NUMBER SYSTEM | PART-9

SSC,CDS

1. $\frac{553+378859+4768+59379}{25}$ Find remainder/ शेषफल बताओ —

(A) 9 (B) 11
(C) 7 (D) 15

2. $\frac{73+75+78+57+197}{34}$ = R (?)

(A) 32 (B) 4
(C) 4 (D) 28

3. $\frac{158\times68\times197\times819}{11}$ Find remainder/शेषफल बताओ —

(A) 2 (B) 4
(C) 0 (D) 3

4. $\frac{1548\times1551\times1552\times1554}{17}$ Remainder = ?
शेषफल बताओ ?

(A) 5 (B) 16
(C) 15 (D) 4

5. $\frac{132\times135\times136\times138\times142}{137}$ Find remainder/ शेषफल बताओ —

(A) 81 (B) 90
(C) 84 (D) 87

6. $\frac{816\times817\times823\times827}{189}$ Find remainder/शेषफल बताओ —

(A) 195 (B) 197
(C) 192 (D) 199

7. $\frac{9367\times8641\times2009\times571571\times3114}{315}$ Find remainder/शेषफल बताओ —

(A) 242 (B) 252
(C) 267 (D) 262

8. Find Remainder
शेषफल बताओ ?

$\frac{73\times75\times78\times57\times197}{34}$ = ?

(A) 22 (B) 30
(C) 30 (D) 28

9. Find tanth digit 13799×96×996
दहाई का अंक बताओ ?

(A) 3 (B) 4
(C) 5 (D) 8

10. Find tanth digit 596×17394×15353×296×427
दहाई अंक बताओ

(A) 1 (B) 2
(C) 3 (D) 5

11. Find Remainder $\frac{2^{21}}{9}$?
शेषफल बताओ

(A) 1 (B) 2
(C) 8 (D) 6

12. $\frac{(306)^{61}}{28}$ Find remainder/शेषफल बताओ —

(A) 25 (B) 1
(C) 4 (D) 26

13. Find Remainder $\frac{7^{40}}{400}$ = ?
शेषफल बताओ ?

(A) 1 (B) 6
(C) 2 (D) 3

14. $\frac{471^{344}}{118}$ Find Remainder = ?
शेषफल बताओ ?

(A) 117 (B) 105
(C) 1 (D) 116

15. Find Remainder $\frac{3^{243}}{54}$
शेषफल बताओ ?

(A) 53 (B) 1
(C) 2 (D) 27

16. Find Remainder $\frac{5^{500}}{500}$

शेषफल बताओ

(A) 1 (B) 499
(C) 498 (D) 125

17. Find Remainder $\frac{12^{163}}{7}$ = ?

शेषफल बताओं

(A) 6 (B) 1
(C) 5 (D) 11

18. Find Remainder $\frac{453^{144}}{17}$

शेषफल बताओ

(A) 1 (B) 2
(C) 143 (D) 0

19. Find Remainder $\frac{9^{111}}{13}$

शेषफल बताओ

(A) 1 (B) 2
(C) 12 (D) 11

20. Find Remaider $\frac{551^{146}}{12}$ = ?

शेषफल बताओ

(A) 1 (B) 2
(C) 11 (D) 10

21. Find Remaider $\frac{113^{97^{96}}}{97}$ = ?

शेषफल बताओ ?

(A) 96 (B) 96
(C) 2 (D) 1

22. $\frac{3^{101}}{77}$ Find remainder/शेषफल बताओ —

(A) 40 (B) 47
(C) 50 (D) 76

23. $\frac{(719)^{140}}{143}$ Find remainder/शेषफल बताओ —

(A) 4 (B) 5
(C) 142 (D) 1

24. $\frac{12^{50}}{68}$ Find remainder/शेषफल बताओ —

(A) 5 (B) 6
(C) 7 (D) 8

25. Find remainder/शेषफल बताओ $\frac{2^{100}}{101}$ —

(A) 0 (B) 100
(C) 99 (D) 1

26. $\frac{7^{481}}{868}$ Find remainder/शेषफल बताओ —

(A) 7 (B) 8
(C) 860 (D) 1

27. $\frac{21^{163}}{24}$ Find remainder शेषफल बताओ —

(A) 20 (B) 0
(C) 1 (D) 21

28. $\frac{17^{2020}}{18}$ Find Remainder/शेषफल बताओ—

[CDS 2020 _ II Paper]

(A) 1 (B) 2
(C) 16 (D) 17

29. Find Remaider $\frac{335^{660}}{77}$ = ?

शेषफल बताओ ?

