Unit!

Model Paper Class 11th, 2018

Mathematics

Time: 3 Hours   Max. Marks: 100

General Instructions:

a) All questions are compulsory
b) The questions paper contains 29 questions
c) Question 1-4 in section A are very short answer type questions carrying 1 marks each
d) Questions 5-12 in section B are short answer type questions carrying 2 marks each
e) Questions 13-23 in section C are long answer type questions carrying 4 marks each
f) Questions 24-29 in section D are long answer type questions carrying 6 marks each.
g) There is no overall choice. However an internal choice is given in three questions of section C and three questions of section D. Do only one out of them.

Section (A)

Questions from 1-4 are of 1 mark each

Q. No. 1. If Set A has 'm' elements and set B has 'n' elements, then the number of relations from set A to set B are;

(a) 2^m (b) mn

(c) $m + n$ (d) 2^{mn}

Q.No.2. Which one of the following functions is invertible?

a) One-One Into functions   (b) Many One onto functions

c) Many-one into functions   (d) One-One onto functions

Q.No.3. The value of $\lim\limits_{n \to 0} \frac{Sin\, x}{x}$ (Where 'x' is in radians) is = ...

Q.No.4. The value of; $\lim\limits_{n \to \infty} \frac{x^n - a^n}{x - a} = n a^{n-1}$ (True/False)

Section (B)

Question from 5 to 12 are of 2 marks each

Q.No.5. Write down the all subsets of $A = \{a, b\}$

Q.No.6. Find the degree measure of $\frac{5\pi}{3}$ radians

Q.No.7. Find the value of; $\quad i^2 + (-i)^4 - i^6$

Q.No.8. Evaluate the limit; $\lim\limits_{x \to 0} \frac{\sin ax + bx}{ax + \sin bx}$, a, b, a+b≠0

Q.No.9. Find $\frac{dy}{dx}$ when $y = 4x^3 + \cos x - \tan x$

Q.No.10. If $P(A) = \frac{1}{4}$ then what is $p(\text{not } \acute{A})$?

Q.No.11. Find the coefficient of x^3 in the expansion of $(1 + \frac{4}{3}x)^7$

Q.No.12. Find first five terms of sequence $a_n = n(\frac{n^2 + 5}{4})$

Section (C)

Question from 13 to 23 are of 4 marks each

Q.No.13. If $U = \{1,2,3,4,5,6,7,8,9\}$, $A = \{2,4,6,8\}$ and $B = \{2,3,5,7\}$. Verify that;

(I) $(A \cup B)' = A' \cap B'$

(II) $(A \cap B)' = A' \cup B'$

Q.No.14. Determine the domain and range of the relation R defined by:

$$R = \{(x, x + 5) : x \in \{1,2,3,4,5\}\}$$

Q.No.15. Prove that: $1^3 + 2^3 + 3^3 + \cdots + n^3 = \left[\frac{n(n+1)}{2}\right]^2$ by using principle of Mathematical induction.

Q.No.16. Prove that: $\frac{\sin 5x + \sin 3x}{\cos 5x - \cos 3x} = \tan 4x$

Q.No.17. Convert the given complex number into the polar form;

$Z = \sqrt{3} + i$

Q.No.18. Find the derivative of; $\frac{\sin x + \cos x}{\sin x - \cos x}$

Or

Evaluate the limit; $\lim\limits_{x \to 0} \dfrac{\tan 3x - 2x}{3x - \sin^2 x}$

Q.No.19. Find the equation of circle passing through the points (2,3) and whose centre is (0, -2)

Q.No.20. 15. If E and F are the events such that $P(E) = \dfrac{1}{4}$; $P(F) = \dfrac{1}{2}$ and $p(E \text{ and } F) = \dfrac{1}{8}$. Find;

(I) $P(E \text{ or } F)$ (II) $P(Not\ E\ and\ Not\ F)$

Or

If A and B are the events such that $P(A) = 0.42, P(B)\ 0.48$ and $P(A \text{ and } B) = 0.16$. Determine;

(I) $P(not\ A)$ (II) $P(A\ or\ B)$

Q.No.21. Find the middle term in the expansion of; $(3 - \dfrac{x^3}{6})^7$

Or

Show that $9^{n+1} + 8n - 9$ is divisible by 64, whenever 'n' is positive integer.

Q.No.22. Find the ratio in which $YZ - plane$ divides the line segment formed by the joining the points $(-2, 4, 7)$ and $(3, -5, 8)$

Q.No.23. (I) Write the negation of the statement; Srinagar is a city

(II) Write the converse of the statement; If 'n' is even, then 'n²' is even

Section (D)

Question from 24 to 29 are of 6 marks each

Q.No.24. Prove that; $Cos^2 x + Cos^2\left(x + \dfrac{\pi}{3}\right) + Cos^2\left(x - \dfrac{\pi}{3}\right) = \dfrac{3}{2}$

Or

Find the general solution and the principle solution of:

$\cos 3x + \cos x - \cos 2x = 0$

Q.No.25. Q.No.4. Find 'n' if;

$$(I)\ (n-1)_{P_3} : n_{P_4} = 1:9$$

$$(II)\ 2n_{C_4} : n_{C_3} = 12:1$$

Or

In how many of the distinct permutations of the letters in MISSISSIPPI do the four I's not come together.

Q.No.26. If p and q are the lengths of perpendiculars from the origin to the line

$x \cos \emptyset - y \sin \emptyset = k \cos 2\emptyset$ and $x \sec \emptyset + y \csc \emptyset = k$ respectively.
Prove that $p^2 + 4q^2 = k^2$

Q.No.27. Find the coordinates of the foci, the vertices, the length of major and

minor axes, the eccentricity and the length of the Latus Rectum of the

ellipse $\dfrac{x^2}{36} + \dfrac{y^2}{16} = 1$

Q.No.28. Calculate the mean, variance and the standard deviation for the

following distribution;

Class:	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Frequency:	3	7	12	15	8	3	2

Q.No.29. Sum of first p, q and r terms of an A.P are a, b and c respectively. Prove

that; $\dfrac{a}{q}(q-r) + \dfrac{b}{q}(r-p) + \dfrac{c}{r}(p-q) = 0$

Or

Find the sum of the sequence 7, 77, 777, ... to n terms.