2nd Edition

Covers
100%
Syllabus

सम्पूर्ण गाइड

आरआरबी एनटीपीसी

गैर-तकनीकी

सहायक स्टेशन मास्टर, ट्रेन क्लर्क, सीनियर क्लर्क कम टाइपिस्ट इत्यादि

Includes : Solved Paper 2019 & 2021-22 Stage I & II

- सामान्य बुद्धिमता एवं तार्किक परीक्षण
- अंकगणितीय योग्यता
- सामान्य जागरूकता
- सामान्य विज्ञान

Based on Latest Syllabus & Pattern

DISHA™
Publication Inc

DISHA Publication Inc.

A-23 FIEE Complex, Okhla Phase II

New Delhi-110020

Tel: 49842349/ 49842350

Typeset By
DISHA DTP Team

Write To Us At

feedback_disha@aiets.co.in

www.dishapublication.com

DISHA™ Publication Inc

Free Sample Contents

भाग -A: सामान्य बुद्धि एवं तर्कशक्ति

भाग -B: गणित

This sample book is prepared from the book **"Sampooran Guide to RRB NTPC (Graduate) Exam 2nd Edition".**

ISBN - 9789362250612

MRP- 520/-

In case you like this content, you can buy the **Physical Book** or **E-book** using the ISBN provided above.

The book & e-book are available on all leading online stores.

विषय सूची

भाग -A: सामान्य बुद्धि एवं तर्कशक्ति

भाग -B: गणित

भाग -C: सामान्य जागरूकता

भाग -D: सामान्य विज्ञान

परीक्षा विधि

आरआरबी एनटीपीसी चयन प्रक्रिया:

आरआरबी एनटीपीसी 2024 चयन प्रक्रिया में चार चरण शामिल हैं। सभी चार चरणों को सफलतापूर्वक पूरा करने से आवेदक आरआरबी एनटीपीसी भर्ती 2024 के लिए पात्र हो जाते हैं। उम्मीदवार आरआरबी एनटीपीसी चयन प्रक्रिया की जांच कर सकते हैं जिसमें निम्नलिखित चरण शामिल हैं

पहला चरण: सीबीटी-1	दूसरा चरण: सीबीटी-2	तीसरा चरण: टाइपिंग टेस्ट (कौशल परीक्षण)	चौथा चरण: दस्तावेज सत्यापन

आरआरबी एनटीपीसी परीक्षा पैटर्न:

सीबीटी-1 आरआरबी एनटीपीसी परीक्षा का पहला चरण है, जो स्नातक और स्नातकोत्तर दोनों पदों पर लागू होता है।

Section (अनुभाग)	प्रश्नों की संख्या	Marks (अंक)	Duration (समय)
सामान्य गणित	30	30	1 घंटे 30 मिनट
सामान्य बुद्धि एवं तर्कशक्ति	30	30	
सामान्य जागरुकता	40	40	
Total (कुल)	**100**	**100**	

सीबीटी-2 के लिए परीक्षा पैटर्न:

Section (अनुभाग)	प्रश्नों की संख्या	Marks (अंक)	Duration (समय)
गणित	35	35	1 घंटे 30 मिनट
तर्कशक्ति	35	35	
सामान्य बुद्धिमत्ता एवं सामान्य जागरुकता	50	50	
Total (कुल)	**120**	**120**	

आरआरबी 2024 एनटीपीसी परीक्षा पैटर्न:

- सहायक स्टेशन मास्टर और यातायात सहायक पदों के लिए कंप्यूटर आधारित एप्टीट्यूड टेस्ट (CBAT) आयोजित किया जाता है।
- टाइपिंग स्किल टेस्ट जूनियर अकाउंट्स असिस्टेंट-कम-टाइपिस्ट, सीनियर क्लर्क-कम-टाइपिस्ट और सीनियर टाइम कीपर जैसे पदों के लिए आयोजित किया जाता है

