



# Federal Board SSC-II Examination

## Model Question Paper Mathematics

**(Curriculum 2022-23)**

### Section - A (Marks 15)

Time Allowed: 20 minutes

**Section – A is compulsory.** All parts of this section are to be answered on this page and handed over to the Centre Superintendent.

**Deleting/overwriting is not allowed.** Do not use lead pencil.

ROLL NUMBER					
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Version No.			
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Candidate Sign. \_\_\_\_\_

Invigilator Sign. \_\_\_\_\_

**Q1.** Fill the relevant bubble against each question. Each part carries one mark.

Sr no.	Question	A	B	C	D	A	B	C	D
i.	If $3-3i=(m-2)i+3$ , then the value of $m$ is:	-1	1	-5	5	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ii.	If $\alpha, \beta$ are the roots of $2x^2-4x-8=0$ then value of the product $\alpha\beta$ is:	-4	-2	2	4	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
iii.	What is the value of $y$ , if $\begin{bmatrix} 3 & 5 \\ 8 & y+9 \end{bmatrix} \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} = \begin{bmatrix} 3 & 5 \\ 8 & -2y \end{bmatrix}$ ?	3	-3	-9	9	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
iv.	If $f(x) = \frac{1}{2}x$ , then what is the value of $f^2(x)$ ?	$\frac{1}{2}x$	$\frac{1}{4}x$	$\frac{1}{4}x^2$	$\frac{4}{x^2}$	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
v.	If $ x-5 =-3$ , then the value of $x$ is:	8	-8	2	$\phi$	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
vi.	The discriminant of $x^2-3x-4=0$ is:	9	12	16	25	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
vii.	A projectile is launched at an angle of $30^\circ$ with an initial velocity of 20 m/s. What is the horizontal component of its velocity?	10 m/s	17.3 m/s	20 m/s	0 m/s	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
viii.	In triangle ABC if $a = 10$ , $b = 15$ and $\alpha = 32^\circ$ , then value of $\beta$ is:	$42.5^\circ$	$46.5^\circ$	$52.6^\circ$	$62.8^\circ$	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

ix.	To create a realistic rainbow effect, which type of the curves is the most appropriate for arcs?	Straight line	Parabola	Circular arc	Spiral	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
x.	Two circles having radii 4cm and 5cm respectively, touch externally. The distance between the centers of the circles is:	1cm	4.5cm	9cm	20cm	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
xi.	The probability of getting two tails when two coins are tossed is:	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{3}$	$\frac{1}{6}$	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
xii.	Line of best fit is given by the equation:	$y = x^2$	$y = mx^2 + c$	$y = mx + c$	$x = y^2$	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
xiii.	If a line is tangent to a circle at point P, what is the angle formed between the tangent line and the radius drawn to point P?	$30^\circ$	$45^\circ$	$90^\circ$	$180^\circ$	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
xiv.	The simplified form of the expression $\frac{2x^2 - 2x}{x+1} \times \frac{2x^2 + 2x}{x-1}$ is:	$2x$	$2x^2$	$4x$	$4x^2$	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
xv.	If $2x + 3y = 2$ , then y – intercept is:	1	$\frac{2}{3}$	$\frac{3}{2}$	2	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>



# Federal Board SSC-II Examination

## Model Question Paper Mathematics

**(Curriculum 2022-23)**

Time allowed: 2.40 hours

Total Marks: 60

Note: Answer all parts from Section 'B' and all questions from Section 'C' on the E-sheet. Write your answers on the allotted/given spaces.

