Federal Board SSC-I Examination
Mathematics Model Question Paper

National Curriculum 2022-2023 (Inclusive Scheme of Studies 2024)
(50% MCQs & 50% Descriptive)

ROLL NUMBER					
0	0	0	0	0	0
1	1	1	1	1	1
2	2	2	2	2	2
3	3	3	3	3	3
4	4	4	4	4	4
5	5	5	5	5	5
6	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9

Version No.			
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
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Section - A (Marks 36)

Time Allowed: 1:20 hours

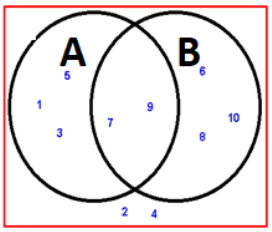
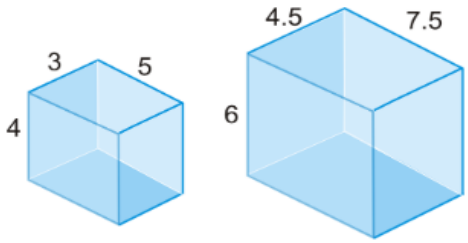
Section – A is compulsory. All parts of this section are to be answered on this page and handed over to the Centre Superintendent. Deleting/overwriting is not allowed. *Do not use lead pencil.*

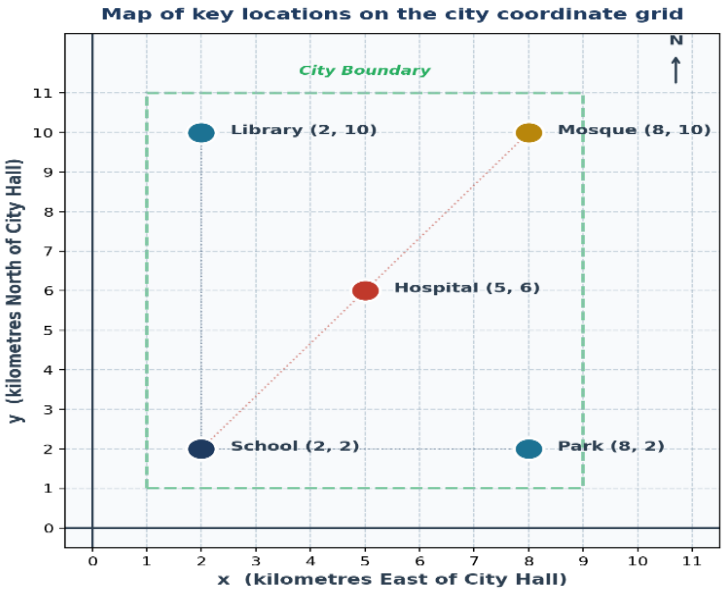
Invigilator Sign. _____ **Candidate Sign.** _____

Note: Fill the correct bubble for each question. Each question carries 0.75 mark.

