

# Model Question Paper

Class –11<sup>th</sup>

Paper – Maths.

Time 3:00 Hrs.

Maximum Marks: – 80

General instructions: -

- (i) This Question paper contains – five sections A,B,C,D and E.
- (ii) Each section is compulsory. However, there are internal choices in some questions.
- (iii) Section A has 16 MCQ's of 1 mark each.
- (iv) Section B has 5 very short Answer (VSA) – questions of 2 marks each.
- (v) Section C has 6 short Answer (SA) – questions of 3 marks each.
- (vi) Section D has 4 long – answer (LA) – question of 4 marks each.
- (vii) Section E has 4 long – answer (LA) – questions of 5 marks each.

(SECTION - A)  
(Multiple choice Questions)  
Each question carries 1 mark

(1X16=16)

- Q.1 The set of Girls in a Boys school is  
(a) a null set (b) a singleton set (c) a finite set (d) None of these
- Q.2 Two sets A, B are disjoint iff  
(a)  $A \cup B = \emptyset$  (b)  $A \cap B \neq \emptyset$  (c)  $A \cap B = \emptyset$  (d)  $A - B = A$
- Q.3 If R is a relation on a finite set having n elements, then the number of relations on A is  
(a)  $2^n$  (b)  $2^{n^2}$  (c)  $n^2$  (d)  $n^n$
- Q.4 The value of  $\pi$  radian is equal to  
(a)  $90^\circ$  (b)  $180^\circ$  (c)  $270^\circ$  (d)  $360^\circ$
- Q.5 The general solution of  $\tan 3x = 1$  is  
(a)  $n\pi + \frac{\pi}{4}$  (b)  $\frac{n\pi}{3} + \frac{\pi}{12}$  (c)  $n\pi$  (d)  $n\pi \pm \frac{\pi}{4}$
- Q.6 The value of  $i^{13} + i^{14} + i^{15} + i^{16}$  is  
(a)  $i$  (b)  $-i$  (c) zero (d)  $-1$

- Q.7 Modulus of a complex number  $3 + i$  is  
(a) 10 (b)  $\sqrt{10}$  (c)  $-\sqrt{10}$  (d) zero
- Q.8 If  $n = 7$  and  $r = 5$ , then value of  $nCr$  is  
(a) 21 (b) 42 (c) 35 (d) 75
- Q.9 If first term of G.P is 5 and its 10<sup>th</sup> term is  $5^{10}$  then the common ratio is  
(a) 1 (b) 5 (c) 9 (d) 11
- Q.10 Slope of lines passing through the points (3,-2) and (-1, 4) is  
(a)  $\frac{-2}{3}$  (b)  $\frac{-4}{2}$  (c)  $\frac{2}{2}$  (d) 0
- Q.11  $\lim_{\theta \rightarrow 0} \frac{\sin 5\theta}{\theta}$  is  
(a) 5 (b)  $\frac{1}{5}$  (c) 1 (d) None of these

- Q.12 Derivative of  $\operatorname{Cosec} x$  is  
(a)  $\operatorname{Cosec} x \cot x$  (b)  $-\operatorname{Cosec} x \cot x$  (c)  $\tan x \cot x$  (d) None of these

## (CASE STUDY - I)

Indian track and field athlete Neeraj Chopra who competes in the Javelin throw, won a gold medal at Tokyo Olympics. He is the first track and field athlete to win a gold medal for India at the Olympics.

- Q.13 Name the shape of the path followed by a Javelin  
(a) Half ellipse (b) Parabola (c) Hyperbola (d) None of these
- Q.14 If equation of a such a curve is given by  $x^2 = -16y$ , then Co – ordinates of the foci are  
(a) (4, 0) (b) (0, 4) (c) (0, -4) (d) (-4, 0)

(CASE STUDY - II)

The derivative of y with respect to x is the change in y with respect to change in x. The derivative of f(x) at x\_0 is given by

f'(x\_0) = lim\_{Delta x -> 0} Delta y / Delta x = (f(x\_0 + Delta x) - f(x\_0)) / Delta x

- Q.15 If f(x) = x^100 - x^50, f'(1) is (a) 0 (b) 50 (c) 51 (d) 101

Q.16 y: x / tan x, dy/dx = -----

- (a) cos^2 x (b) sec^2 x (c) (tan x - sec x) / tan^2 x (d) (tan x - x sec^2 x) / tan^2 x

(SECTION-B) (2x5=10)

This section comprises of very short answer type questions (VSA) of 2- marks each.

