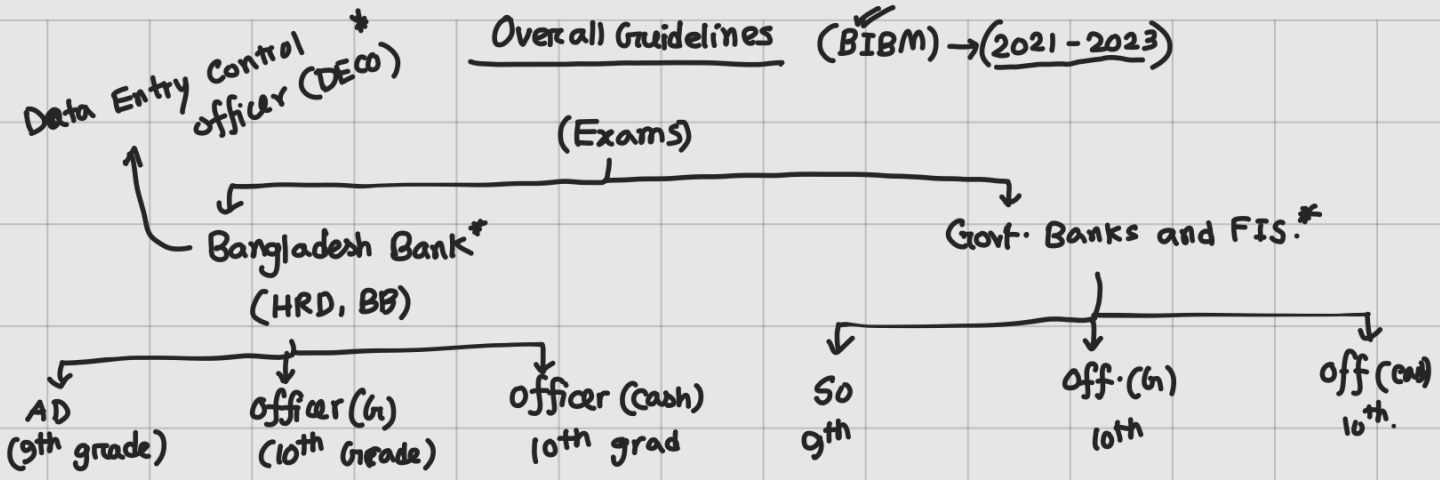

Bangladesh Bank: 4 বার (BAD.2023 ; Officer (cash), 2023 ; Off (G), 2022 , AD , 2022)

Topic	AD – 2023	Off (cash) – 2022	Off (G) – 2022	AD – 2022
~~01~~ [Number System] and LCM, HCF	1	1	3	1
~~02~~. Fraction and Decimal + Series	4	3	1	1
~~03~~. Percentage	2	2	1	3
04. Ratio, proportion, Mixture	0	0	0	1
05. Profit – loss	0	0	1	0
~~06~~. Interest	1	1	2	2
~~07~~ Average and Age	3	3	3	3
08. Time & Work, Pipes and Cisterns	0	0	0	0
~~09~~. Time, distance, speed, Train & Boat	1	1	1	0
~~10~~. Algebric expression (1), Equation (2), Inequality, exponent (1)	6	7	4	5
11. Set theory, Permutation, Combination. probability	0	0	1	0
~~12~~. Geometry	2	2	3	4.

Banker Selection (5) → ① Number system, ② Fraction Decimal, ③ percentage, ④ Average & Age, ⑤ Algebraic expression ..... ⑥ Geometry

Number System :- (MCQ + Written)

MCQ :-
1. odd-even Type (জোড় বিজোড় সংখ্যা) Long
2. Divisibility (বিভাজ্যতা) Long
3. Prime number (মৌলিক সংখ্যা)
4. ~~No. of Trailing zeros~~ (একটি সংখ্যার শেষে কয়টি শূন্য রয়েছে)
5. Finding unit digit (একক স্থানীয় অংক কত হবে?)
6. ~~No. of Divisor~~ (উৎপাদক সংখ্যা)
7. Formation of a number and place value of digits (unit digit, tenth digit → number)*
8. ~~The division Rule~~ (ভাজ্য = ভাজক × ভাগফল + ভাগশেষ)

No. of Trailing zero :-
1. Very large scale exponent (উচ্চ ঘাত বিশিষ্ট রাশি)
2. Factorial expression

Example :- $(125)^{48} \times (64)^{22} \times (27)^3$ → no. of trailing zero?
= 132টা.

How many 10?

সংখ্যার শেষে zero আসে কীভাবে?

$10 = 2 \times 5$

$20 = 2 \times 10$

$200 = 2 \times 10 \times 10$

$2000 = 2 \times 10 \times 10 \times 10$

$5^{(?)}$ $2^{(?)}$

$(125)^{48} \times (64)^{22} \times (27)^3$

$= (5^3)^{48} \times (2^6)^{22} \times (3^3)^3$

$= 5^{3\times48} \times 2^{6\times22} \times 3^9$

$= 5^{144} \times 2^{132} \times 3^9$

5 এর power এবং 2 এর power-এর মধ্যে যেটি ছোট হবে সেটাই হবে no. of trailing zero.

no. of 2 = 132
no. of 5 = 144 (12)

132টা 0

Factorial expression : 1 পর্যন্ত গুনফল

100! / |100 = 100 থেকে শুরু করে 1 পর্যন্ত যতগুলো স্বাভাবিক সংখ্যা আছে তাদের গুনফল

$100! = 100 \times 99 \times 98 \times \cdots \times 3 \times 2 \times 1$.

example :- Find the no. of trailing zeroes in 30! ?

