SVKM's NMIMS

Nilkamal School of Mathematics, Applied Statistics & Analytics

M. Sc. (Data Science)

Syllabus of Entrance Test

Sets, Relations and Functions, Sequences and Series, Matrices, Permutation and Combination, Probability and Statistics, Interpretation using - Graphs, Bar charts, Pie charts, Venn Diagrams, Core python

Sample Questions

1) Which of the following is not an injective function?
   a) $f:[0,1] \to [0,1]$ given by $f(x) = x^2$
   b) $f:[-1,1] \to [-1,1]$ given by $f(x) = x^2$
   c) $f:[0,1] \to [-1,1]$ given by $f(x) = x^2$
   d) None of these

2) If cardinality of a set X is 5, then the cardinality of its power set is
   a) 16
   b) 32
   c) 48
   d) 64

3) Which of the following is a transitive relation on $A = \{2,4,5,6\}$?
   a) $\{(2,4),(4,5),(2,5)\}$
   b) $\{(4,6),(5,6),(6,2),(2,5)\}$
   c) $\{(2,2),(4,4),(5,5),(6,6)\}$
   d) None of these

4) The series $\sum_1^{\infty} (-1)^{n-1} \frac{n^2}{(n+1)!}$ is

   a) divergent

   b) convergent

   c) Both of these

   d) None of these

5) Determine the limits of the following sequences (x_n) whose nth term x_n is given below.

   $x_n = \frac{7n^4 + n^2 - 2}{14n^4 + 5n - 4}$ as $n \to \infty$

a) 1/2

b) 0

c) 1

d) None of the above

6) The sequence $\langle s_n \rangle =< 1,0,1,0,1,0, \ldots>$ is

a. not monotonic but bounded

b. not monotonic and not bounded

c. monotonic but not bounded

d. monotonic and bounded

7) For three $n \times n$ matrices A, B and C, $A(B + C)$ is equal to

a) $AB + CA$

b) $BA + CA$

c) $AB + AC$

d) All of these

8) The determinant of the matrix

$$\begin{pmatrix} 1 & 5 & 0 \\ 2 & 4 & -1 \\ 0 & -2 & 0 \end{pmatrix}$$

is

a) 2

b) -2

c) 3

d) -3

9) The eigenvalues of the matrix

$$\begin{pmatrix} 1 & 3 & 3 \\ -3 & -5 & -3 \\ 3 & 3 & 1 \end{pmatrix}$$

are

a) $-2, 1, 2$

b) $1, 2, 2$

c) $-2, -2, 1$

d) $-1, 2, 2$

10) An eigenvector for the matrix

$$\begin{pmatrix} 2 & 4 & 3 \\ -4 & -6 & -3 \\ 3 & 3 & 1 \end{pmatrix}$$

is

a) $\begin{pmatrix} 1 \\ -1 \\ 1 \end{pmatrix}$

b) $\begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix}$

c) $\begin{pmatrix} -1 \\ 1 \\ 1 \end{pmatrix}$

d) $\begin{pmatrix} 1 \\ 1 \\ -1 \end{pmatrix}$

11) What is the result of the following code in Python?

```
x = [1, 2, 3, 4, 5]
y = x
y[2] = 10
print(x)
```

a) [1, 2, 3, 4, 5]
b) [1, 2, 10, 4, 5]
c) [1, 2, 10, 4, 5, 10]
d) [1, 2, 3, 4, 5, 10]

12) What is the output of the following code in Python?

```
x = 5
y = 2
print(x // y)
```

a) 2.5
b) 2
c) 2.0
d) 2.2

13) The following pie-chart shows the percentage distribution of the expenditure incurred in publishing a book. If for a certain quantity of books, the publisher has to pay Rs. 30,600 as printing cost, then what will be amount of royalty to be paid for these books?

Various Expenditures (in percentage) Incurred in Publishing a Book

Promotion Cost 10%
Transportation Cost 10%
Royalty 15%
Printing Cost 20%
Binding 20%
Paper Cost 25%
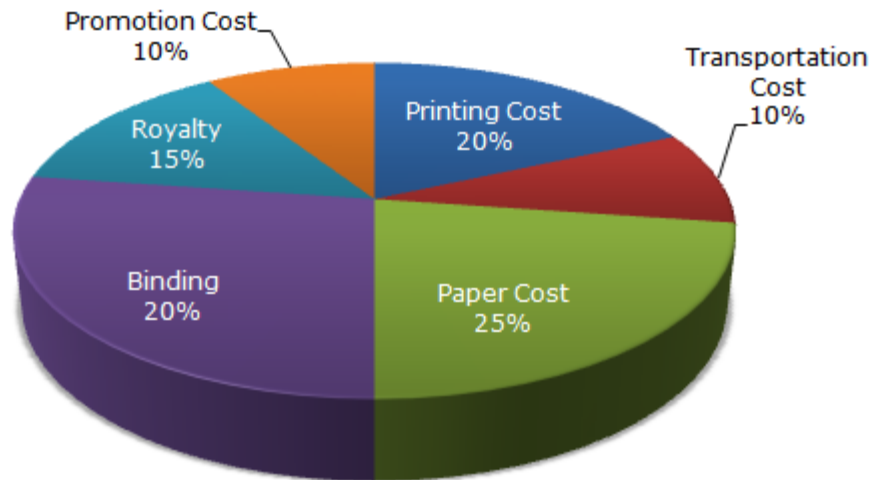
a) Rs. 19,450
b) Rs. 21,200
c) Rs. 22,950
d) Rs. 26,150

14) If coefficient of regression b_{xy}= 5 and b_{yx}= 0.14 then correlation between x and y will be

a) 0.7
b) 0.837
c) -0.7
d) -0.837

15) If P(A ∩ B)=0.5, P(A^C ∩ B^C) =0.5 and 2*P(A)= P(B)= p then value of p will be

a) 0.25
b) 0.5
c) 0.33
d) 0.67

(Ans: 1: b, 2: b, 3: a, 4: b, 5: a, 6: a, 7: c, 8: b, 9: c, 10: a, 11: b, 12: b, 13: c, 14: b, 15: d)