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312303 - Programming In 'C' (Sem II)

As per MSBTE's K Scheme

CO / CM / IF / AI / AN / DS

Unit V		Pointers	Marks - 12	
S. N.	MSBTE Board Asked Questions	Exam Year	Marks	
1.	<p>Define pointer. Write syntax for pointer declaration.</p> <p>ANS:</p> <p>Definition:</p> <p>A pointer is a variable that stores memory address of another variable which is of similar data type.</p> <p>Declaration:</p> <pre>datatype *pointer_variable_name;</pre> <p>Eg: <code>int *ptr;</code></p>	W-23	2M	
2.	<p>Explain pointer arithmetic operations with example.</p> <p>ANS:</p> <p>Pointer Arithmetic is the set of arithmetic operations that can be performed on pointers. The basic operations on pointers are:</p> <ul style="list-style-type: none"> • Increment <p>Increment is used to increment the pointer. Each time a pointer is incremented, it points to the next memory location.</p> <p>Example</p> <p>For an int pointer variable, if the current position of pointer is 1000, when incremented it points to 1002(memory location) because for storing an int value it takes 2 bytes of memory.</p>	W-23,W-19	4M	

```
#include <stdio.h> #include<conio.h> void main()
```

```
{  
    int a = 13; int *p = &a;  
    printf("p = %u\n", p); p++;  
    printf("p++ = %u\n", p); getch();  
}
```

- **Decrement**

Decrement is used to decrement the pointer. Each time a pointer is decremented, it points to the previous memory location.

Example

If the current position of pointer is 1002, then decrement operation results in the pointer pointing to the location 1000.

```
#include <stdio.h>
```

```
#include<conio.h>
```

```
void main()
```

```
{  
    int a = 22; int *p = &a;  
    printf("p = %u\n", p);  
    p--;  
    printf("p-- = %u\n", p);  
    getch();  
}
```

a. Addition:

When addition operation is performed on the pointer variable, it shows that particular location in the memory. When a pointer is added with an integer value, the value is first multiplied by the size of the data type and then added to the pointer.

Example #include<stdio.h> #include<conio.h> void main()

```
{  
    int number=20; int *p; p=&number;  
    printf("Address of p  
variable is %u \n",p);  
    p=p+3;  
    printf("After adding 3: Address of p
```

	<pre>variable is %u \n",p); getch(); } b. Subtraction: When subtraction operation is performed on the pointer variable, it shows that particular location in the memory. When a pointer is subtracted with an integer value, the value is first multiplied by the size of the data type and then subtracted from the pointer. Example #include<stdio.h> #include<conio.h> void main() { int number=10; int *p; p=&number; printf("Address of p variable is %u \n",p); p=p-3; printf("After subtracting 3: Address of p variable is %u \n",p); getch(); }</pre>		
3.	<p>Develop a C program to sum of all elements stored in given array using pointer</p> <p>ANS:</p> <p>(Note: Any other correct logic shall be considered).</p> <pre>#include<stdio.h> #include<conio.h> void main() { int a[5],sum=0,i,*ptr; clrscr(); printf("\n Enter array elements:"); for(i=0;i<5;i++) scanf("%d",&a[i]); ptr=&a[0]; for(i=0;i<5;i++) { sum=sum+(*ptr); ptr=ptr+1; } printf("\n Sum= %d",sum); getch(); }</pre>	W-23,S-23	6M

4.	<p>Write a program to accept two numbers from user and perform addition, subtraction, multiplication and division operations using pointers.</p> <p>ANS:</p> <pre> #include<stdio.h> #include<conio.h> void main() { int no1,no2,*ptr1,*ptr2,result; clrscr(); printf("Enter no1:"); scanf("%d",&no1); printf("\nEnter no2:"); scanf("%d",&no2); ptr1=&no1; ptr2=&no2; result=(*ptr1)+(*ptr2); printf("\n Addition=%d",result); result=(*ptr1)-(*ptr2); printf("\n Subtraction=%d",result); result=(*ptr1)*(*ptr2); printf("\n Multiplication=%d",result); result=(*ptr1)/(*ptr2); printf("\n Division=%d",result); getch(); } </pre>	W-23	6M
5.	<p>Explain pointer with example.</p> <p>ANS:</p> <p>Definition:</p> <p>A pointer is a variable that stores memory address of another variable which is of similar data type.</p> <p>Declaration:</p> <pre> datatype *pointer_variable_name; Eg: int *ptr; </pre>	S-23	2M