1 अध्या;

lkn';rk

lkn';rk

lkn';rk dk vFk lekurk gkrk gA bldk mí'; oLrvk d chp lekurk ;k mue vUrfufgr vkUrfjd lEc/k dk le>u ,o fo'y"k.k dju dh ;kX;rk dk ij[kuk gA leku lc/k d vkèkkj ij lekurk dk ijh{k.k lkn';rk dk e[; mí'; gA

bll lEcf/r i'u fofHkUu rRok] oLrvk] ?kVukvk] fØ;kvk bR;kfn d vUrlc/k dk le>u vkj ij[ku dh ;kX;rk dh tkp d fy, gkr gA ;|fi ,l i'u vkIku irhr gkr g] fdUr FkkMh Hkh vlko/kuh ij xyr gku dh lEHkkouk cuh jgrh gA

vr% ,l i'uk dk mÙkj nr le; ijh lko/kuh cjruh pkfg,A 'kCnk dk O;kid vFkk e le>u dk i;kl djuk pkfg,A bl ijh{k.k d vUrxr i'u vd] v{kj rFkk 'kCn rhuk ij vk/kfjr gkr gA v{kjk ij vk/kfjr i'uk dk gy dju d fy, vxth o.kekyk e fofHkUu v{kjk dh fLFkfr ;kn j[kuh pkfg,A

lkn';rk ij i'u iR;d idkj d lEc/k ij Hkh vk/kfjr gkr g tk ge lkpr g ;k ftl ge viu nfud thou e ikr gA ; fuEu idkj d gkr gA

⊳ ⊳ ⊳ ⊳ प्रश्नों के प्रकार ◁ ◁ ◁ ◁

टाइप 1 % 'kCn le:irk

उदाहरण ▶ 1 : egkIkxj : rkykc : : fdykehVj : ?

(a) okYV **(b)** unh
(c) ehVj **(d)** ld.M

gy (c) ftl idkj 'egkIkxj' dk NkVk :i 'rkykc' g] mlh idkj 'fdykehVj' dh NkVh bdkb 'ehVj' gA
vr% ? ⇒ ehVj

Vkbi 2 % v{kj le:irk

उदाहरण ▶ 2 : LMNO : MNOP : : STUD : ?

(a) TUVW **(b)** TUEV
(c) TUVE **(d)** TTVE

gy (c) 12 13 14 15 → 13 14 15 16
L M N O → M N O P
+1, +1, +1, +1

;gk ge n[k jg g fd v{kj leg 'LMNO' d iR;d v{kj dk Øe'k% + 1, +1, + 1, ... d Øe l c<kdj 'MNOP' d :i e fy[kk x;k gA
blh idkj]

19 20 21 4 → 20 21 22 5
S T U D → T U V E
+1, +1, +1, +1

vr% ? ⇒ TUVE

Vkbi 3 % l[;k le:irk

उदाहरण ▶ 3 : 635768 : 867536 : : 819578 : ?

(a) 785918 **(b)** 875981
(c) 875819 **(d)** bue l dkb ugh

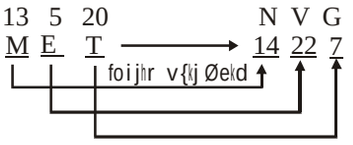
gy (d) 635768 → 867536
;gk ge n[k jg g fd ckb vkj dh l[;k '635768' d lHkh vdk dk myV dj fy;k x;k gA
blh idkj]
819578 → 875918
vr% ? ⇒ 875918

Vkbi 4 % v{kj&'kCn le:irk

उदाहरण ▶ 4 : MET : 14227 : : DAM : ?

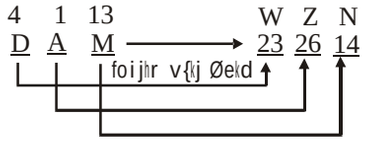
(a) 23263 **(b)** 232613
(c) 236213 **(d)** 232614

gy (d)



;gk ge n[k jg g fd 'MET' 'kCn d iR;d v{kj d foijhr v{kj d o.kekyk Øekfdr eku dk dkM djr g, 'kCn 'MET' dk '14227' d :i e vkfdd dkM fd;k x;k gA

blh idkj]



vr% ? ⇒ 23 26 14

उदाहरण ▶ 5 : $\frac{M}{S} : \frac{13}{19} :: \frac{K}{J} : ?$

(a) $\frac{10}{11}$ **(b)** $\frac{11}{10}$

(c) $\frac{14}{20}$ **(d)** $\frac{22}{21}$

gy (b) $\frac{M}{S} : \frac{13}{19}$

;gk ge n[k jg g fd nkb vkj dh l[;k ckb vkj d v{kj dk o.kekyk Øekd eku gA

blh idkj] $\frac{K}{J} : \frac{11}{10}$

vr% ? ⇒ $\frac{11}{10}$

साधित उदाहरण

उदाहरण ▶ 1 : '**8**' dk '**16P**' l vkj '**6**' dk '**12L**' l tk lc/ g ogh lc/ '**11**' dk _____ l gA

(a) **22R** **(b)** **22K**

(c) **22J** **(d)** bue l dkb ugh

gy (d) $8 \times 2 = 16$,o P

(vxyh o.kekyk e P dk LFkku 16ok gA)