Sr no.	Question	A	B	C	D	A	B	C	D
1	The radical form of $2^{\frac{3}{4}} \times 27$ is:	$3 \times \sqrt[3]{2^4}$	$3^3 \times \sqrt[4]{2^3}$	$3^3 \times \sqrt[3]{2^4}$	$3^4 \times \sqrt[4]{2^4}$	○	○	○	○
2	The scientific notation of 150 million kilometres is:	1.5×10^6	1.5×10^8	1.5×10^{-6}	1.5×10^{-8}	○	○	○	○
3	The temperature in a freezer was $-\frac{9}{2}^{\circ} C$. It increased by $\frac{5}{2}^{\circ} C$. What is the new temperature?	$7^{\circ}C$	$2^{\circ}C$	$-2^{\circ}C$	$-7^{\circ}C$	○	○	○	○
4	For what values of x and y, $(x+y, 4x+1) = (3,9)$?	$x = 1$, $y = 2$	$x = 0.5$, $y = 8.5$	$x = 2$, $y = 1$	$x = 2$ $y = 7$	○	○	○	○
5	If $(x-1)$ is a factor of $x^3 - 5x^2 + ax + 6$, the value of a is:	-2	-1	0	2	○	○	○	○
6	If $x^2 - 11x + 30 = (x-a)(x-b)$, then value of $a+b$ is:	-30	-11	11	30	○	○	○	○
7	The HCF of $6x^2y$ and $9xy^2$ is:	$3x^2y$	$3x^2y^2$	$3xy$	$18x^2y^2$	○	○	○	○
8	If $\sqrt{x^2+6x+9} = x + k^2$, the value of k is:	-3	$\pm\sqrt{9}$	3	$\pm\sqrt{3}$	○	○	○	○
9	The profit of a small business is modelled by $x^2 - 9x + 20$. For a breakeven point the factorized expression is:	$(x-4)(x-5)$	$(x-4)(x+5)$	$(x+4)(x-5)$	$(x+4)(x+5)$	○	○	○	○
10	On solving $\frac{x}{2} - \frac{3}{2} \geq 2$, the value of x is:	$x \leq 5$	$x \geq 5$	$x \geq 7$	$x \leq 7$	○	○	○	○
11	Which value of y satisfies the equation $0.6y + 1.2 = 3$?	0.3	1.08	3	7	○	○	○	○
12	What is the midpoint of the line segment joining A (2, 4) and B (6, 10)?	(2,3)	(4,7)	(6,5)	(8,14)	○	○	○	○

13	What is the gradient of a line passing through points (3, 7) and (3, –5)?	0	-2	$\frac{1}{3}$	undefined	○	○	○	○
14	If $y = 2x + c$ passes through the point (3, 10), what is the numerical value of c?	-17	4	16	23	○	○	○	○
15	The line $y = 5x + 1$ is perpendicular to another line. What is the gradient of the other line?	5	-5	$\frac{1}{5}$	$-\frac{1}{5}$	○	○	○	○
16	Two schools are located at points (2, 3) and (8, 11) on a map. What is the distance between them?	100 units	14 units	10 units	5 units	○	○	○	○
17	On a toy model car, the length of the door is 3 cm. If the actual car is exactly 40 times larger than the model, what is the length of the door on the actual car?	43 cm	80 cm	120 cm	1200 cm	○	○	○	○
18	A bakery makes two sizes of similar cube-shaped cakes. The larger cake has sides that are twice as long as the smaller cake. If the small cake requires 1 cup of butter, how many cups of butter are needed for the larger cake?	2 cups	4 cups	8 cups	16 cups	○	○	○	○
19	Two intersecting roads form supplementary angles where one angle is three times the other. What is the measure of the smaller angle?	22.5°	45°	90°	135°	○	○	○	○
20	Two sides of a triangle have slopes 1 and -1. What is the angle between them?	45°	90°	135°	180°	○	○	○	○
21	Two similar triangles have corresponding sides in the ratio 1: 3. What is the ratio of their areas?	1 : 6	6 : 1	9 : 1	1 : 9	○	○	○	○
22	A cuboid has volume 1000 cm^3. It is enlarged by a scale factor of 2. What is the volume of the enlarged cuboid?	500 cm^3	2000 cm^3	4000 cm^3	8000 cm^3	○	○	○	○
23	A goat is tied to a corner of a square field with a 7m rope. The locus of points it can graze is a:	Quarter circle	Semi-circle	Full circle	Square	○	○	○	○
24	A dog is tied to a fixed pole in a park with a 5 m rope. The set of all points the dog can reach is a:	Circle	Semi-circle	Square	Rectangle	○	○	○	○
25	135° in circular system (radians) is:	$\frac{3\pi}{4}$	$\frac{4\pi}{3}$	$\frac{3\pi}{2}$	$\frac{5\pi}{4}$	○	○	○	○
26	A person stands 20 m from a building. The angle of elevation to the top is 45°. What is the height of the building?	11.5 m	14.1 m	20 m	34.6 m	○	○	○	○
27	The value of $\cos^2 100° + \sin^2 100°$ is:	0	0.81	1	1.15	○	○	○	○