	<p>Write a program calculate sum of all elements using structure.</p> <p>ANS:</p> <pre> #include<stdio.h> int main() { //let's assume the maximum array size as 100. //initialize sum as 0. Otherwise, it will take some garbage value. int arr[100], size, i, sum = 0; //Get size input from user printf("Enter array size\n"); scanf("%d",&size); //Get all elements using for loop and store it in array printf("Enter array elements\n"); for(i = 0; i < size; i++) scanf("%d",&arr[i]); //add all elements to the variable sum. for(i = 0; i < size; i++) sum = sum + arr[i]; // same as sum += arr[i]; //print the result printf("Sum of the array = %d\n",sum); return 0; } </pre>	S-23	4M
7.	<p>Write a C program to demonstrate access structure members using pointer.</p> <p>ANS:</p> <pre> // C program to demonstrate structure pointer #include <stdio.h> struct point { int value; </pre>	S-23	6M

	<pre> }; int main() { struct point s; //Initialization of the structure pointer struct point* ptr = &s; return 0; } </pre>		
8.	<p>Write the meaning of & and * with respect to pointer.</p> <p>ANS:</p> <p>& is a unary operator in C which returns the memory address of the variable. This is also known as address of operator.</p> <p>* is a unary operator which returns the value pointed by a pointer variable.</p>	W-22	2M
9.	<p>Write output for the following programming code:</p> <pre> #include<stdio.h> #include<conio.h> void main() { int x,y,a, b,*P1, *P2; x = 10; y = 20; P1 = &x; P2 = &y; a = *P1 ** P2 +20; b = *P1 **P2 - 20; print f("x=%d, y = %d", x,y); print f("a=%d, b = %d", a,b); } </pre> <p>Output: x=10, y=20a=220, b=180</p>	W-22	4M

10.	<p>Write a program to find largest number from an array using pointer.</p> <p>ANS:</p> <pre> #include<stdio.h> #include<conio.h> void main() { int n,*ptr,i,largest=0; clrscr(); printf("Enter how many numbers u want:"); scanf("%d",&n); for(i=0;i<n;i++) { printf("\nEnter Number %d :: ",i+1); scanf("%d",(ptr+i)); } largest=*ptr; for(i=1;i<n;i++) { if(*(ptr+i)>largest) largest=*(ptr+i); } printf("\nThe Largest Number is %d \n",largest); getch(); } </pre>	W-22	6M
11.	<p>Write a C program using pointer to read an array of characters and print them in reverse order.</p> <p>ANS:</p> <pre> #include<stdio.h> #include<conio.h> void main() </pre>	W-22	6M

	<pre> { char str[10],*ptr; int l=0; clrscr(); printf("Enter string:"); scanf("%s",str); ptr=str; while(*ptr!='\0') { l=l+1; ptr=ptr+1; } while(l>0) { ptr=ptr-1; printf("%c",*ptr); l=l-1; } getch(); } </pre>		
12.	<p>State the syntax to declare a pointer variable with example.</p> <p>ANS:</p> <p>A pointer is a variable that stores memory address of another variable which is of similar data type.</p> <p>Declaration: datatype *pointer_variable_name;</p>	S-22	2M
13.	<p>Explain meaning of following statements with reference to pointers int *a, b ; b = 20 ; *a= b ; a = &b ;</p> <p>ANS</p> <p>:</p> <p>int *a,b;</p> <p>It is declaration of integer pointer a and integer variable b</p>	S-22	4M

	<p>b=20; value 20 is assigned to variable b. *a=b; Value of b is assigned to pointer a. A=&b; Address of b is assigned to variable A.</p>		
<p>14.</p>	<p>Write a program to compute the sum of all elements stored in an array using pointers.</p> <p>ANS:</p> <p>PROGRAM:</p> <pre> #include<stdio .h> #include<conio .h> void main() { { int a[5], sum =0,i, *ptr; clrsc r(); printf("\n Enter array elements:"); for(i=0;i<5;i++) scanf("%d",&a[i] </pre>	<p>S-22</p>	<p>6M</p>

	<pre>]); ptr=&a[0]; for(i=0;i<5;i++) { sum=sum+(*ptr); ptr=ptr+1; } printf("\n Sum= %d",sum); getch(); } </pre>		
15.	<p>Write a program to perform arithmetic operations on pointer.</p> <p>ANS: PROGRAM:</p> <pre> #include<stdio.h> int main() { int no1,no2; int *ptr1,*ptr2; int sum,sub,mult; float div; printf("Enter number1:\n"); scanf("%d",&no1); printf("Enter number2:\n"); scanf("%d",&no2); ptr1=&no1;//ptr1 stores address of no1 ptr2=&no2;//ptr2 stores address of no2 sum=(*ptr1) + (*ptr2); sub=(*ptr1) - (*ptr2); mult=(*ptr1) * (*ptr2); div=(*ptr1) / (*ptr2); printf("sum= %d\n",sum); printf("subtraction= %d\n",sub); printf("Multiplication= %d\n",mult); printf("Division= %f\n",div); return 0; } \ </pre>	S-22	6M

