example of a Eulerian graph which is not Hamiltonian and a Hamiltonian graph which is not Eulerian
6. Define isomorphism of graphs. Check whether the two graphs below are isomorphic. Give appropriate reasons.





7. Translate the following into formal statements. 'All scientists are human beings. Therefore, all children of scientists are children of human beings.'
8. Show that, $(\exists x\ (P(x) \wedge Q(x)) \Rightarrow \exists x\ (P(x))$.

PART B

Answer All Questions. Each question carries 6 marks

MODULE I

9. If $A \cup C = B \cup C$ and If $A \cap C = B \cap C$ is it true that $B = C$. Justify your answer.

OR

10. Write Warshall's algorithm. Use it to find the transitive closure of the relation {(1,4),(2,3),(3,1),(1,2) on {1,2,3,4}

MODULE II

11. Write the GCD of 42823 and 6409 as a linear combination of the two numbers.

OR

12. Solve the set of simultaneous congruences

$$x \equiv 5(mod\ 6), x \equiv 14(mod\ 11), x \equiv 3(mod\ 17)$$

MODULE III

13. a) Show that if 5 points are selected from the interior of a equilateral of side 2 cm, two of them have distance which is less than or equal to 1

    b) In a chess competition involving some men and women, every player needs to play exactly one game with every other player. It was found that in 45 games, both the players were women and in 190 games, both players were men. What is the number of games in which one person was a man and other person was a woman?

OR

14. . How many integers between 100 and 999 inclusive a) are not divisible by 4 b) are divisible by 3 or 4 c) are divisible by 3 and 4d)are divisible by 3 but not by 4

MODULE IV

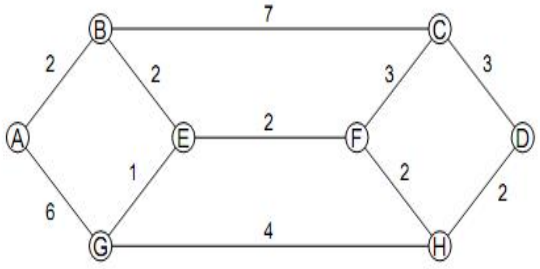
15. Solve the recurrence relation $a_n = a_{n-1} + 2a_{n-2}$ with $a_0 = 2$ and $a_1 = 7$

OR

16. Construct the the recurrence relation for the tower of Hanoi problem and then solve it.

MODULE V

17. Find the shortest path from A to D in the graph below



OR

18. State and prove a necessary and sufficient condition for a graph to be Eulerian.

MODULE VI

19. Show that $S \vee R$ is tautologically implied by $P \vee Q, P \rightarrow R, Q \rightarrow S$

OR

20. Check whether the following conclusion is valid or not. Each student writes the exam using blue ink or black ink. A student who writes the exam using black ink and does not write his/her roll number gets an F grade. A student who writes the exam using blue ink and does not have his/her ID card gets an F grade. A student who has his/her ID card has written the exam with black ink. Therefore, a student who passes the exam must have written his roll number.

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FIRST SEMESTER REGULAR MCA DEGREE EXAMINATION

RLMCA105-APPLIED PROBABILITY & STATISTICS

MODEL QUESTION PAPER

Duration: 3 Hours **Max Marks: 60**

PART A

Answer All Questions

Each question carries 3marks

1. Find the mean and standard deviation of first n natural numbers?
2. State Baye's theorem
3. Derive variance of a discrete random variable.
4. Define binomial distribution. Write its mean and variance.
5. Define normal distribution. Write its mean and variance.
6. Define joint probability distribution
7. State central limit theorem.
8. Explain about statistical inference.

PART B

Answer All Questions, Each question carries 6 marks

MODULE I

9. Find the Missing information of the following.

	Group I	GroupII	Group III	Combined
Size	50	-	90	200
S.D	6	7	-	7.746
Mean	113	-	115	116

OR

10. You are given the following incomplete distribution. It is known that total frequency=1000 and median is 413.11. Find the missing frequencies and hence find the value of mode.

X	F
300-325	5
325-350	17
350-375	80
375-400	f1
400-425	326

425-450	f2
450-475	88
475-500	9

MODULE II

11. In a bolt factory machines A,B,C manufacture respectively 25%,35%,and 40% of total. Of their output 5,4,2 percentages are known to be defective bolts. A bolt is drawn at random from the product and is found to be defective. What is the probability that it was manufactured by

1) machine A

2) machine B or machine C

OR

12. Probability that a man will be alive 25 years hence is 0.3 and the probability that his wife will be alive 25 years hence is 0.4.Find the probability that 25 years hence

1) both will be alive

2) only the man will be alive

MODULE III

13. Two dies thrown simultaneously. Let x denotes the sum of the face values. Find its mean and variance

OR

14. Fit the poisson distribution for the following data. Calculate the theoretical frequencies.

x	0	1	2	3	4
f	123	59	14	3	1

MODULE IV

15. For a particular normal distribution the mean =12 and standard deviation σ=2.Find P(9.6<x<13.8).

OR

16. Find the probability that atmost five defective fuses will be found in a box of 200 fuses if experience shows that 2% of such fuses are defective(e^{-4} = 0.0183)

MODULE V

17. Explain different types of sampling.

OR

18. A random sample of 500 pineapples was taken from a large consignment and 65 of them were found to be bad .Show that the Standard error of the propotion of bad ones in a sample of this size is 0.015 and deduce that the percentage of bad pineapples in the consignment almost certainly lies between 8.5 and 17.5.

