AL AMAL LEARNING CENTER

FBISE SSC-I Model Paper Pattern

MATHEMATICS CHAPTER QUIZ

Class 9 | Unit 2

LOGARITHMS

Time Allowed: 1:30 hours **Total Marks:** 64

Roll Number	Paper Version

Candidate Sign. _____ Invigilator Sign. _____

SECTION A (Marks 16)

Note: Section A is compulsory. Fill the correct bubble for each question. Each question carries 0.5 mark.

Q#	Question	A	B	C	D
1.	The scientific notation of 0.00053407 is:	53.407×10^{-5}	5.3407×10^{-3}	5.3407×10^{-4}	5.3407×10^{4}
2.	The standard form of 6.53×10^{-6} is:	0.0000653	0.000000653	6530000	0.00000653
3.	The logarithmic form of $2^7 = 128$ is:	$\log_2 128 = 7$	$\log_7 128 = 2$	$\log_{128} 2 = 7$	$\log_2 7 = 128$
4.	The value of $\log_4 64$ is:	2	3	4	16
5.	Which of the following is NOT defined?	$\log_5 1$	$\log_3 9$	$\log_2 0$	$\log_{10} 100$
6.	The value of $\log_b 1 + \log_b b$ is:	0	1	2	b
7.	If $\log_x 9 = 2$, then x is:	3	−3	±3	81
8.	The characteristic of log 0.0093 is:	3	2	−2	−3
9.	If the mantissa of log 156.3 is 0.1939, then log 156.3 is:	1.1939	2.1939	3.1939	0.1939
10.	If log x = −3, then x is:	0.003	1000	0.001	0.0001
11.	The value of ln e^5 is:	5	e	1/5	5e
12.	log 36 can be written as:	$(\log 6)^2$	log 18 + 2	6 log 2	2 log 6
13.	log 5 − log 2 is equal to:	log 3	log 10	log (5/2)	log (2/5)
14.	$\log_a b \times \log_b a$ is equal to:	1	0	ab	a/b
15.	Using the change of base law, $\log_3 5$ is equal to:	log 3 / log 5	log 5 / log 3	log 5 − log 3	log 5 × log 3
16.	3 log 2 + log 5 is equal to:	log 10	log 11	log 30	log 40
17.	log (xy^2 / z) expands to:	log x + 2 log y − log z	log x + 2 log y + log z	2 log (xy) − log z	log x × 2 log y − log z
18.	2 log x − 3 log y can be combined into:	log (2x / 3y)	log ($x^2 - y^3$)	log (x^2 / y^3)	log (x^2 y^3)

Q#	Question	A	B	C	D
19.	If the characteristic of log N is 5, the number of digits in N is:	4	5	7	6
20.	The number of digits in 100^{100} is:	100	201	200	202
Scenario for MCQs 21–24 The magnitude of an earthquake on the Richter scale is M = log (I/I_0). Earthquake A has magnitude 7 and earthquake B has magnitude 5.					
21.	The intensity of earthquake A is:	$7\ I_0$	$70\ I_0$	$10^7\ I_0$	$7^{10}\ I_0$
22.	How many times stronger is earthquake A than earthquake B?	100	2	20	1000
23.	An earthquake of intensity $1000\ I_0$ has magnitude:	30	10	1000	3
24.	If the magnitude increases by 1, the intensity is multiplied by:	1	10	2	100
Scenario for MCQs 25–28 Given: log 2 = 0.3010, log 3 = 0.4771, log 5 = 0.6990					
25.	The value of log 6 is:	0.1761	0.7781	0.9030	1.4313
26.	The value of log (3/2) is:	0.7781	0.9030	1.1761	0.1761
27.	The value of log 8 is:	0.9030	0.6020	0.3010	1.2040
28.	The number of digits in 5^{10} is:	6	10	7	11
MCQs 29–32: Find the value of x					
29.	If $\log_2 x = 6$, then x is:	12	36	64	8
30.	If $\log_3 (x + 1) = 2$, then x is:	5	8	7	9
31.	If log x = log 12 − log 4, then x is:	8	16	48	3
32.	If $\log_x 81 = 4$, then x is:	3	9	±3	27

SECTION B (6 × 3 = 18 Marks)

Note: Attempt all questions. Each question has an internal choice (OR).