16.	<p>State the syntax to declare pointer variable with example.</p> <p>ANS:</p> <p>General syntax to declare pointer.</p> <p>datatype *var_name;</p> <p><i>Eg: int var = 20;</i></p>	W-19	2M
17.	<p>State four arithmetic operations perform on pointer with example.</p> <p><i>(Note: Code snippet shall be considered).</i></p> <p>ANS:</p> <p>The pointer arithmetic is done as per the data type of the pointer.</p> <p>The basic operations on pointers are:</p> <p>Increment</p> <p>It is used to increment the pointer. Each time a pointer is incremented, it points to the next location. Eg, for an int pointer variable, if the current position of pointer is 1000, when incremented it points to 1002 because for storing an int value it takes 2 bytes of memory.</p> <p>Decrement</p> <p>It is used to decrement the pointer. Each time a pointer is decremented, it points to the previous location. Eg, if the current position of pointer is 1002, then decrement operation results in the pointer pointing to the location 1000.</p> <p>Addition and subtraction:</p> <p>When addition or subtraction operation is performed on the pointer variable, it shows that particular location in the memory.</p> <p>Eg: int *ptr; -say address is 1000.</p> <p>If -> ptr+n- then ptr+n*2 .</p> <p>If -> ptr-n then ptr-n*2.</p> <pre>#include<stdio.h> #include<conio.h> void main() {</pre>	S-19	4M

	<pre> int i = 10; int *ptr=&i; clrscr(); printf("%x%d",ptr,i); ptr++; printf("\n%x%d",ptr,i); printf("\n%x",ptr+2); printf("\n%x",ptr-2); getch(); } </pre>		
18.	<p>Explain meaning of following statements with reference to pointers :int *a, b ; b = 20 ; *a= b ; a = &b ;</p> <p>ANS</p> <p>:</p> <p>int *a,b; It is declaration of integer pointer a and integer variable b</p> <p>b=20; value 20 is assigned to variable b.</p> <p>*a=b; Value of b is assigned to pointer a.</p> <p>A=&b; Address of b is assigned to variable A.</p>	S-19	4M
19.	<p>Write a program to print reverse of a entered string using pointer.</p> <p><i>(Note: Any other correct logic shall be considered).</i></p> <p>ANS:</p> <pre> #include<stdio.h> #include<conio.h> </pre>	S-19	6M

	<pre> void main() { char str[10],*ptr; int l=0; clrscr(); printf("Enter string:"); scanf("%s",str); ptr=str; while(*ptr!='\0') { l=l+1; ptr=ptr+1; } while(l>0) { ptr=ptr-1; printf("%c",*ptr); l=l-1; } getch(); } </pre>		
20.	<p>Define pointer. Write syntax for pointer declaration.</p> <p>ANS:</p> <p>Definition:</p> <p>A pointer is a variable that stores memory address of another variable which is of similar data type.</p> <p>Declaration:</p> <pre>datatype *pointer_variable_name;</pre>	W-18	2M

21.	<p>Write the output of following c program</p> <pre>#include<stdio.h> int main() { char *ptr; char str[]="MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION"; ptr=str; ptr=ptr+11; printf("%s", ++ptr); return 0; }</pre> <p>ANS: Output : STATE BOARD OF TECHNICAL EDUCATION</p>	W-18	4M
22.	<p>Write a program to accept two numbers from user and perform addition, subtraction, multiplication and division operations using pointer.</p> <p>ANS:</p> <pre>#include<stdio.h> #include<conio.h> void main() { int no1,no2,*ptr1,*ptr2,result; clrscr(); printf("Enter no1:"); scanf("%d",&no1); printf("\nEnter no2:");</pre>	W-18	6M

	<pre>scanf("%d",&no2); ptr1=&no1; ptr2=&no2; result=*ptr1+*ptr2; printf("\n Addition=%d",result); result=*ptr1-*ptr2; printf("\n Subtraction=%d",result); result=*ptr1**ptr2; printf("\n Multiplication=%d",result); result=*ptr1/(*ptr2); printf("\n Division=%d",result); getch(); }</pre>		
23.	<p>Give any four advantages of pointer.</p> <p>Advantages of pointer:</p> <ol style="list-style-type: none"> 1. Pointers reduce the length and complexity of a program. 2. They increase execution speed. 3. A pointer enables us to access a variable that is defined outside the function. 4. Pointers are more efficient in handling the data tables. 5. The use of a pointer array of character strings results in saving of data storage space in memory. 6 It supports dynamic memory management. 	S-18	2M

24.	<p><i>ANS:</i></p> <p>Pointer to function:</p> <pre>include<stdio.h> int sum(int x, int y) { return x+y; } int main() { int s; int(*fp)(int, int); fp = sum; s = fp(10,12); printf("Sum = %d",s); return 0; }</pre>	S-18	6M
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Thank You

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