28	A ship sails from port on a bearing of 225°. In which direction is it moving?	North-East	South-East	South-West	North-West	○	○	○	○
29	In a triangle, the three medians meet at a point called the:	Circumcenter	Orthocenter	Centroid	Incentre	○	○	○	○
30	The vertices of a right-angled triangle are (0, 0), (6, 0), and (0, 8). What is the midpoint of the hypotenuse?	$(3, 4)$	$(6, 8)$	$(3, 0)$	$(0, 4)$	○	○	○	○
31	What is the probability of getting M in MATHEMATICS?	$\frac{1}{10}$	$\frac{2}{10}$	$\frac{1}{11}$	$\frac{2}{11}$	○	○	○	○
32	A fair coin is tossed 100 times. The expected number of Tails to occur is:	0	1	50	100	○	○	○	○
	STIMULUS/SITUATION/SCENARIO BASED MCQs								
	Scenario for MCQs 33 to 36	**The Venn diagram shows the elements of set A and set** 							
33	Which of the elements belong only to set A?	{1,2,4,6, 7}	{1,3,5,7,9}	{1,3,5}	{7,9}	○	○	○	○
34	Which of the elements are in the intersection of sets A and B?	{1,3,5, … ,10}	{7,9}	{1,3,5}	{6,8,10}	○	○	○	○
35	Which of the elements are not included in either set A or set B?	{1,2,3, … ,10}	{1,3,5}	{2,4}	{6,8,10}	○	○	○	○
36	The elements of $A - B$ are:	{1,3,5}	{6,8,10}	{7,9}	{2,4}	○	○	○	○
	Scenario for MCQs 37 to 40	**The given prisms are similar** 							
37	What is the linear scale factor from the smaller cuboid to the larger cuboid?	1.25	1.5	2.0	2.25	○	○	○	○
38	The total surface area of the smaller cuboid is 94 cm^2, what is the total surface area of the larger cuboid?	141 cm^2	211.5 cm^2	317.25 cm^2	423 cm^2	○	○	○	○
39	The volume of the smaller cuboid is 60 cm^3, what is the volume of the larger cuboid?	90 cm^3	135 cm^3	202.5 cm^3	270 cm^3	○	○	○	○
40	What is the ratio of the volume of the smaller prism to the volume of the larger prism?	1 : 1.5	1 : 2.25	1 : 3.375	1 : 4.5	○	○	○	○

	Scenario for MCQs (41-44)	**The table below shows weight distribution (in kg) of students in a class.** C-I: 30-40 | 40-50 | 50-60 | 60-70 | 70-80 f: 6 | 10 | 16 | 12 | 6							
41	What is the size of class interval?	10	11	12	15	O	O	O	O
42	What is the value of $\frac{\Sigma f}{2}$?	20	22	25	26	O	O	O	O
43	What is the cumulative frequency for the class $50-60$?	16	26	32	34	O	O	O	O
44	Which is the median class?	$40-50$	$50-60$	$60-70$	$30-40$	O	O	O	O
	Scenario for MCQs (45-48)	**Study the given map and answer the following questions.** 							
45	What is the distance between School and Park?	4 km	6 km	8 km	10 km	O	O	O	O
46	What is the midpoint of the line segment joining Library and Park?	(4, 5)	(5, 5)	(5, 6)	(6, 5)	O	O	O	O
47	What is the slope of the line joining two points (school and mosque)?	$\frac{4}{3}$	$\frac{3}{4}$	$\frac{6}{5}$	$\frac{5}{6}$	O	O	O	O
48	Which pair of locations on the map is exactly 8 km apart?	School & Hospital	Park & Hospital	Park & Mosque	Library & Hospital	O	O	O	O

Federal Board SSC-I Examination
Model Question Paper Mathematics

National Curriculum 2022-2023 (Inclusive Scheme of Studies 2024)
(50% MCQs & 50% Descriptive)

Time allowed: 1:40 hours Total Marks: 39

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 21)