MODULE VI

19. A weighing machine without any display was used by an average of 320 persons a day with a standard deviation of 50 persons. When an attractive display was used on the machine, the average for 100 days increased by 15 persons. Can we say that the display did not help much? Use a level of significance of 0.05.

OR

20. In a random sample of 400 persons from a large population, 120 are females. Can it be said that males and females are in the ratio 5:3 in the population? Use 1% level of significance.

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FIRST SEMESTER REGULAR MCA DEGREE EXAMINATION

RLMCA107- PRINCIPLES OF MANAGEMENT

MODEL QUESTION PAPER

Duration: 3 Hours **Max Marks: 60**

PART A

Answer All Questions

Each question carries 3 marks

1. How is efficiency different from effectiveness. Explain with an example.
2. Explain Unity of command, Scalar chain and Esprit de corps principles' of management proposed by Fayol.
3. Discuss the levels of planning with examples.
4. Explain matrix organization. How is it different from project organization?
5. Define job description and job specification.
6. Explain the different sources of information for job analysis.
7. Define six sigma. List the tools used in the DMAIC phases of six sigma.
8. Explain benchmarking with an example.

PART B

Answer any one question from each module. Each question carries 6 marks

MODULE I

9. Explain the different functions of management with suitable examples.

OR

10. Explain the differences between programmed decisions and non-programmed decisions.

MODULE II

11. Describe the contributions of Gilbreths.

OR

12. Briefly explain the open systems approach and contingency approach with examples.

MODULE III

13. Describe the various steps in the MBO process.

OR

14. What is SWOT analysis? Explain with a good example.

MODULE IV

15. What is meant by delegation of authority? What are the steps in delegation of authority?

OR

16. What is span of management? What are the different factors affecting span of management?

MODULE V

17. Explain any 6 external sources of recruitment.

OR

18. What are the steps in manpower planning? Explain with an example.

MODULE VI

19. Describe Abraham Maslow's need hierarchy theory of motivation.

OR

20. What is marketing mix? Explain the 4Ps of product marketing mix.

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FIRST SEMESTER REGULAR MCA DEGREE EXAMINATION

RLMCA109- DIGITAL FUNDAMENTALS

MODEL QUESTION PAPER

Duration: 3 Hours **Max Marks: 60**

PART A

Answer All Questions

Each question carries 3 marks

1. What is a Flip Flop? Why is it called a bistable multivibrator?
2. State and prove DeMorgans Law?
3. Convert the decimal number 178.32 to binary?
4. Compare Synchronous & Asynchronous Counter?
5. Design a 4-bit parallel binary adder?
6. What is the difference between register and memory?
7. What is meant by parity bit? Explain the use of parity check in error detection process?
8. What are Universal gates? Why they are called so?

PART B

Answer any one question from each module. Each question carries 6 marks

MODULE I

9. Perform the following number conversions
   a) 514_8 to binary and decimal
   b) 152.75_{10} to binary, octal and hexadecimal.
   c) $68170.AB_{16}$ to octal and decimal.

OR

10. a) Given the two binary numbers A= $(110010)_2$ and B= $(100110)_2$. Perform the following operations using 2's complement method.

    i) A-B

    ii) B-A

    b) Represent the decimal number 123.45 into floating point single precision format.

MODULE II

11. Simplify the Boolean function F(A,B,C,D)=∑(4,5,10,11,13,15) using K-Map and implement the circuit.

OR

12. Prove the given Boolean expression using Boolean Laws
    (A'+B+C')(A'+C'+D)(B'+D')=A'B'+A'D'+C'B'+C'D'

MODULE III

13. Design a full subtractor circuit with three inputs x, y, B_{in} and two outputs D_{iff} and B_{out}. The circuit subtracts x-y-B_{in}, where B_{in} is the input borrow, B_{out} is the output borrow, and D_{iff} is the difference.

OR

14. Implement the Boolean function F(A,B,C,D) =∑(0,2,5,7,11,14) with a multiplexer.

MODULE IV

15. Explain the working of an SR flip-flop and discuss its drawbacks. How can it be overcome?

OR

16. Convert T flip-flop into JK flip-flop and draw the logic diagram of the circuit.

MODULE V

17. Design a modulo-5 synchronous counter.

OR

18. What is a Universal Shift register? Explain any two modes of shift register.

MODULE VI

19. Explain the internal architecture of Arduino .

OR

20. Describe the internal architecture of a Computer. Discuss the current typical hardware specifications of a computer motherboard.