(A) 76 (B) 1
(C) 70 (D) 12

30. Find remainder/शेषफल बताओ —

$\frac{2^{1441}}{323}$

(A) 1 (B) 2
(C) 322 (D) 321

31. Find remainder/शेषफल बताओ —

$\frac{21^{962}}{221}$

(A) 220 (B) 219
(C) 1 (D) 2

32. $\frac{33^{389}+39^{389}}{36}$ Find Remainder = ?

शेषफल बताओ ?

(A) 0 (B) 2
(C) 1 (D) 34

33. Find remainder/शेषफल बताओ —

$\frac{20^1+20^2+20^3+.....20^{44}}{6}$

(A) 3 (B) 2
(C) 1 (D) 0

34. Find Remainder—
शेषफल बताओ—

$$\frac{9^{312}+99^{316}+999^{320}+9999^{324}+....1000\text{ times}}{8}$$

(A) 0 (B) 1
(C) 7 (D) 6

35. Find remainder/शेषफल बताओ —

$$\frac{7^2+77^2+777^2+.....(777.....49\text{ digit})^2}{9}$$

(A) 3 (B) 2
(C) 4 (D) 8

36. Find Reaminder $\frac{\lfloor 109}{110}$ = ?

शेषफल बताओ ?
(A) 1 (B) 108
(C) 109 (D) 2

37. $\frac{\lfloor 1 + \lfloor 2 + \lfloor 3 + ... \lfloor 1000}{12}$

Find Remainder/ शेषफल बताओ ? **[CDS 2015]**
(A) 6 (B) 5
(C) 9 (D) 7

38. $\frac{\lfloor 14}{17}$ Find remainder/शेषफल बताओ —
(A) 16 (B) 15
(C) 1 (D) 8

39. Find the remainder when 39! is divided by 41
शेषफल बताओ $\frac{39!}{41}$ —
(A) 1 (B) 40
(C) 39 (D) 10

40. $\frac{\lfloor 100-10}{101}$ Find remainder/शेषफल बताओ —
(A) 50 (B) 100
(C) 1 (D) 90

41. $40^{41^{42^{43^{44}}}}$ Find remainder/शेषफल बताओ —
6
(A) 4 (B) 3
(C) 6 (D) 9

42. Find Remainder $\frac{\left[32^{32}\right]^{32}}{7}$
शेषफल बताओं ?
(A) 4 (B) 3
(C) 5 (D) 2

43. If (x + 1) and (x – 1) are the factors of polynomial $ax^3 + bx^2 + 3x + 5$, then the value of a and b.
यदि (x + 1) और (x – 1) बहुपद $ax^3 + bx^2 + 3x + 5$ के गुणनखंड है, तब a और b का मान बताओ।
(A) a = –2, b = –3 (B) a = 3, b = 5
(C) a = 2, b = 3 (D) a = –3, b = –5

44. When $x^3 + 5x^2 + 10k$ is divided by $(x^2 + 2)$ the remainder obtained is 2x then the value of k.
$x^3 + 5x^2 + 10k$ को $(x^2 + 2)$ से विभाजित करने पर यह शेषफल 2x देता है, तब k का मान बताओ।
(A) –2 (B) –1
(C) 1 (D) 2

45. Which of the following does not complete divide by $29^{37} + 17^{37}$.
निम्न में से कौनसी संख्या $29^{37} + 17^{37}$ को पूर्णत: विभाजित नहीं करेगी।
(A) 2 (B) 11
(C) 23 (D) 46

46. Which of the following $x^n - a^n$ is complete divide by (x – a).
निम्नलिखित में से किसके लिए $(x^n - a^n)$, (x – a) से पूर्णत: विभाजित है— **[CDS 2020]**
(A) every positive integer value of n/प्रत्येक घनपूर्ण संख्या n के लिए
(B) Only for every positive even number/केवल प्रत्येक सम घनपूर्ण संख्या n के लिए
(C) Only for every odd number/केवल प्रत्येक विषम घनपूर्णांक के लिए
(D) Only for every prime no. n/केवल प्रत्येक अभाज्य संख्या n के लिए

47. 7777..... 56 digits, when this number is divided by 19, find remainder.
7777..... 56 अंक, यदि इस संख्या को 19 से विभाजित किया जाये तो शेषफल बताओ।
(A) 1 (B) 18
(C) 2 (D) 15

48. One of the factors of $(8^{2k} + 5^{2k})$ where k is an odd number is :
$(8^{2k} + 5^{2k})$ का कौनसा एक गुणनखण्ड है, जहां k विषम संख्या है :
[CGL Mains 2018]