$6 \times 2 = 12$,o L

(vxyh o.kekyk e L dk LFkku 12ok gA)

vr% $11 \times 2 = 22$,o V

(vxyh o.kekyk e V dk LFkku 22 ok gA)

उदाहरण ▶ 2 : ;fn '**IN**' dk '**KQ**' fy[kr g rk ^_____* dk '**FR**' fy[kk tk,xkA

(a) **EO** **(b)** **DO**

(c) **DP** **(d)** **EP**

gy (b) ftl idkj $I \xrightarrow{+2} K$

$N \xrightarrow{+3} Q$

mlh idkj $F \xrightarrow{-2} D$

$R \xrightarrow{-3} O$

उदाहरण ▶ 3 : ^fp=k* dk lc/ ftl idkj ^n[kuk* l g] mlh idkj ^iLrd* dk lc/ _____ l gA

(a) luuk **(b)** i<uk

(c) [kjhnuk **(d)** ckDl

gy (b) ftl idkj ge ykx fp=k n[kr g] mlh idkj ge iLrd i<r gA

उदाहरण ▶ 4 : fuEufyf[kr e l fdl tkM dk lc/ rek'kk:gluk d leku g\

(a) Hke:cpuh **(b)** 'kyh:jgL;

(c) 0;x:Øk/ **(d)** Mjkouk:Mj

gy (d) ftl idkj rek'kk gku l ykx glr g mlh idkj Mjkouh oLr l ge Mj yxrk gA

उदाहरण ▶ 5 : fuEufyf[kr e l fdl tkM dk lc/ tkllh:xlr d leku g\

(a) y[kiky :l{e

(b) i;Vd:i;Vu

(c) odhy :Bkl

(d) xMfj;k:ckruh

gy (a) ftl idkj tkll] xlr rjhd l dk; djrk g mlh idkj y[kiky cgr gh l{e rjhd l dk; djrk gA

उदाहरण ▶ 6 : ftl idkj 'xke' lcf/kr gS 'Hkkj' l, mlh idkj 'lVhehVj' lcf/kr gS _____ lA

(a) {k=Qy (b) vk;ru

(c) yEckbZ (d) /ofu

gy (c) ftl idkj 'xke', 'Hkkj' dh ,d bdkbZ g mlh idkj 'lVh ehVj' 'yckbZ' dh ,d bdkbZ gA

प्रश्नावली

1. ACF : GIL : : CEH : ?
   (a) ILN (b) IKN
   (c) IKM (d) ILM
2. 'BEAN' dk 'NEAB' l vkj 'SAID' dk "DAIS' l ogh lcèk g tk 'LIME' dk _____ l gA
   (a) MLEI (b) ELMI
   (c) EIML (d) EILM
3. fuEufyf[kr e fdl tkM dk lc/ OFTEN : FOTNE d leku g\
   (a) HEART : TRAHE (b) OPENS : SNEOP
   (c) ROSLU : ULORS (d) FIRST : IFRTS
4. ^eyh* dk ^tM* l ogh lc/ g] tk ^xykc* dk _____ l gA
   (a) cxhpk (b) lx/
   (c) dkVk (d) iQy
5. ftl idkj ^dlrku* dk lc/ ^ny* l g mlh idkj ^fun'kd* dk lc/ fuEufyf[kr e l fdld lkFk g\
   (a) i;o{kd (b) depkjh
   (c) lxBu (d) l?k
6. tk lc/ HEART : THREA d chp g] ogh lc/ fuEufyf[kr e l fdld chp g\
   (a) SWORN : NSOWR (b) FUNDS : FSDUN
   (c) GLAZE : EGZAL (d) bue l dkb ugh
7. JM : LO : : GJ : ?
   (a) HK (b) HL
   (c) IL (d) IK
8. fuEufyf[kr e l fdle ogh lEcU/ g tk ^CASE' vkj ^EASC' e g\
   (a) PICK : KIPC (b) JAIL : IJLA
   (c) DOME : MOED (d) bue l dkb ugh
9. 'MP' dk 'NQ' l ogh lcèk g tk 'BE' dk _____ l gA
   (a) CF (b) DG
   (c) CG (d) DF
10. 'BF' mlh idkj 'DH' l lcf/r g] ftl idkj 'PS' lcfèkr g _____ lA
    (a) SU (b) SV
    (c) RV (d) RU
11. fn; x, fodYik e l dku i'uokpd LFkku ij vk,xk\
    JPLM : NTPQ : : BKLO : ?
    (a) DOPS (b) FOPS
    (c) FOQR (d) FRPS
12. fn; x, fodYik e l dku lh l[;k i'uokpd LFkku ij vk,xh\
    25 : 630 : : 10 : ?
    (a) 105 (b) 47
    (c) 18 (d) 27
13. ^pnek* dk lc/ ftl idkj ^lVykbV* l g] mlh idkj ^iFoh* dk lc/ g _____ lA
    (a) ty (b) xg
    (c) ifjØek (d) l;

