**Jyothy Institute of Technology**

**Tataguni, Bangalore – 560 082**

**Mid Term Exam**

**SECTION-‘A’**

**SCHEME OF EVALUATION**

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| **Program** | **:** | **BE (Civil Engineering)** | **Date** | **:** |  | **Time** | **:** | **1Hour 30 Minutes** |
| **Course Name** | **:** | **Programming in C & Data Structures** | **Course Code** | **:** | **15PCD13** | **Maximum Marks** | **:** | **40** |

**Answer the following questions.**

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| **Q No** | **Question** | **Marks** |
| Q1a  Q1b | i) What is pseudo code? Write a pseudo code for finding sum and average of three numbers.  Pseudocode is an informal language, so it is mainly used for creating an outline or a rough draft of a program. Because it is not an actual programming language, pseudocode cannot be [compiled](http://techterms.com/definition/compile) into an executable program. Therefore, pseudocode must be converted into a specific programming language if it is to become an usable [application](http://techterms.com/definition/application).  Average(no1, no2, no3, sum, average)  1. Input three numbers no1, no2, no3  2. sum=no1+no2+no3  3. average = sum/3  4. Display sum and average.  ii) How operators can classified. List all the operators with their precedence and associativity.  Operators can be classified as follows:- Image result for precedence of operators in C  OR  i) What is data type? How it can be classified? List all primitive data types with format specifiers and memory occupied by them.  Image result for Datatypes  in C  Image result for Datatypes  in C  ii) What are printf() and scanf() functions. Explain with one example.  printf()  1. It is a pre defined function.  2. It is defined in header file <stdio.h>  3. It is used to print the messages onto the terminal.  Eg. printf(“Enter the Values”);  4. It can also be used to print formatted data onto the terminal.  Eg. printf(“The area and perimeter of rectangle is %d and %d”, area, perimeter);  scanf()  1. It is a pre defined function.  2. It is defined in header file <stdio.h>  3. It is used to read data from terminal entered by the user through terminal.  Eg scanf(“%d%d”, &a, &b); | 5  5  5  5 |
| Q2a  Q2b | i) Write the output for the following code:  void main()  {  int a = 5, b=2, res1;  float f1=5.0, f2=2.0, res2;  res1=5/2.0+a/2+a/b;  res2=f1/2\*f1-f2;  printf(“ res1=%d res2=%f ”, res1, res2);  }  Ans:-  res1=6 res2=10.5  ii) Write a program to find area and perimeter of a rectangle. Write test cases and output.  void main()  {  int length, beadth, area, perimeter;  printf(“Enter the length and breadth of the rectangle\n”);  scanf(“%d%d”, &length, &breadth);  area=length\*breadth;  perimeter=2\*(length+breadth);  printf(“Area & Perimeter of rectangle of length %d and breadth %d is %d & %d”, length, breadth, area, perimeter);  }  Output:  Enter the length and breadth of the rectangle  4  6  Area & Perimeter of rectangle of length 4 and breadth 6 is 24 & 20    OR  i) Write the output for the following code:  void main()  {  int i=5, j=6, m,n;  m=++i+j++;  n=--i+j--;  printf(“ m=%d n=%d ”, m, n);  }  Ans:  m=12 n=12  ii) Write a program to swap two numbers using third variable. Write test cases and output.  void main()  {  int a, b, temp;  printf(“Enter the values of a & b\n”);  scanf(“%d%d”, &a, &b);  printf(“Values of a & b before swapping is %d & %d\n”, a, b);  temp=a;  a=b;  b=a;  printf(“Values of a & b after swapping is %d & %d\n”, a, b);  }  Output:  Enter the values of a & b  5  3  Values of a & b before swapping is 5 & 6  Values of a & b after swapping is 6 & 5 | 5  5  5  5 |