Q1	(a) Simplify and write the answer in scientific notation: $(3.2 \times 10^5 \times 1.5 \times 10^{-2}) \div (4 \times 10^{-1})$	**3**	**OR**	(b) Write the following in standard notation: (i) 9.067×10^{-5} (ii) 3.1415×10^9	**3**
Q2	(a) Find the value of x: (i) $\log_5 x = 3$ (ii) $\log_{x+1} 16 = 2$ (iii) $\log_2 (x^2 - 1) = 3$	**3**	**OR**	(b) Find the value of x: (i) log (x + 3) + log (x − 3) = log 16 (ii) $\log_4 x = -2$ (iii) $\log_2 64 = x + 1$	**3**
Q3	(a) Use laws of logarithms to expand: log $(a^2\sqrt{b} / c^3)$	**3**	**OR**	(b) Use laws of logarithms to expand: log $\sqrt[5]{(7^2t^3p / d^6b^2)}$	**3**
Q4	(a) Combine into a single logarithmic term: ½ log t + ⅓ log r − ⅕ log s	**3**	**OR**	(b) Combine into a single logarithmic term: (1/7) [log 57.7 − 3 log 9.24 + 4 log 36.6 − 2 log 23.3]	**3**
Q5	(a) If log 2 = 0.3010, log 3 = 0.4771 and log 5 = 0.6990, evaluate: (i) log 30 (ii) log 0.45	**3**	**OR**	(b) With the same values, evaluate: (i) log (6/5) (ii) log (100/9) (iii) log 360	**3**
Q6	(a) Find the number of digits in 3^{40}. (log 3 = 0.4771)	**3**	**OR**	(b) Find the number of digits in 529^{30}. (Hint: $529 = 23^2$, log 23 = 1.3617)	**3**

SECTION C (5 × 6 = 30 Marks)

Note: Attempt all questions. Each question has an internal choice (OR).

Q7	(a) Use laws of logarithms (and log tables) to evaluate: $(\sqrt[3]{74.3} \times (5.46)^2) / (2.83 \times \sqrt{3.97})$	**6**	**OR**	(b) Use laws of logarithms to evaluate: (i) $(27.98)^2 / (28.73)^3$ (ii) $\sqrt{(16\frac{3}{4})} / \sqrt[3]{53}$	**3+3**
Q8	(a) The magnitude of an earthquake is $M = \log (I/I_0)$. (i) Prove that $\log (I_1/I_2) = M_1 - M_2$. (ii) One earthquake measured 8.1 and another 6.9. How many times stronger was the first? (iii) Find the intensity (in terms of I_0) of an earthquake of magnitude 5.	**2+2+2**	**OR**	(b) Using $M = \log (I/I_0)$: (i) The Kansu, China earthquake of 1920 measured 8.5 and the Tokyo, Japan earthquake of 1923 measured 7.8. How many times stronger was the 1920 earthquake? (ii) Find the intensity (in terms of I_0) of an earthquake of magnitude 6.5. (iii) Prove that $\log (I_1/I_2) = M_1 - M_2$.	**2+2+2**
Q9	(a) (i) Prove that $\log_b (m/n) = \log_b m - \log_b n$. (ii) Without using tables, simplify: $\log (75/16) - 2 \log (5/9) + \log (32/243)$	**3+3**	**OR**	(b) (i) Prove that $\log_b (mn) = \log_b m + \log_b n$. (ii) Prove that $\log (a^2/bc) + \log (b^2/ca) + \log (c^2/ab) = 0$	**3+3**
Q10	(a) A sum of Rs. 50,000 is invested at 6% compound interest per year. The amount after t years is $A = P (1.06)^t$, where P is the principal. (i) Using logarithms, find the number of years in which the money doubles. ($\log 2 = 0.3010$, $\log 1.06 = 0.0253$) (ii) After how many years will the money become three times? ($\log 3 = 0.4771$)	**3+3**	**OR**	(b) A culture starts with 200 bacteria and the number doubles every 3 hours, so after t hours the number of bacteria is $N = 200 \times 2^{t/3}$. (i) Find the number of bacteria after 12 hours. (ii) Using logarithms, find after how many hours there will be 10,000 bacteria. ($\log 2 = 0.3010$)	**2+4**
Q11	(a) The acidity of a solution is measured by $pH = -\log [H^+]$, where $[H^+]$ is the hydrogen ion concentration in mol/L. (i) Find the pH of milk if $[H^+] = 4 \times 10^{-7}$. ($\log 4 = 0.6021$) (ii) How many times larger is $[H^+]$ in a solution of pH 3 than in a solution of pH 5?	**3+3**	**OR**	(b) The amount of carbon-14 left in a fossil after t years is $N = N_0 (0.5)^{t/5730}$, where N_0 is the original amount. (i) A fossil has 30% of its original carbon-14. Write the equation for t. (ii) Use logarithms to find the age of the fossil. ($\log 2 = 0.3010$, $\log 3 = 0.4771$)	**2+4**

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