funsZk ¼14&46½ fn; x, fodYik e l lcf/kr v{kjk@'kCnk@vdk dk puko dj&

14. ukfj;y %% [kky % i=k % \
    (a) fyQkQk (b) ikLV
    (c) Mkd fVdV (d) Mkd ckDl
15. fcfLeYykg [kku % 'kgukbokknd %% fcjt egkjkt % \
    (a) dFkd (b) HkkjrukV;e
    (c) lxhr (d) flrkj
16. 212 : 436 : : 560 : ?
    (a) 786 (b) 682
    (c) 1132 (d) 688
17. VXZ : JLN : : GIK : ?
    (a) QSO (b) QRS
    (c) OQS (d) LMO
18. 126 : 14 :: 162 : ?
    (a) 50 (b) 18
    (c) 35 (d) 28
19. 678 : U : : 456 : ?
    (a) P (b) O
    (c) Q (d) R
20. CALL : ACLL :: COOL : ?
    (a) LOOC (b) LCOO
    (c) OOLC (d) OCLO
21. itkc : pMhx< :: vle :
    (a) fnlij (b) xvkgkVh
    (c) f'kykx (d) bEQky
22. Lokn % thHk %% pyuk % \
    (a) QVikFk (b) clk[kh
    (c) iko (d) okfdx fLVd
23. fpeuh % /vk %% ---------- % ----------
    (a) cUnd : cyV (b) ?kj : Nr
    (c) dhpM : fljkfed (d) pk; : dryh
24. DCGH : LKOP : : FEJI : ?
    (a) MLSR (b) NMRQ
    (c) ONTS (d) QPUT
25. CAD : FDG : : XZW : ?
    (a) IQJ (b) CAD
    (c) ZBY (d) ACZ

26. 5 : 124 : : 7 : ?
(a) 342 (b) 343
(c) 248 (d) 125

27. likn d % if=kdk % % \ % \
(a) miU;kl :y[kd (b) dfork :dfo
(c) dlh :y[kd (d) fun'kd :fQYe

28. MAT : NCW : : APE : ?
(a) CRH (b) BRH
(c) BSG (d) BSH

29. ADBC : WZXY : : EHFG : ?
(a) SVTU (b) STUV
(c) TUSV (d) STVU

30. 136 : 469 : : 247 : ?
(a) 137 (b) 358
(c) 368 (d) 146

31. 365 : 90: : 605 : ?
(a) 150 (b) 45
(c) 123 (d) 63

32. teuh % ekd % % ekjDdk % \
(a) teuh (b) yhjk
(c) fnjge (d) Øu

33. LIEF : UVRO : : QOMK : ?
(a) QPSR (b) PNLJ
(c) VTRP (d) YXWU

34. COUNTRY : FRXQWUB : : EXAMINE : ?
(a) HAPDLQH (b) HADPLQH
(c) HAHPLDQ (d) GBQDVWB

35. ;fn BAT = CBU g rk CAT = \
(a) DBU (b) BUD
(c) DBV (d) bue l dkb ugh

36. yky jDr dkf'kdk,% ,fjFkkIkbVl %% 'or jDr dkf'kdk, % \
(a) FkkEckIkbV (b) fyEiQkIkbVk
(c) ekukIkbVl (d) Y;dkIkbV

37. pkn % pn;ku %% exy xg % \
(a) ,liy (b) vk;HkVV
(c) exy;ku (d) HkkLdj

38. ABDE : PQST : : MNPQ : ?
(a) EFHI (b) UVXZ
(c) IJLN (d) TVWX

39. ELIMS : SMILE :: KRAPS : ?
(a) KRAPS (b) SPARK
(c) PARKS (d) KARPS

40. xf.kr % l[;k %% bfrgkl % \
(a) ykx (b) ?kVuko Qe
(c) frfFk;k(lu) (d) ;n/

41. ikphu % vk/fud %% vDlj % \
(a) ge'kk (b) dHkh Hkh ugh
(c) dHkh&dHkh (d) fu;fer

