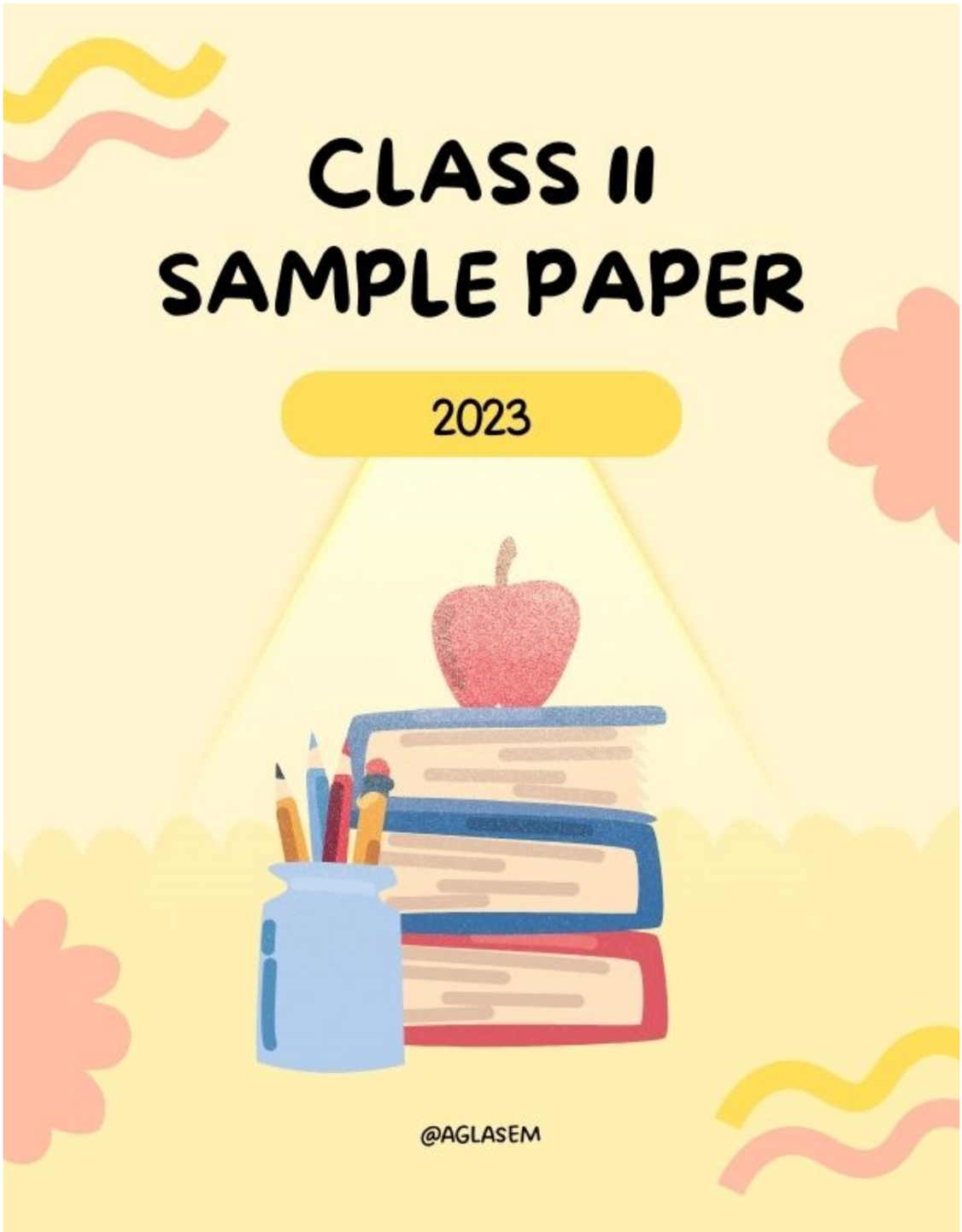
Class 11 Maths Sample Paper 2023



Annual Examination Practice Paper -I
(2022-23)

Class – XI

Mathematics (Code: 041)

Time: 3 hours **Maximum Marks: 80**

General Instructions :

1. This Question paper contains - **five sections A,B,C,D,E**. Each section is compulsory. However, there are internal choices in some questions.
2. **Section A** has 18 **MCQ's and 02** Assertion-Reason based questions of 1 mark each.(20 Marks)
3. **Section B**has 5 **Very Short Answer (VSA)-type** questions of 2 marks each.(10 Marks)
4. **Section C** has 6 **Short Answer (SA)-type** questions of 3 marks each.(18 Marks)
5. **Section D** has 4 **Long Answer (LA)-type** questions of 5 marks each.(20 Marks)
6. **Section E has 3 Source based/Case based/passage based/integrated units of assessment (4 marks each) with sub parts.(12 Marks)**

Section – A

Question Number 1-18 are of MCQ type question one mark each.

1. **1**

If $P = 3\sin 10^\circ - 4\sin^3 10^\circ$, then the value of $(2P^2 - 1)$ is :

(a) -0.5	(b) 0
(c) 0.5	(d) 1

2 **1**

Which of the following is <u>not</u> equal to cos 2x ?

