

52. Give the output for the following program segments :

(i) for i in range(10, 6, -2):

print("%d" % i)

(ii) for i in range(-5, -8):

print("%d" % (i+1))

53. Give the output for the following program segments :

(i) for i in range(-3, 11):

sum = 0

sum = sum+i

print("%d" %sum)

(ii) i, j = 100, 9

print("%.2f" % int(i/j))

—————[4 Marks]—————

Important Questions

1. Write a program to display the first 5 multiples of 9 using :

(i) *for* loop

(ii) *while* loop

2. Write a program to input two unique numbers and find the greatest between them (using abbreviated *if* statement).

3. Write a program to implement Fibonacci series such as : 1 1 2 3 5 8 13 upto 'N'.

4. Write a program to enter three subject marks and calculate the total of entered marks and grades. If the total marks are more than 250 then the grade is 'A' otherwise 'B'.

5. Write a program to calculate the factorial of a number.

6. Write a program to find whether a given number is even or odd.

7. Write a program to swap two numbers without using third variable.

8. Write a program to check whether the number is perfect or not.

9. Write a program to check whether a number is prime or not.

10. Write a program to find sum of all even numbers and odd numbers upto 'N' numbers.

11. Write a program to print table multiples from 1 to 10 of a given number.

12. Write a program to find the greatest number among the three numbers.

13. Write a program to print first 'N' natural numbers and their sum.

14. Write a program that takes a value from the user and prints the square of it. Value should be less than 120.

15. Write a menu driven program that displays the result of the following evaluations based on the user's entry of choice.

- Absolute value of a number.
- Natural logarithm of a number.
- Square root of a number.
- A random number between 0 and 100.

16. Write a program that accepts a character from the keyboard and determines whether it is a vowel or not. If the given character is a vowel print ("It is a vowel.") otherwise print ("It is not a vowel.").
17. A library issues books on rental basis as 1% charge on the cost price of the book per day. A book can be issued for 5 days without any late fee. If the book is returned after 5 days, a late fee will be charged for above 5 days as per the given table.

Issue Days	Late Fee per day (₹)
1 to 5	1
6 to 10	3.5
more than 10	5.5

Write a program to calculate the late fee according to the number of days.

18. Write a program to compute the compound interest for 'N' investors, given by the following formula :

$$\text{Interest} = P \left[\left(1 + \frac{r}{100} \right)^t - 1 \right]$$

The required variables values should be entered by the user.

19. Write a program to input any 10 numbers and find their sum and average using *for* loop.
20. Write a program to print the mathematical tables from 1 to 10.
21. Write a program to input any number and print its digits in reverse order using *while* statement. The input number must be positive.
22. Write a program to find the greatest common divisor of given two numbers.
23. Write a program to find smallest factor of a number.
24. Write a *for* loop which will produce the following output (*Hint* : Use two nested *for* loops).

```
1
2 2
3 3 3
4 4 4 4
5 5 5 5 5
```

25. Write a program to print the following pattern using nested *while* loop :

```
1
1 2
1 2 3
1 2 3 4
1 2 3 4 5
```

26. Write a menu driven program to find the area of circle, rectangle, circumference of circle and area of square.
27. Write a program to input number in between 1 and 100 and guess either it is too low or too high (Hints: Use random function)

28. Write a program to find the roots of a quadratic equation of the form $ax^2 + bx + c$.

- If the result of $b^2 - 4ac$ is negative, then print "Roots are imaginary".
- If the result of $b^2 - 4ac$ is positive, then print "Real and distinct roots".

$$\text{root1} = \frac{-b + \sqrt{b^2 - 4ac}}{2a}$$

$$\text{root2} = \frac{-b - \sqrt{b^2 - 4ac}}{2a}$$

• If $b^2 - 4ac = 0$, print "Roots are equal".