| **Q3a)**  **Q3b)** | **i) List all conditional control statements used in C. Write a C program to find if the number is even or odd.**  If  If else  Else if ladder  Nested if else  Nested if  Switch  void main()  {  int n;  printf(“Enter the number\n”);  scanf(“%d”,&n);  if(n%2==0)  printf(“Number %d is an even number\n”,n);  else  printf(Number %d is a odd number\n”,n);  }  Output:  8  Number 8 is an even number  5  Number 5 is a odd number  ii)Write a C program to find the reverse of an integer number NUM and check whether it is PALINDROME or NOT.  void main()  {  int n,m,reverse=0,digit;  printf(“Enter the number \n”);  scanf(“%d”,&n);  m=n;  while(m!=0)  {  digit=m%10;  reverse=reverse\*10+digit;  m=m/10;  }  if(reverse==n)  printf(“Number %d is a palindrome number\n”,n);  else  printf(“Number %d is not a palindrome number\n”,n);    }  Output:  575  Number 575 is a palindrome number.  698  Number 698 is not a palindrome number.  OR  **i) Explain switch statement with syntax and example.**  A switch statement allows a variable to be tested for equality against a list of values. Each value is called a case, and the variable being switched on is checked for each switch case.  switch(expression) {  case constant-expression :  statement(s);  break; /\* optional \*/    case constant-expression :  statement(s);  break; /\* optional \*/    /\* you can have any number of case statements \*/  default : /\* Optional \*/  statement(s);  }  Example:-  #include <stdio.h>    int main () {  /\* local variable definition \*/  char grade = 'B';  switch(grade) {  case 'A' :  printf("Excellent!\n" );  break;  case 'B' :  case 'C' :  printf("Well done\n" );  break;  case 'D' :  printf("You passed\n" );  break;  case 'F' :  printf("Better try again\n" );  break;  default :  printf("Invalid grade\n" );  }    printf("Your grade is %c\n", grade );    return 0;  }  **ii)List the differences between the while loop and do while loop.**  do-while loop is similar to while loop, however there is one basic difference between them – do-while runs at least one even if the test condition is false at first place. let’s understand this with an example –  Using while loop:  main()  {  int i=0  while(i==1)  {  printf("while vs do-while");  }  printf("Out of loop");  }  Output:  Out of loop  Same example using do-while loop  main()  {  int i=0  do  {  printf("while vs do-while\n");  }while(i==1);  printf("Out of loop");  }  Output:  while vs do-while  Out of loop  Explanation: As I mentioned above do-while runs at least once even if the condition is false because compiler checks the condition after execution of its body. | 5  5  5  5 |
| **Q4a)**  **Q4b)** | **i) Write a C program to find sum of natural numbers from 1 to N using for loop.**  void main()  {  int n, i, sum=0;  printf(“Enter the number of elements\n”);  scanf(“%d”, &n);  for(i=0;i<n;i++)  sum+=i;  printf(“Sum is %d \n”, sum);  }  Output:  5  Sum is 15  **ii)What is array? Write a program to find largest of n numbers.**  Array is a collection of homogeneous elements stored at sequential memory locations under a common name.  **void main()**  **{**  **int n, i, max, a[50];**  **printf(“Enter the number of elements\n”);**  **scanf(“%d”, n);**  **for(i=0;i<n;i++)**  **scanf(“%d”,&a[i]);**  **max=a[0];**  **for(i=0;i<n;i++)**  **{**  **if(a[i]>max)**  **max=a[i];**  **}**  **printf(“Largest number is %d \n”,max);**  **}**  **Output:**  **5**  **10 12 15 8 7**  **Largest number is 15**  **OR**  **i) Write a program to find factorial of a number.**  void main()  {  int fact,n,i;  printf(“Enter the number \n”);  scanf(“%d”,&n);  fact=1;  for(i=n;i>=1;i--)  fact=fact\*i;  printf(“Factorial of number %d is %d \n”,n,fact);  }  Output:  5  Factorial of number 5 is 120  **ii)Define array. Write a program to find smallest of n numbers.**  Array is a collection of homogeneous elements stored at sequential memory locations under a common name.  void main()  {  int n, i, min, a[50];  printf(“Enter the number of elements\n”);  scanf(“%d”, n);  for(i=0;i<n;i++)  scanf(“%d”,&a[i]);  max=a[0];  for(i=0;i<n;i++)  {  if(a[i]<min)  min=a[i];  }  printf(“Smallest number is %d \n”,min);  }  Output:  5  10 12 15 8 7  Largest number is 7 | 5  5  5  5 |

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