42. ihfy;k % fyoj %% \
(a) Mk;fyfll % fdMuh (b) njkj % Ropk
(c) dYiuk% efLr"d (d) oyVkbu% fny

43. MkDVj % gkfLiVy %% vè;kid % \
(a) enku (b) yckjVjh
(c) LoQy (d) mn;e

44. Hkkjr oQ igy i/ku e=kh % i- tokgj yky ug# %% Hkkjr oQ igy jk"Vifr % \
(a) Mk- ,l- jk/kÑ".ku (b) Mk- jktn ilkn
(c) Mk- tkfdj glu (d) Mk- ,- ih- t vCny dyke

45. vrjk"Vh; lk{kjrk fnol % 8 flrcj %% vrjk"Vh; efgyk fnol % \
(a) 8 ekp (b) 26 tu
(c) 22 viy (d) 4 uocj

46. ZX : AC : : VT : ?
(a) EG (b) DF
(c) AB (d) AE

47. eRL;&>M dk lc/ eNyh l ogh g tk dkykuh dk ---------- l g **(RRB NTPC 2016, Stage-I)**
(a) phfV;k (b) xk;
(c) ?kj (d) ftnxh

48. lkn'k i.k dhft,% **(RRB NTPC 2017, Stage-II)**
\ % ij % % gkFk % dykb
(a) trk (b) Vkx
(c) V[kuk (d) yckb

49. lkn'k i.k dhft,% **(RRB NTPC 2017, Stage-II)**
oDrk % Jkrk %% fiQYe % ----------
(a) vkykpd (b) n'kd
(c) ilkj.kdrk (d) vfHkurk

50. lkn'k i.k dhft, dc % dgk %% le; % ---------- **(RRB NTPC 2017, Stage-II)**
(a) LFkku (b) fnu
(c) ilk (d) ?kMh

51. ml fodYi dk pu] tk rhlj in l mlh rjg lcfèkr g tl igyk in nlj l lcfèkr gA
BSTN : AQUP :: DNUC : ? **(RRB NTPC-2021, Stage-I)**
(a) CLVE (b) TSTB
(c) BSTO (d) TOUS

52. ml fodYi dk pu tk rhlj in l mlh rjg lcfèkr g tl igyk in nlj l lcfèkr gA
DFB : GHC :: LNJ : ? **(RRB NTPC-2021, Stage-I)**
(a) LOJ (b) OPK
(c) EGC (d) OQM

53. ml fodYi dk pu ftle ;Xe d 'kCnk d chp ogh lcèk g tk fn, ;Xe d 'kCnk d chp gA
Cat : Mew :: ? **(RRB NTPC-2021, Stage-I)**
(a) Bull : Crow (b) Owl : Hiss
(c) Jackal : Hoot (d) Duck : Quack

54. ml fodYi dk pu] tk rhljh l[;k l mlh rjg lcfèkr g tl igyh l[;k nljh l lcfèkr gA
25 : 16 :: 41 : ? **(RRB NTPC-2021, Stage-I)**
(a) 31 (b) 51
(c) 32 (d) 30

55. ml fodYi dk p;u dhft,] ftldk ikpo v{kj&leg l ogh lcèk g] tk nlj v{kj&leg dk igy v{kj&leg l g vkj pkFk v{kj&leg dk rhlj v{kj&leg l gA
(RRB NTPC-2022, Stage-II)
CKO : FNL :: FLP : IOM :: DPQ : ?
(a) GST (b) GSN
(c) HRN (d) HRT

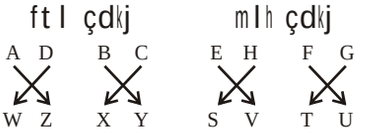
56. ml fodYi dk p;u dhft,] ftldk ikpo v{kj&leg l ogh lcèk g] tk nlj v{kj&leg dk igy v{kj&leg l g vkj pkFk v{kj&leg dk rhlj v{kj&leg l gA
MDT : PAW :: RFQ : UCT :: LSK : ?
(RRB NTPC-2022, Stage-II)
(a) ORH(b) HRN
(c) JPH (d) OPN