### SECTION – B (Marks 36)

$(9 \times 4 = 36)$

Q.2	Question	Marks	Question	Marks
i.	Express $\frac{(2+3i)}{(3-2i)^2}$ in the form $a+bi$	4	<b>OR</b>	Square of two times a number is equal to the difference of four times the number and 1. Find the number.
ii.	If $T = \begin{bmatrix} 1 & -2 \\ 3 & 3 \end{bmatrix}$ , then a. Find $T^{-1}$ b. Show that $TT^{-1} = I$	4	<b>OR</b>	If $f(x) = 2x+1$ , $g(x) = (3x-1)^2$ then find a. $fog(x)$ b. $gof(x)$ .
iii.	For an absolute function $f(x) =  x-2 $ a. Construct table of values b. Plot the graph	4	<b>OR</b>	Two workers, Saqib and Aqib, are hired to clean a large warehouse. Saqib can clean the entire warehouse in 5 hours, while Aqib can clean it in 7 hours. They start cleaning together, but after two hours, Saqib leaves, and Aqib continues cleaning alone. How long will it take Aqib to finish cleaning the warehouse after Saqib leaves?
iv.	Solve the inequality: $\left  \frac{2-5x}{4} \right  \geq \frac{2}{3}$	4	<b>OR</b>	Sketch and interpret the graph of an exponential function $f(x) = 4^x$
v.	Shade the solution region bounded by a pair of linear inequalities: $x+y \leq 50$ ; $x-y \geq 10$ ; $x \geq 0$ ; $y \geq 0$	4	<b>OR</b>	Given two points A (2,3) and B (6,8), a vector $\vec{v} = [4,5]$ translates point A to a new point C. a. Determine the coordinates of point C after the translation. b. Verify if the same vector $\vec{v}$ can also translate point B to the point D (10,13). Justify your answer.
vi.	Three points A, B and C in the plane are given by the position vectors: $\overrightarrow{OA} = [2, 1]$ , $\overrightarrow{OB} = [5, -2]$ , $\overrightarrow{OC} = [1, -3]$ with O (0, 0) as reference point. a. Find $\overrightarrow{AB}$ and $\overrightarrow{AC}$ . b. Determine if A, B and C are collinear	4	<b>OR</b>	Find the solution set of the equation: $\frac{1}{x} - \frac{11}{\sqrt{x}} = -18$
vii.	A balloon is floating at a height of 60 meters. From two points on the ground, 80 meters apart along a straight line, the angles of elevation to the balloon are $30^\circ$ and $45^\circ$ , respectively. Calculate the horizontal	4	<b>OR</b>	If two congruent chords of a circle are 12cm long and equidistant from the center, calculate the perpendicular distance from the center to each chord if the radius is 10cm.

	distance from the balloon to the closer point, when points lie on the opposite side of balloon.				
viii.	A magician takes out two cards from a deck of cards, one after the other, without replacement. What is the probability of getting an ace of spade, and a card of heart, as the first and second card, respectively?	4	<b>OR</b>	Solve the fractional equation $\frac{2x}{x-3} + \frac{4}{x+2} = \frac{10}{x^2 - x - 6}$	4
ix.	In the adjoining figure, ABCD is a cyclic quadrilateral inscribed in a circle having center at O. If $a = 30^\circ$ , $d = 45^\circ$ then find the values of $b, c, e$ and $f$ .	4	<b>OR</b>	Draw a tangent from a point at a distance of 8cm from the center of the circle of radius 4cm.	4

## SECTION – C (Marks 24)

(3 × 8 = 24)

**Note:** Attempt all questions. Marks of each question are given along with each question.

Q. No.	Question	Marks	Question		Marks														
Q.3	Area of a rectangular park is 1500 square metres and perimeter is 160 metres. Find the length and width of the park.	8	<b>OR</b>	Find the solution of following simultaneous linear equations with complex coefficients: $3ix + 2iy = 1, (2+i)x - (3-i)y = -1$ .	8														
Q.4	A military drone is flying at a velocity of 150 m/s at an angle of $60^\circ$ above the horizontal when it releases a package. Due to a wind blowing from east at 40 m/s, the trajectory of the package changes. a. Represent the drone's initial velocity vector and the wind velocity vector in component form. b. Calculate the resultant velocity vector of the package at the moment of release. c. If the package is dropped from a height of 500 m, determine the horizontal displacement of the package before it hits the ground. Ignore air resistance.	8	<b>OR</b>	The following table represents the marks obtained by 50 students in a mathematics test. a. Construct a cumulative frequency table. b. Draw a cumulative frequency polygon for the data <table border="1"> <tr> <td>Marks Obtained</td> <td>0-10</td> <td>10-20</td> <td>20-30</td> <td>30-40</td> <td>40-50</td> <td>50-60</td> </tr> <tr> <td>No. of Students</td> <td>5</td> <td>8</td> <td>12</td> <td>10</td> <td>9</td> <td>6</td> </tr> </table>	Marks Obtained	0-10	10-20	20-30	30-40	40-50	50-60	No. of Students	5	8	12	10	9	6	8
Marks Obtained	0-10	10-20	20-30	30-40	40-50	50-60													
No. of Students	5	8	12	10	9	6													
Q.5	Solve $f(x) = 2x + 5$ , and $g(x) = 2x^2 + 1$ graphically.	8	<b>OR</b>	Draw two tangents to a circle of radius 4cm meeting each other at $45^\circ$ .	8														