(a) $\cos^2 x - \sin^2 x$	(b) $1 - 2\sin^2 x$
(c) $1 - 2\cos^2 x$	(d) $\frac{1 - \tan^2 x}{1 + \tan^2 x}$

3 **1**

Greatest value of sinx cos x is :

(a) 0	(b) -1
(c) 1	(d) 0.5

4 **1**

The domain of the function defined by f(x)=$\sqrt{4-x} + \frac{1}{\sqrt{x^2-1}}$ is equal to :

(a) $(-\infty, -1)$U (1 ,4]	(b) $(-\infty, -1]$U (1,4]
(c) $(-\infty, -1)$U [1,4]	(d) $(-\infty, -1)$U [1,4)

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5.	If $[x]^2-5[x]+6=0$ *where* $[.]$ *denotes the greatest integer function, then.* (a) $x\in[3,4]$ (b) $x\in(2,3]$ (c) $x\in[2,3]$ (d) $x\in[2,4)$	**1**
6	If $\tan\theta=3$ and θ lies in the third quadrant then the value of $\sin\theta$ is: (a) $\frac{5}{\sqrt{10}}$ (b) $\frac{3}{\sqrt{10}}$ (c) $\frac{-3}{\sqrt{10}}$ (d) $\frac{-1}{\sqrt{10}}$	**1**
7	$(1+i)^6=p+iq$ then (p+q) equals to : (a)-2 (b) -4 (c) -6 (d)-8	**1**
8	*If* $z=\frac{3+4i}{4-3i}$ then |z| equals: (a) 0 (b) 1 (c) 5 (d) 1/5	**1**
9	*If* $z=\frac{(2+3i)(3+4i)}{4+5i}$, then Im $(z.\bar{z})$ equals to : (a) 0 (b) $\frac{5\sqrt{13}}{\sqrt{41}}$ (c) $\frac{\sqrt{13}}{\sqrt{41}}$ (d) $\frac{5}{\sqrt{41}}$	**1**
10	If $\frac{-2}{x-3}>0$ then x belongs to : (a) $(3,\infty)$ (b) $[3,-\infty)$ (c) $(-\infty,3)$ (d) $(-\infty,3]$	**1**
11	For $x\epsilon R$ minimum value of x satisfying $\frac{x}{2}+\frac{x}{3}-\frac{x}{6}\geq 1$ is : (a) 0.5 (b) 1 (c) 1.5 (d) 2	**1**

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12	If the focus of the parabola is (0,-3) and its directrix is y=3 then its equation is : (a) $x^2=12y$ (b) $x^2=-12y$ (c) $y^2=12x$ (d) $y^2=-12x$	**1**
13	Distance of a point (3 ,4 5) from the origin is : (a) $5\sqrt{2}$ (b) $2\sqrt{5}$ (c) $\sqrt{5}$ (d) $\sqrt{2}$	**1**
14	If ,$P=\lim_{x\to 0}\frac{\sin 5x}{\tan 7x}$, then (7P-2) equals : (a) 0 (b) 1 (c) 3 (d) 5 is	**1**
15	Value of $\lim_{x\to 0}\left(\frac{x^3+x^2+x-3}{x-1}\right)$is equal to : (a) 0 (b)3 (c) 5 (d) 6	**1**
16	If P(A)=0.2 , P(B)=0.3 and P($A\cap B$)=0.1 Then P($A\cup B$) equal to : (a) $\frac{1}{11}$ (b) $\frac{2}{11}$ (c) $\frac{5}{11}$ (d) $\frac{6}{11}$	**1**
17	If A and B three mutually exclusive and exhaustive events of an experiment such that $3P(A)=2P(B)=P(C)$ then $P(A)$ equals to : (a) $\frac{4}{15}$ (b) $\frac{8}{15}$ (c) $\frac{1}{3}$ (d) $\frac{2}{9}$	**1**
18	Mean deviation about mean of -2, -1, 0, 1, 2 is (a) 0 (b) 0.8 (c) 1 (d 1.2	**1**

(ASSERTION-REASON BASED QUESTIONS)

In the following questions, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices.

(a) Both A and R are true and R is the correct explanation of A.

(b) Both A and R are true but R is not the correct explanation of A.

(c) A is true but R is false.

(d) A is false but R is true.