(A) 86 (B) 88
(C) 84 (D) 89

49. $\frac{3^{521}}{8}$ Find Remainder/ शेषफल बताओ— **[CDS 2019]**

(A) 1 (B) 3
(C) 7 (D) 9

50. 44444 ..... 22 digit/अंक ÷ 23 find remainder/शेषफल बताओ —
(A) 0 (B) 1
(C) 2 (D) 21

51. $\frac{10^1+10^2+10^3+.....10^{100}}{6}$ Find remainder/ शेषफल बताओ —
(A) 0 (B) 1
(C) 4 (D) 2

52. 377377 ..... 98 (digits) it is divided by 13 then find the remainder ?
377377 ..... 98(अंक) है तो 13 से भाग देने पर शेष क्या होगा —
(A) 10 (B) 7
(C) 0 (D) 11

53. 6666 ..... (45 digit) divided by 23 then find remainder ?
6666 ..... (45 अंक) को 23 से भाग देने पर शेषफल क्या

Solution

होगा ?

(A) 0 (B) 6

(C) 12 (D) 7

1. (A) $\frac{\overset{3}{553}+\overset{9}{378859}+\overset{-7}{4768}+\overset{4}{59379}}{25}$

$= 3 + 9 - 7 + 4 = 9$

2.(C) $\frac{\overset{+5+7+10-11-7}{\cancel{73+75+78+57}+197}}{\cancel{34}} = \frac{4}{34} = 4$

3. (B) $\frac{\overset{4}{158}\times\overset{2}{68}\times\overset{-1}{197}\times\overset{5}{819}}{11}$

$= 4 \times 2 \times (-1) \times 5$

$= -40 + 44 = 4$

4. (D) $\frac{\overset{+1}{\cancel{1548}}+\overset{+4}{\cancel{1551}}+\overset{+5}{\cancel{1552}}+\overset{+7}{\cancel{1554}}}{17} = \frac{\overset{+1}{4\times\cancel{35}}}{17} = 4$

5. (D) $\frac{\overset{-5}{132}\times\overset{-2}{135}\times\overset{-1}{136}\times\overset{1}{138}\times\overset{5}{142}}{137}$

$= -50 + 137 = 87$

6. (C) $\frac{\overset{-3}{816}\times\overset{-2}{817}\times\overset{4}{823}\times\overset{8}{827}}{819} = 192$

7. (B) $\frac{\overset{2}{9367}\times\overset{1}{8641}\times\overset{-1}{2009}\times\overset{\overset{1}{11}\times\overset{-2}{13}\times\overset{1}{571}}{\cancel{571571}}\times\overset{\overset{1}{346}}{\cancel{3114}}}{\cancel{315}\ \cancel{35}_{5}}$

(9, 7)

$\therefore$ R = 2 × 1 × (–1) × 1 × (–2) × 1 × 1 = 4

$\therefore$ Actual rem. $\rightarrow 4 \times 9 \times 7 \rightarrow 252$

8 . (A) $\frac{\overset{+5+7+10-11-7}{\cancel{73+75+78+57}+197}}{\cancel{34}}$

$= \frac{350\times 77}{34} = \frac{10\times 9}{34} = 22$

9. (D) $\frac{\overset{-1}{\cancel{13799}}\times\overset{-4}{\cancel{96}}\times\overset{-4}{\cancel{996}}}{100} = \frac{-16}{100} = 84$

10. (B) $\frac{596\times 17394\times 15353\times\overset{74}{\cancel{296}}\times 427}{\cancel{100}\ _{25}}$

$\frac{\overset{-4}{\cancel{596}}\times\overset{-6}{\cancel{17394}}\times\overset{+3}{\cancel{15353}}\times\overset{-1}{\cancel{74}}\times\overset{+2}{\cancel{427}}}{25}$

$= \frac{-144}{25} = \frac{-(-6)}{25} = +6$

Actual Remainder = 6 × 4 = 24

11. (C) $\frac{(2^3)^7}{9} = \frac{(8)^7}{9} = \frac{(9-1)^7}{9} =$ – 1 or +8

12. (D) $\frac{(306)^{61}}{4\times 7}$

$\Rightarrow \frac{(306)^{61}}{4} \Rightarrow \frac{306}{4} = 2(R)$

$\Rightarrow \frac{(306)^{61}}{7} = \frac{306}{7} = 5(R)$

$\Delta \Rightarrow 4 - 2 = 2$

$\Delta \Rightarrow 7 - 5 = 2$

Required Answer $\Rightarrow 28 - 2 = 26$

13. $\frac{(7^4)^{10}}{400} = \frac{(2401)^{10}}{400} = \frac{(2400+1)^{10}}{400} = 1$ (R)