$$\text{root} = -b/2a$$

29. Write a program to print a pattern as given below :

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**
****
*****
*****
*****
*****
*****
*****
*****

```

30. Write a menu driven program to perform mathematical calculation like addition, subtraction and multiplication between two numbers using *if...elif* statements. The menu is as :

Mathematical Calculation

-
1. For Addition
 2. Subtraction
 3. Multiplication
 4. Division

31. Write a program to find the sum of series : $1 + x^1/2! + x^2/3! + \dots + x^n/(n+1)!$

32. Write a program to find greatest number between 'N' numbers.

33. Write a program to find the sum of following geometric series :

$$s = a + ar + ar^2 + ar^3 + \dots + ar^n$$

34. Write a program to find armstrong (like $153 = 1^3 + 5^3 + 3^3 + \dots + 3^N$) numbers upto N.

35. Write a program to accept monthly salary from the user, and display income tax with the help of following rules :

MONTHLY SALARY	INCOME TAX
69000 or More	20% of monthly salary
47500 – 68999	15% of monthly salary
47499 or Less	10% of monthly salary

36. For domestic consumption category, an electricity board charges according to following table:

Load	Fixed Charges (₹)	Energy Charges (₹)		
		0-200 Units/pm	201-400 Units/pm	Above 400 Units/pm
Upto 2 kw,	40/month	3.70	5.50	6.50
Upto >2-5 kw	100/month	3.70	5.50	6.50
Above 5 kw	20/kw/month	3.70	5.50	6.50

Write a program to enter the sanctioned load and the number of units consumed and print out the monthly charges.

37. Three natural numbers a , b and c are said to form a Pythagorean Triplet if $c^2 = a^2 + b^2$. Write a program to find the Pythagorean triplets for integers from 1 to 20.

38. Write a program to input a number and print whether the number is a special number or not. (Note: A number is said to be a special number, if the sum of the factorial of the digits of the number is same as the original number, e.g., 145 is a special number, because $1! + 4! + 5! = 1 + 24 + 125 = 145$)

39. Computech company has 15 employees who have been divided into four grades as per their basic pay as follow :

GRADE I Basic : ₹45000 p.m. or more

D.A : 40 % of Basic

H.R.A : 30 % of Basic

GRADE II Basic : ₹ 30000 p.m. or more but less than ₹ 45000

D.A : 40 % of Basic

H.R.A : 25 % of Basic

GRADE III Basic : Less than ₹ 30000 but more than ₹ 15000

D.A : 30 % of Basic

H.R.A : 20 % of Basic

GRADE IV Basic : ₹ 15000 p.m. or less

D.A : 30 % of Basic

H.R.A : 15 % of Basic

If the salary, which is the total of Basic, D.A (Dearness Allowance) and H.R.A (House Rent Allowance), is above ₹100000 per annum, then Income Tax at the rate of 30% of the annual salary exceeding ₹100000 is deducted on monthly basis at source. Taking names of the employees and the basic (Monthly) pay as inputs, a pay slip for each employee is to be printed. Write a program to perform this job.

40. A computerized ticket counter of an underground metro rail station charges for each ride at the following rates :

AGE (in years)	AMOUNT/HEAD
18 or above	₹ 50
5 or above but below 18	₹ 20
Accompanying kids below 5	NIL

Write a program which takes the number of people of various age-groups as input and prints a ticket. At the end of the journey, the program states the number of passengers of different age groups who travelled and the total amount received as collection of fares.

41. Write a program to prepare a frequency distribution table of the percentage marks in Computer Studies of sixty students, to be taken as inputs, into the following categories :

Category	Marks(%)
Fail	0 – 34
Pass	35 – 59
Good	60 – 79
Very Good	80 and above

The output should display the categories and the corresponding frequencies, *i.e.*, the number of students in each category in two columns.

42. Write a program to accept a date (dd/mm/yyyy) and check for the validity of the date.

43. SBI Home Finance revised its rate of interest for public deposits as follows :

Years	Cumulative Interest Scheme (p.a.)	Annual Income Scheme (compounded Annually)
1	-	10%
2	-	10.5%
3	11.5%	11%
4	11.5%	11%
5	11.5%	11%

Deposit under the cumulative scheme is accepted for a period between 3 and 5 years only.

Write a program to find the :

(i) Amount (A) due for sum (P) invested under the cumulative option scheme, by using the formula : $A = P \times (1 + 0.01 \times r)^t$.

(ii) Interest (I) for each year, under the annual interest scheme, using the formula :

$$I = 0.01 \times P \times r.$$

44. A game is played between two players in which a player, by turn, throws an ordinary dice respectively till the scores add up to 20 or more. The game is won by the player who does it in a minimum number of throws. Write a program to illustrate the game. In case of a tie, the output should indicate that the game has been drawn.

ANSWERS

[1 Mark]

1. The sequence structure indicates that instructions are to be executed in the order, *i.e.*, they occur from top to bottom unless a different control structure dictates otherwise.