

Sample Midterm Exam Questions with Solutions

Q.2. (15 points) Design an algorithm **OR** draw a flowchart for a computer program that finds the **average of 3 input numbers** entered by the user and prints “pass”, if average is greater than or equal to 50, otherwise prints “fail”. At the end it must print computed average as well.

1. BEGIN
2. PRINT “Enter three numbers:”
3. READ num1, num2, num3
4. average = (num1+num2+num3)/3
5. IF average >= 50
 PRINT “pass”
 ELSE
 PRINT “fail”
 ENDIF
6. PRINT “average:”, average
7. END

Q.3. (19 points)

a) (10 points) State which of the following C identifier names are valid or invalid. Give reason if invalid.

Identifier Name	Valid or Invalid	Reason(s) if invalid
Return	valid	
_C	valid	
a.b	invalid	No special character
2B	invalid	Cannot start with a number
Midterm Grade	invalid	No space between the words

b) (9 points) Write down a C expression corresponding to each of the following mathematical expressions.

Mathematical Expression	C Expression
a) $\frac{t}{k} - \frac{\frac{t}{k} + 2}{3s^2}$	$t/k - (t/k + 2)/(3*s*s)$
b) $2a \frac{2c}{a+b}$	$2*a*((2*c) / (a+b))$
c) $\frac{-b + (b^2 - 4ac)}{2a}$	$(-b + (b*b - 4*a*c))/(2*a)$

Q.5. (20 points)

In the following C program there are total of **10 errors** in different lines. In the provided table, indicate the line numbers which error occurred and write your correction in front:

```

1:#include (stdio.h)
2:#Define PI 3.14
3:int main
4:{
5:  Int rad, base, height;
6:  Float area, ci;
7:
8:  printf("\nEnter radius of circle: ");
9:  scanf("%d", rad);
10:
11:  area = PI * rad * rad;
12:  printf("\nArea of circle : %d ", area);
13:
14:  ci = 2 * PI * rad;
15:  printf("\nCircumference : %f ", ci)
16:
17:  printf("\nEnter the base of Right Angle Triangle : ");
18:  scanf("%d", &base);
19:
20:  printf("\nEnter the height of Right Angle Triangle : ");
21:  scanf("%d", &height);
22:
23:  area = 0.5 * base * height;
24:  printf("\nArea of Right Angle Triangle : %f", area);
25:  Return 0;
26:

```

Line number	Correction
1	#include <stdio.h>
2	#define PI 3.14
3	int main()
5	int rad, base, height;
6	float area, ci;
9	scanf("%d", &rad);
12	printf("\nArea of circle : %f ", area);
15	printf("\nCircumference : %f ", ci);
25	return 0;
26	}

Q.6. (17 points) The formula for the volume of a sphere is $V = \frac{4}{3} \pi a^2 b$ where a and b are the half-lengths of the major and minor axes respectively. The following C program reads values for a and b and then calculates and displays the volume. Complete the missing parts in the program. Use appropriate variable declarations in the program (do not use any additional variables) and write only 1 statement on each blank line.

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

```
/*declare the constant value of  $\pi$  as 3.141593
```

```
_____ #define PI 3.141593 _____
```

```
int main()
```

```
{
```

```
/* declare variables */
```

```
_____ float a, b, V; _____
```

```
/*read the values of a and b from the keyboard*/
```

```
_____ scanf("%f%f", &a, &b); _____
```

```
/*compute the volume of the sphere */
```

```
_____ V=4.0/3*PI*a*a*b;- _____
```

```
/*display the result onto the screen*/
```

```
_____ printf("Volume = %f", V); _____
```

```
return 0;
```

```
}
```