संकेत ,oa हल

1. (b) ftl idkj] $A \xrightarrow{+6} G$ mlh idkj $C \xrightarrow{+6} I$
$C \xrightarrow{+6} I$ $E \xrightarrow{+6} K$
$F \xrightarrow{+6} L$ $H \xrightarrow{+6} N$
blfy, vHkh"V mÙkj = *IKN*
2. (c)
3. (d) ftl çdkj 1 2 3 4 5 2 1 3 5 4
O F T E N : F O T N E
mlh çdkj
1 2 3 4 5 5 4 3 1 2
H E A R T → T R A H E
1 2 3 4 5 5 4 3 1 2
O P E N S → S N E O P
1 2 3 4 5 5 4 2 1 3
R O S L U → U L O R S
1 2 3 4 5 2 1 3 5 4
F I R S T → I F R T S
4. (d)
5. (c) ftl idkj dlrku ny dk i/ku gkrk gA mlh idkj fun'kd lxBu dk i/ku gkrk gA
6. (d)
1 2 3 4 5 5 1 4 2 3
H E A R T → T H R E A
1 2 3 4 5 5 1 3 2 4
S W O R N → N S O W R
1 2 3 4 5 1 5 4 2 3
F U N D S → F S D U N
1 2 3 4 5 5 1 4 3 2
G L A Z E → E G Z A L
7. (c) ftl idkj] mlh idkj]
$J \xrightarrow{+2} L$ $G \xrightarrow{+2} I$
$M \xrightarrow{+2} O$ $J \xrightarrow{+2} L$
8. (d) C A S E → E A S C
1 2 3 4 4 2 3 1
P I C K → K I P C
1 2 3 4 4 2 1 3
J A I L → I J L A
1 2 3 4 3 1 4 2
D O M E → M O E D
1 2 3 4 3 2 4 1
9. (a) ftl idkj] mlh idkj]
$M \xrightarrow{+1} N$ $B \xrightarrow{+1} C$
$P \xrightarrow{+1} Q$ $E \xrightarrow{+1} F$
10. (d) ftl idkj] mlh idkj]
$B \xrightarrow{+2} D$ $P \xrightarrow{+2} R$
$F \xrightarrow{+2} H$ $S \xrightarrow{+2} U$
11. (b) ftl idkj] mlh idkj]
$J \xrightarrow{+4} N$ $B \longrightarrow F$
$P \xrightarrow{+4} T$ $K \longrightarrow O$
$L \xrightarrow{+4} P$ $L \longrightarrow P$
$M \xrightarrow{+4} Q$ $O \longrightarrow S$
12. (a) $(25 \times 25) + 5 = 630$
$(10 \times 10) + 5 = 105.$
13- (b) ftl idkj pnek ,d lVykbV g mlh idkj] iFoh ,d xg gA
14. (a) 15. (a)
16. (c) 212 : 436 :: 560 : ?
ftl idkj $212 \times 2 + 12 = 436$
mlh idkj $560 \times 2 + 12 = 1132$
17. (c)
18. (b) 12 6 : 14 :: 162 : ?
ftl idkj $14 \times 8 + 14 = 112 + 14 = 126$
mlh idkj $18 \times 8 + 18 = 144 + 18 = 162$
19. (b) 20. (d) 21. (a) 22. (c) 23. (a)
24. (b) ftl çdkj D C G H
+8 +8 +8 +8
L K O P
mlh çdkj F E J I
+8 +8 +8 +8
N M R Q
25. (d) ftl çdkj $C \xrightarrow{+3} F$, $A \xrightarrow{+3} D$, $D \xrightarrow{+3} G$
mlh çdkj $X \xrightarrow{+3} A$, $Z \xrightarrow{+3} C$, $W \xrightarrow{+3} Z$

26. (a) 27. (d) 28. (b)

29. (a)



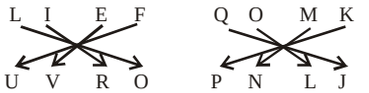
(vxth o.kekyk d foijhr Øe e) (vxth o.kekyk d foijhr Øe e)

30. (b)

31. (a) ftl idkj $90 \times 4 + 5 = 360 + 5 = 365$
mlh idkj $150 \times 4 + 5 = 600 + 5 = 605$

32. (c)

33. (b)



(vxth o.kekyk d foijhr Øe e) (vxth o.kekyk d foijhr Øe e)

34. (b) 35. (a) 36. (d) 37. (c) 38. (a) 39. (b)
40. (c) 41. (c) 42. (a) 43. (c) 44. (b) 45. (a)
46. (a) 47. (c)

48. (b) ftl idkj dykb] gkFk dk ,d Hkkx g] mlh idkj ij] Vkx dk ,d fgLlk gA

49. (b) ftl idkj Jkrk] oDrk dk lurk g] mlh idkj n'kd] fiQYe dk n[kr gA

50. (a) ftl idkj dc dk lc/ dgk l gA
mlh idkj]
le; dk lc/ LFkku l gA

51. (a)