- Q.17 How many times will be a wheel of a car rotate in a Journey of 1320m, if the radius of the wheel is 35cm?

- Q.18 Find the multiplicative inverse of 2 + sqrt(3) i. OR

For any positive integer n, prove that i^{2n} + i^{4n+1} + i^{4n+2} + i^{4n+3} = 0

- Q.19 If 1/8! + 1/9! = x/10!, find x.

OR

In how many ways can 4 red, 3 yellow and 2 green discs be arranged in a row if the discs of the same colour are indistinguishable?

- Q.20 Find the derivative of 5 sin x - 6 cos x + 7.

- Q.21 Write the contrapositive of the statement, if a number is divisible by 9, then it is divisible by 3.

(SECTION-C) (3x6=18)

This section comprises of short answer type questions (SA) of 3 marks each.

- Q.22 Prove that (sin x + sin 3x) / (cos x + cos 3x) = tan 2x

- Q.23 Solve the equality for real x:

3(x-2)/5 <= 3(2-x)/2

OR

Solve the system of inequalities graphically

2x + y - 3 >= 0 and x - 2y + 1 <= 0

- Q.24 Find the equation of the line passing through (-3,5) and perpendicular to the line through the points (2,5) and (3,-6).

OR

Find the angle between the lines y - sqrt(3)x - 5 = 0 and sqrt(3)y - x + 6 = 0

- Q.25 Find the equation of the circle passing through the points (2,3) and (-1,1) and whose centre is on the line x - 3y - 11 = 0

OR

Find the coordinates of the foci, the vertices, the length of major axis, the minor axis, the eccentricity and the length of the latus rectum of the ellipse

x^2/36 + y^2/16 = 1

- Q.26 Find the ratio in which the YZ-plane divides the line segment formed by joining the points (-2,4,7) and (3,-5,8).

- Q.27 A and B are events such that P(A)=0.42, P(B)=0.48 and P(A and B)=0.16. Determine (i) P(not A) (ii) P(not B) (iii) P(A or B)

(SECTION-D) (4x4=16)

This section comprises long answer (LA) questions of 4 marks each.

- Q.28 In a group of 65 people, 40 like cricket, 10 like both cricket and tennis. How many like tennis only not cricket? How many like tennis?

- Q.29 A function  $f$  is defined by  $f(x)=2x-5$ . Write down the values of  
 (i)  $f(0)$  (ii)  $f(7)$  (iii)  $f(-3)$

OR

Find the domain of the function  $f(x)=\frac{x^2+2x+1}{x^2-8x+12}$

- Q.30 Using principle of mathematical Induciton, prove that  
 $1^2+2^2+3^2+4^2+\dots+n^2=\frac{n(n+1)(2n+1)}{6}$

- Q.31 Three coins are tossed once. Find the probability of getting (i) 3 heads (ii) no tail (iii) atmost 2 heads (iv) exactly two tails.

OR

A and B are two events such that  $P(A)=0.54$ ,  $P(B)=0.69$  and  $P(A \cap B)=0.35$

Find:

- (i)  $P(A \cup B)$  (ii)  $P(A' \cap B')$  (iii)  $P(A \cap B')$  (iv)  $P(B \cap A')$

**SECTION-E**

**(5x4=20)**

This section comprises long answer (LA) - questions of 5 marks each.

- Q.32 Find the general solution of  
 $\sin x + \sin 3x + \sin 5x = 0$

OR

If  $\tan x = -\frac{4}{3}$ ,  $x$  in quadrant II, find the value of  $\sin \frac{x}{2}$ ,  $\cos \frac{x}{2}$  and  $\tan \frac{x}{2}$

- Q.33 Find the 4<sup>th</sup> term in the expansion of  $(x-2y)^{12}$

OR

Find the middle terms in the expansion of  $(\frac{x}{2} + 9y)^{10}$

- Q.34 Find the sum to  $n$  terms of the series  
 $1 \times 2 + 2 \times 3 + 3 \times 4 + 4 \times 5 + \dots$

- Q.35 Find the mean and variance for the following distribution

Classes	Frequencies
0-30	2
30-60	3
60-90	5
90-120	10
120-150	3
150-180	5
180-210	2

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