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19	**Assertion(A) :** If ${}^{2023}C_{2x-2} = {}^{2023}C_x$ then sum of all positive values of x is 677. **Reason (R) :** If ${}^{n}C_x = {}^{n}C_y$ then x=y or x+y=n	**1**
20	**Assertion(A) :** $\frac{d}{dx} = \left[\left(\frac{x^a}{x^b}\right)^{a+b}, \left(\frac{x^b}{x^c}\right)^{b+c}, \left(\frac{x^c}{x^a}\right)^{c+a}\right] = 1$ **Reason (R) :** Derivative of a constant function is zero.	**1**
	(Section B) **This section contains 5 Very Short Answer (VSA)-type questions of 2 marks each.**	
Q 21	How many cords can be drawn through 21 points on a circle ?	**2**
Q 22	Find the number of different 8 letter arrangement that can be made from the letter of the word "Daughter' so that vovels do not occur together.	**2**
Q 23	If $(x+iy)^3 = u+iv$ then show that $\frac{u}{x} + \frac{v}{y} = 4(x^2 - y^2)$.	**2**
Q 24	Find the derivative of $\frac{\sin^2 x}{1+\cos x}$ w. r. t. x. **OR** Find the value of $\lim_{x \to \frac{\pi}{4}} \frac{sinx - \cos x}{x - \frac{\pi}{4}}$.	**2**
Q 25	Prove that : tan 2023x -tan 2022x -tanx =tan2023x .tan 2022x .tan x **OR** If tan (A+B)=p and tan (A-B)=q then Prove that $\tan 2A = \frac{p+q}{1-pq}$	**2**
	Section C	
	This section contains 6 Short Answer (SA)-type questions of 3 marks each.	
Q26	Show that the points A(1, -1, 3) , B(2, -4, 5) and C(5, -13, 11) are collinear .	**3**
Q27	Solve for x : if $\lvert x-2 \rvert \le p$ when (a) p=2 (b) p=-3 (c) p=0	**3**
Q28	If tan x =3/4, $\pi < x < \frac{3\pi}{4}$ then find the value of $\sin\frac{x}{2}$, $\cos\frac{x}{2}$, $\tan\frac{x}{2}$ OR Find the value of tan $\tan 22^\circ 30'$	**3**
Q29	If A=$\{x : x \in R, x \text{ is the root of } x^3 - x = 0\}$, B=$\{x : x \in R, x \text{ is the root of } x^3 + 2x^2 - x - 2 = 0\}$ then find the value of (a)$A \cup B$(b)$A \cap B$	**3**
Q30	Find the equation of the circle which passes through the point (1,1) and centre lies at the point of intersection of lines x+y=4 and x-y=0 OR If the eccentricity of the ellipse is $\frac{5}{8}$ and distance between its foci is 10 . Find the equation of ellipse .	**3**
Q. 31	If $y = (x-1)(x+1)(x^2+1)(x^4+1)(x^8+1)\sin x + 1$ then find $\frac{dy}{dx}$.	**3**

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OR

Find the value of $\lim_{x \to 0} \frac{tanx - \sin x}{x^3}$

(SECTION D)

This section contains **four Long Answer (LA)-type** questions of 5marks each.

Q 32 **5**

Find the coefficient of a^4in the product of $(1-2a)^4(2-a)^5$using binomial theorem.

OR

Find $(x+1)^6+(x-1)^6$hence or otherwise evaluate $(\sqrt{2}+1)^6+(\sqrt{2}-1)^6$

Q 33 **5**

Find the domain and Range of $f(x)=\frac{x^2}{1+x^2}$ and $g(x)=\frac{4-x}{x-4}$

Q 34 **5**

(a)Find the sum of n terms of the following series 7+77+777+--------.

(b)Find the value of $\left(6^1.6^{\frac{1}{2}}.6^{\frac{1}{4}} - - - - - - - - - - - \infty\right)$

OR

If a and b are roots of $x^2-3x+p=0$ and c,d are roots of $x^2-12x+q=0$ where a,b,c ,d form a GP

Prove that $\frac{q+p}{q-p}=\frac{17}{15}$

Q35 **5**

Find the mean ,variance and 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

Section E

Source based/Case based/passage based/integrated units of assessment Questions

Q36

A class Eleventh Maths teacher Khushali wrote some sets in set builder form on a black board of class;

A={x: x is a prime natural number and $x \le 7$ }

B ={y: y is an odd natural number and $y<7$ }

whereas Universal set given as

U={1,2,3,4,5,6,7,8}

Based on the information given above answer the following questions.

(a)Write sets A and B in roster form .

(b))Find $A \cup B$ and $A \cap B$ **1**

(c)$\acute{A} \cap \acute{B}$ and $\acute{A} \cup \acute{B}$ **1**

OR **2**

Find the number of all subsets of universal set U and number of relations from A to B

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Q 37	For an EMC project Students need rectangular sheets, therefore they made Eco friendly rectangular sheet PQRS from the paper waste as shown below On the coordinate plane elevation of QR is 3x+4y=12and point P is (2,4), While point R is (16/5,a) On the basis information given above answer the following (a) Find the equation of PS (b)Find the value of a . (c) Find the area of rectangular sheet . OR Find the perimeter of rectangular sheet.	**1** **1** **2**
Q 38	On her winter vacations Myiesha visits four cities (Delhi ,Mumbai ,Goa and Bangalore) in random order . On the basis of information given above answer the following . (a) What is the probability that she visits Delhi before Goa and Goa before Mumbai? OR What is the probability that she visits Delhi First and Mumbai last.? (b)What is the probability that she visits Delhi just before Mumbai? 	**2+2**

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