B	S	T	N
−1	−2	+1	+2
A	Q	U	P

blh rjg

D	N	U	C
−1	−2	+1	+2
C	L	V	E

52. (b)

D	F	B
+3	+2	+1
G	H	C

blh rjg

L	N	J
+3	+2	+1
O	P	K

53. (d) ftl idkj Cat, Mew dh vkok"k fudkyrh gA
mlh idkj Duck, Quack dh vkok"k fudkyrh gA

54. (c) $25 - 9 = 16$
blh rjg
$41 - 9 = 32$

55. (b) iVu g%

C	K	O
+3↓	+3↓	−3↓
F	N	L

vkj

F	L	P
+3↓	+3↓	−3↓
I	O	M

mlh idkj]

D	P	Q
+3↓	+3↓	−3↓
G	S	N

56. (d) iVu g&

M	D	T
+3↓	−3↓	+3↓
P	A	W

vkj

R	F	Q
+3↓	−3↓	+3↓
U	C	T

mlh idkj]

L	S	K
+3↓	−3↓	+3↓
O	P	N

1 अध्याय

l[;k i¼fr

vad

nl ldr 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 dk vd dgr g tk fdlh Hkh l[;k dk inf'kr dj ldr gA

ikÑfrd l[;k

; l[;k, g (1, 2, 3 bR;kfn) ftudk mi;kx fxurh d fy, gkrk gA bl *N* }kjk fu:fir fd;k tkrk gA
ikÑfrd l[;k, vuUr g rFkk lcl NkVh ikÑfrd l[;k ,d (1) gA

le l[;k,¡

2 l HkkT; ikÑfrd l[;k, le l[;k, dgykrh gA bl *E* }kjk fu:fir fd;k tkrk gA

$E = 2, 4, 6, 8, ...$

lcl NkVh le l[;k 2 gA lcl cMh le l[;k ugh gkrh gA

fo"ke l[;k,¡

o ikÑfrd l[;k, tk 2 l HkkT; ugh gkrh] fo"ke l[;k, dgykrh gA
bl *O* }kjk fu:fir fd;k tkrk gA

$O = 1, 3, 5, 7, ...$

lcl NkVh fo"ke l[;k 1 gA
lcl cMh fo"ke l[;k ugh gkrh gA

HkkT;rk dk vk/kkj ij nks izdkj dh ikÑfrd l[;k gkrh gA

vHkkT; l[;k rFkk HkkT; l[;k ¼;k l[;¡Dr l[;k½

(a) vHkkT; l[;k% o ikÑfrd l[;k, ftud doy nks gh x.ku[k.M 1 rFkk l[;k Lo; gks] dk vHkkT; l[;k dgr gA
U;wure vHkkT; l[;k 2 gA
2 doy le vHkkT; l[;k Hkh gA

(b) HkkT; l[;k (;k l;Dr l[;k)% ; o ikÑfrd l[;k, g ftldk de l de ,d Hkkt bdkb rFkk l[;k Lo; l fHkUu gkrk gA
iR;d HkkT; l[;k vHkkT; x.ku[k.Mk d x.ku d :i e fy[kh tk ldrh gA
mnkgj.k d fy, % $24 = 2 \times 2 \times 2 \times 3$.
vr% 24 ,d HkkT; l[;k gA
lcl NkVh HkkT; l[;k 4 gA

i.kZ l[;k

'kU; (0) rFkk lHkh ikÑfrd l[;k, feydj i.kZ l[;k fudrh gA bl *W* }kjk fu:fir fd;k tkrk gA
lcl cMh dkbZ i.kZ l[;k ugh gkrh gA
lcl NkVh i.kZ l[;k 'kU; (0) gA

i.kZkad

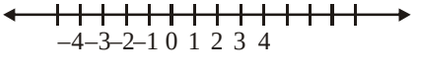
og l[;k fudk; ftle lHkh ikÑfrd l[;k,] mud ½.kkRed rFkk 'kU; fufgr gks i.kZkad dgykrh gA
bl *Z* ;k *I* }kjk fu:fir fd;k tkrk gA
lcl NkVk rFkk lcl cMk i.kZkad dkbZ ugh gkrkA