Solution :-

$\frac{30}{5^1} + \frac{30}{5^2} + \frac{30}{5^3} + \cdots$ (লব > হর)

$30 < 5$

$30 < 5^2 = 25$

$= 6 + 1$

$= 7$

$\frac{3}{2} = 1.5$

quotient = 1

remainder = 1.

$28! = \frac{28}{5^1} + \frac{28}{5^2}$

$= 5 + 1 = 6$.

$10 \times 10 = 10^2$

$10 \times 10 \times 10 \times \cdots \times 10 = 10^{100}$

No of trailing zero in $n!$ = $\frac{n}{5^1} + \frac{n}{5^2} + \frac{n}{5^3} + \cdots$ (until $n > 5^n$)

 # Combined 9 bank and 1 FI ; SO (2023) :-

Find the no. of zeroes in $10 \times 20 \times 30 \times \cdots \times 1000$?

100 টা পদ

100 টা Term.

(b) 124

$= (10 \times 10 \times 10 \times \cdots \times 10) \times (1 \times 2 \times 3 \times \cdots \times 100)$

(100 টা)

$= (10 \times 1) \times (10 \times 2) \times (10 \times 3) \times \cdots \times (10 \times 100)$

$= 10^{100} \times 1 \times 2 \times 3 \times \cdots \times 100$

$= 10^{100} \times 100!$

$= 100 + 24$

$= 124$.

$10^1 = 0$

$10^2 = 00$

$10^1 = 10$

$10^2 = 100$

$10^3 = 1000$

$\frac{100}{5^1} + \frac{100}{5^2} + \frac{100}{5^3}$

$= 24$

$\frac{100}{5^1} + \frac{100}{5^2} + \frac{100}{5^3}$

$= 24$

No. of Divisor :-

Example :- Find the number of (divisor) of 540 ?

(Factor) (উৎপাদক)

যাকে দিয়ে 540 কে ভাগ করা যায়

(prime factorization)

⑧ মৌলিক সংখ্যার গুণফল আকারে প্রকাশ

⑧ Prime number :- 1 এবং সেই সংখ্যা নিজ

2 টা Factor

1 → is not prime. (only 1)

least prime = 2 (only even prime)

$36 = 1, 2, 3, 4, 6, 9, 12, 18, 36$

no. of divisor = 9 টা

$2 \mid 540$

$2 \mid 270$

$5 \mid 135$

$3 \mid 27$

$3 \mid 9$

3

$\therefore 540 = 2^2 \times 5^1 \times 3^3$

no. of divisor $= (2+1)(1+1)(3+1)$

$= 3 \times 2 \times 4$

$= 24$.

$2 \mid 36$, $2 \mid 18$, $3 \mid 9$, 3

$36 = 2^2 \times 3^2$

$= (2+1)(2+1)$

$= 9$

$36 = 2 \times 2 \times 3 \times 3$

$(2, 4, 6), 12, 18, 36, 3.$

Formula:-

If $N = a^p \times b^q \times c^r \times \dots$, where, a, b, c are prime numbers and, p, q, r ... are integer, then, no. of divisor of N

$= (p+1)(q+1)(r+1) \dots$

1. No. of divisor of 540 $\Rightarrow 540 = 2^2 \times 5^1 \times 3^3 \therefore N = (2+1)(1+1)(3+1) = 24$

(বিজোড় উৎপাদক) 2. No. of odd divisor of 540 $\Rightarrow 540 = 2^2 \times 5^1 \times 3^3$

$(1+1)(3+1) = 2 \times 4 = 8$

3. No. of even divisor of 540 $\Rightarrow 24 - 8 = 16 \rightarrow$ even divisor.

$8 \times 2 = 16$

Division Rule:-

(*) ভাজ্য (যাকে ভাগ করা হবে।) → Dividend.

(*) ভাজক (যাকে দিয়ে ভাগ করা হবে।) → Divisor

(*) ভাগফল (Result হিসেবে যা পাওয়া যাবে।) → Quotient

(*) ভাগশেষ (যে অংশটি সিমকোচে বিভাজ্য হয় না) → Remainder

Dividend = Divisor × Quotient + Remainder

5, 2, 2, 1

$5 = 2 \times 2 + 1 \Rightarrow 5 = 5.$

example:- if m is divided by n the remainder is 9. If $\frac{m}{n} = 39.12$ (Quotient), then, Find out the value of n?

process-1:-

$\frac{m}{n} = 39 + 0.12$

$\Rightarrow m = (39 + 0.12)n = 39n + 0.12n$

$\therefore m = 39n + 0.12n$

Dividend = Quotient × Divisor + Remainder

$0.12n = 9$

$\Rightarrow n = \frac{9}{0.12} = \frac{900}{12} = 75$

$\therefore n = 75.$

$\frac{5}{2} = 2.5$ (1)

$\frac{1}{2} = 0.5$

process-2:-

$0.12 = \frac{\text{Remainder}}{\text{Divisor}}$

$\Rightarrow 0.12 = \frac{9}{n}$

$\therefore n = \frac{9}{0.12} = 75.$