14. (C) $\frac{471^{344}}{118} = \frac{(472-1)^{344}}{118} = +1$

15. (D) $\frac{3^{243}}{3^3\times 2} = \frac{3^{240}\times 3^3}{2\times 3^3} = \frac{(2+1)^{240}}{2} = 1$

Actual Remainder = 1 × 3^3 = 27

16. (D) $\frac{5^{500}}{125\times 4} = \frac{5^{497}\times 5^3}{4\times 5^3} = \frac{(4+1)^{497}}{4} = 1$

$\therefore$ Actual Remaider = 5^3 × 1 = 125

17. (C) $\frac{12^{163}}{7} = \frac{12^{\overset{163}{6}}}{7} = \frac{12^1}{7} = \frac{12}{7} = 5$

18. So, (A) $\frac{453^{144}}{17} = \frac{453^{\overset{144}{16}}}{17}$ cycle Comlete

Means Remainder = 1

19. $\frac{9^{111}}{13} = \frac{9^{\overset{111}{12}}}{13} = \frac{9^3}{13} = \frac{729}{13} = 1$

20. (A) $\frac{551^{446}}{12} = \frac{(551)^{\overset{446}{4}}}{12} = \frac{551\times551}{12} = \frac{11\times11}{12} = 1$

21. (D) Totient of 97 = 96

$$\frac{\left[113^{1}\right]^{96}}{97} = \frac{113^{96}}{97} = \frac{113^{\frac{96}{96}}}{97} = 1 \text{ (Remainder)}$$

22. (B) $\frac{3^{101}}{7\times11}$

$$\Rightarrow \frac{3^{101}}{7} = \frac{3^{5}}{7} = \frac{243}{7} = 5(R)$$

$$\Rightarrow \frac{3^{101}}{11} = -\frac{3^{1}}{11} = 3(R)$$

$$\Rightarrow \frac{N}{11} = 3(R),\ \frac{N}{7} = 5(R)$$

N = 14, 25, 36, 47

When n $\frac{47}{7} = 5(R)$

∴ Answer = 47

23. (D) $\frac{(719)^{140}}{11\times13}$

$$\Rightarrow \frac{(719)^{140}}{11} = 1(R),\ \frac{(719)^{140}}{13} = 1(R)$$

∴ Required Answer = 4

24. (D) $\frac{\uparrow 50\times3^{50}}{4\times17} = \frac{4^{49}\times3^{50}}{17}$

$\phi(17) = 16$

$$\frac{4^{\frac{49}{16}}3^{\frac{50}{16}}}{17} = \frac{4\times3^{2}}{17} = 2$$

accurate remainder = 2 × 4 = 8

25. (D) $\frac{2^{100}}{101}$

∴ (101) = 101 – 1 = 100

Remainder = $\frac{2^{\frac{100}{100}}}{101} = 1(R)$

26. (A) $\frac{7^{481}}{868} = \frac{7^{481}}{7\times24} = \frac{7^{480}}{124}$

$$\phi(124) = 124\times\frac{1}{2}\times\frac{30}{31} = 60$$

∴ Required remainder = 7 × 1 = 7

27. (D) $\frac{21^{163}}{24}$

$$\phi(24) = 24\times\frac{1}{2}\times\frac{2}{3} = 8$$

$$\frac{21^{160}\times21^{3}}{24} = \frac{21^{3}}{24} = \frac{-27}{24} = +21(R)$$

28. (A) $\frac{(18-1)^{2020}}{18} = \frac{(-1)^{\text{even}}}{10} = 1$

29. (B) $\frac{335^{660}}{77}$

11×7

$$\frac{335^{660}}{11} = \frac{335^{\overset{660}{10}}}{11} = 1(R);\quad \frac{335^{660}}{7} = \frac{335^{\overset{660}{6}}}{7} = 1(R)$$

$$\therefore \frac{335^{660}}{77} = 1(R)$$

30. (B) $\frac{2^{1441}}{323}$

$17 \wedge 19$

$$\frac{2^{1441}}{17} = \frac{2^{\frac{1441}{16}}}{17} = 2(R);\quad \frac{2^{1441}}{19} = \frac{2^{\frac{1441}{18}}}{19} = 2(R)$$

$$\therefore \frac{2^{1441}}{323} = 2$$

31. (A) $\frac{21^{962}}{13\times17}$

$$\Rightarrow \frac{21^{962}}{13} = \frac{21^{\overset{962}{12}}}{13} = \frac{21^{2}}{13} = 12(R)$$