$(7 \times 3 = 21)$

Q No.	Question	Marks		Question	Marks
1	Using the laws of exponents, simplify: $\left(\frac{2187\times a^5\times b^{17}}{a^{12}\times b^3}\right)^{\frac{1}{7}}$	3	***OR***	A line cuts intercepts on axes such that x-intercept is three times y-intercept and the line pass through $P(3,2)$. Write the equation of the line in standard form.	3
2	Solve the equation $\lvert 2x-3\rvert = \lvert x+5\rvert$	3	***OR***	Two power stations are at $S(2,0)$ and $T(8,0)$. A substation is to be built equidistant from S and T. Find locus of possible positions for the substation and its equation.	3
3	Find the acute angle between the line $y=\sqrt{3}x+2$ and the x-axis.	3	***OR***	Prove that $\sqrt{\frac{1-cos\theta}{1+cos\theta}} = \frac{sin\theta}{1+cos\theta}$	3
4	The volume of a rectangular box is given by $x^3+6x^2+11x+6$ cubic cm. If its height is $(x+1)$ cm, find the product of its length and width.	3	***OR***	Solve the inequality $-5 < \frac{2x+7}{3} \leq 1$ and represent the solution set on the real line.	3
5	In a survey, 200 people were asked if they prefer tea. 85 said yes. Calculate the relative frequency of preferring tea.	3	***OR***	The intensity of sound is measured by $L = 10\log\left(\frac{I}{I_0}\right)$. A machine produces intensity $1000I_0$. Find the value of L.	3
6	Two similar rectangles have lengths 6cm and 9 cm. (a) Find ratio of the corresponding sides. (b) Find ratio of the corresponding areas.	3	***OR***	A ladder reaches a height of 4 m on a wall. The foot of the ladder is 3 m from the wall. If θ is the angle the ladder makes with the ground, (a) Find the values of $\sin\theta$ and $\cos\theta$. (b) Verify that $\sin^2\theta+\cos^2\theta=1$	3
7	Consider the relation $R=\{(2,4),(3,9),(4,16),(5,25)\}$. (a) Find the domain and range of the relation. (b) Identify the rule connecting the elements.	3	***OR***	A scout walks from camp C to a river R on a bearing of $240°$. Draw a rough sketch showing the direction. (a) State in which quadrant the bearing lies? (b) Find the acute angle from South.	3

SECTION – C (Marks 18)

$(3 \times 6 = 18)$

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

<table>
<tr><th>Q. No.</th><th>Question</th><th>Marks</th><th colspan="2">Question</th><th>Marks</th></tr>
<tr><td>8</td><td>Verify the Associative Laws of union for three sets A, B, C using the analytical method.</td><td>6</td><td>OR</td><td>Two similar metal spheres have radii in the ratio 5 : 2.
Find the ratio of their surface areas and volumes.
If the smaller sphere has volume 40πcm³, find the larger sphere's volume.</td><td>6</td></tr>
<tr><td>9</td><td>If $A = 12x^3y^2(x^2 - 9)$,
$B = 18x^2y^3(2x^2 + 5x - 3)$
Factorize both expressions completely, then determine their HCF and LCM. Also verify that
A × B = HCF × LCM</td><td>6</td><td>OR</td><td>From the top of a 100 m high building, the angle of depression to the bottom of a second building is 30°and the angle of elevation to the top of the second building is 20°. Calculate the height of the second building.</td><td>6</td></tr>
<tr><td>10</td><td>Draw a triangle ABC with
$AB = 4$ cm, $BC = 5$ cm, and
$CA = 6$ cm.
Construct all three medians of the triangle. Verify that they are concurrent. Name the point of concurrency, and state whether it lies inside, on, or outside the triangle.</td><td>6</td><td>OR</td><td>A school principal wants to allocate funds to different departments based on student enrolment. The number of students in each department is tabulated as under.
<table>
<tr><td>Subject</td><td>x</td><td>Science</td><td>Maths</td><td>English</td></tr>
<tr><td>No. of Students</td><td>f</td><td>200</td><td>150</td><td>180</td></tr>
</table>
If the total available fund is Rs. 700,000, calculate the amount each department should receive if funds are distributed equally per student.</td><td>6</td></tr>
</table>