$\left[\frac{21^{962}}{13} = 12(R)\right]$, Δ = 13 – 12 = 1

$$\frac{21^{962}}{17} = \frac{21^{\frac{962}{16}}}{17} = \frac{441}{17} = 16(R)$$

$$\frac{21^{962}}{17} = 16$$

Δ = 17 – 16 = 1

∴ Required remainder = 221 – 1 = 220

32. (A) $\frac{(36-3)^{389}+(36+3)^{389}}{36} = \frac{-3^{389}+3^{389}}{36} = 0$

33. (D) $\frac{20}{6} = \left(\frac{18+2}{6}\right) = 2(R)$

$$\frac{20^{2}}{6} = \frac{2\times2}{6} = 4(R)$$

$\frac{20^3}{6} = \frac{2\times2\times2}{6} = 2(R)$

$\frac{20^4}{6} = \frac{2\times2\times2\times2}{6} = 4(R)$

$\frac{20^5}{6} = \frac{2^5}{6} = 2(R)$

Total sum $= \frac{2\times22+4\times22}{6} = 0(R)$

34. (A) $8 = 2^3$

8's totient $= 8\times\frac{1}{2} = 4$

$\frac{9^{312}}{8} = \frac{9^{\frac{312}{4}}}{8} = 1(R)$

$\frac{1+1+1+1+....1000}{8} = \frac{1000}{8} = 0(R)$

35. (B) $\frac{7^2\left(1^2+11^2+111^2+.....(111.....\text{digit})\right)}{9}$

$= \frac{7^2(\text{sum of digit})}{9}$

$= \frac{49\left(1^2+2^2+3^2+.....+49^2\right)}{9}$

$= 49\times\frac{49\times50\times99}{6\times9}$

$= \frac{49\times49\times25\times11}{3}$

$= \frac{1\times1\times1\times2}{3} = 2$

36. (C) $\frac{\lfloor P-1}{\lfloor P}$ = (P–1) or (–1) Remainder

37. (C)

$\lfloor 1 = 1, \lfloor 2 = 2, \lfloor 3 = 6, \lfloor 4 = 24, \lfloor 5 = 120$

$\therefore \frac{1+2+6}{12} = 9$

38. (D) Willison Theorem $\frac{\lfloor 16}{17} = 16(R)$

$\Rightarrow \frac{16\times15\times\lfloor 14}{17} = 16(R)$

$\Rightarrow -1\times-2\times(x) = 16(R)$

$x = \frac{16}{2} = 8$

39. (A) Willison Theorem $\frac{40!}{41} = 40(R)$

$\frac{40\times39!}{41} = 40$

$40\times x = 40$

$x = 1$

40. (D) $\frac{\lfloor 100-10}{101} = 100-10 = 90$

41. (A) $\frac{40^{41^{42^{43^{44}}}}}{6} = \frac{4^{41^{42^{43^{44}}}}}{6} = 4(R)$

42. (A) $\frac{32^{1024}}{7} = \frac{(2^5)^{1024}}{7} = \frac{2^{5120}}{7}$

$= \frac{(2^3)^{1706}\times2^2}{7} = 4$

43. (D) $x+1=0$

$x=-1$

$a(-1)^3+b(-1)^2+3(-1)+5=0$

$-a+b+2=0$

$a-b=2$ ....(1)

$\Rightarrow x-1=0$

$x=1$

$a(1)^3+b(1)^2+3(1)+5=0$

$a+b+8=0$

$a+b=-8$ ....(2)

$\therefore a = \frac{-8+2}{2} = -3$

$b = \frac{-8-2}{2} = -5$

44. (C) $x^2+2=0$

$x^2=-2$

$\Rightarrow x^3+5x^2+10k$

$\Rightarrow -2x-10+10k = -2x$

$10k = 10$

$k = 1$

45. (B) a^n+b^n

When $n\rightarrow$ odd, is complete divide by $a+b$

$\therefore 29+17 = 46$ is complete divide this number.

46. (A)

47. (A) $\frac{56}{18} = 2(R)$; $\frac{77}{19} = 1(R)$

48. (D) $K\rightarrow$ Odd

$2K\rightarrow$ Even

Put $k = 1$

$8^2+5^2 = 64+25 = 89$

49. (A) $\frac{\left(3^2\right)^{521}}{8}=\frac{(8+1)^{521}}{8}=1$

50. (A) $\frac{4\left(10^{23}-1\right)}{9\times 23}=0(\mathrm{R})$

51. (C) $\frac{10^1}{6}=4$

$\frac{10^2}{6}=4$

$\frac{10^{100}}{6}=4$

$\therefore \frac{4\times 10}{6}=4(\mathrm{R})$

52. (D) $\frac{37}{13}=11(\mathrm{R})$

53. (B)