याद रखें

- 1 u rk vHkkT; g u gh HkkT; gA
- 1 ,d fo"ke l[;k gA
- 0 u rk /ukRed g u gh ½.kkRed gA
- 0 ,d le l[;k gA
- 2 vHkkT; rFkk le nkuk gA
- lHkh vHkkT; l[;k (2 dk NkMdj) fo"ke l[;k, gkrh gA

l[;k j[kk

l[;k j[kk ck;h vkj ½.kkRed vuUr rFkk nk;h vkj /ukRed vuUr d chp ,d ljy j[kk gkrh gA



okLrfod l[;k,¡

o lHkh l[;k, ftudk fu:i.k l[;k j[kk ij fd;k tk ldrk g okLrfod l[;k, dgykrh gA bl *R* }kjk fu:fir fd;k tkrk gA
R^+ /ukRed okLrfod l[;kvksa d lewg; dk fu:fir djrk gA
R^- ½.kkRed okLrfod l[;kvksa d lewg; dk fu:fir djrk gA

okLrfod l[;k, = ifje; l[;k, $ vifje; l[;k,

(a) ifje; l[;k,¡

dkbZ Hkh l[;k tks $\frac{p}{q}$ d :i e fy[kh tk ldrh g] tgk *p* rFkk *q* i.kZkad g ,oa $q \neq 0$] ifje; l[;k dgykrh gA
bl *Q* }kjk fu:fir fd;k tkrk gA
iR;d i.kZkad ,d ifje; l[;k gkrh gA

'kU; (0) Hkh ,d ifje; l[;k gA lcl NksVh rFkk lcl cMh ifje; l[;k dkb ugh gkrhA lHkh fHkUu (n'keyo fHkUu lfgr) ifje; l[;k gkr gA

$$Q=\frac{p\ \text{¼v'k½}}{q\ \text{¼gj½}}$$

याद रखें

- ;fn x rFkk y nk ifje; l[;k gk rk $\frac{x+y}{2}$ Hkh ifje; gksxh rFkk bldk eku nh xb nkuk ifje; l[;kvk x rFkk y d chp gksxkA
- nk ifje; l[;kvk d chp vuUr ifje; l[;k, Kkr dh tk ldrh gA

(b) vifje; l[;k,¡

o l[;k, tk ifje; ugh g ;k tk $\frac{p}{q}$ d :i e ugh j[kh tk ldrh] tgk p rFkk q i.kkd g ,o $q\neq 0$, vifje; l[;k, dgykrh gA

bl Q' ;k Q^c }kjk fu:fir fd;k tkrk gA

$\sqrt{2}, \sqrt{3}, \sqrt{5}, 2+\sqrt{3}, 3-\sqrt{5}, 3\sqrt{3}$ vifje; l[;k, gA

नोट :

- iR;d /ukRed vifje; l[;k d lxr ,d ½.kRed vifje; l[;k gkrh gA
- $\sqrt{2}+\sqrt{3}\neq\sqrt{5}$

  $\sqrt{5}-\sqrt{3}\neq\sqrt{2}$

  $\sqrt{3}\times\sqrt{2}=\sqrt{3\times 2}=\sqrt{6}$

  $\sqrt{6}\div\sqrt{2}=\sqrt{\frac{6}{2}}=\sqrt{3}$
- dHkh-dHkh nk vifje; l[;kvk dk x.kuiQy ,d ifje; l[;k gkrh gA

  mnkgj.k d fy, % $\sqrt{2}\times\sqrt{2}=\sqrt{2\times 2}=2$

  $(2+\sqrt{3})\times(2-\sqrt{3})=(2)^2-(\sqrt{3})^2=4-3=1$
- ifje; rFkk vifje; nkuk l[;k, l[;k j[kk ij inf'kr dh tk ldrh gA

  $$R=Q\cup Q'$$
- iR;d okLrfod l[;k ifje; ;k vifje; nkuk e l ,d vo'; gksxhA

fHkUu

fHkUu og jkf'k gkrh g tk i.kk d ,d v'k dk inf'kr djrh gA

$$\boxed{\text{fHkUu}=\frac{\text{v'k}}{\text{gj}}}$$

fHkUuksa d çdkj

(a) mfpr fHkUu % ;fn v'k gj l de gk] rk fHkUu mfpr fHkUu dgykrk gA

mnkgj.k d fy, % $\frac{2}{5}, \frac{6}{18}$

(b) fo"ke fHkUu % ;fn v'k gj l cMk ;k gj d cjkcj gk rk bl fo"ke fHkUu dgr gA

mnkgj.k d fy, % $\frac{5}{2}, \frac{18}{7}, \frac{13}{13}$

नोट : ;fn fHkUu d v'k rFkk gj cjkcj gk rk fHkUu bdkb vFkkr 1 d cjkcj gkrk gA

(c) fefJr fHkUu % ble ,d i.kkd rFkk mfpr fHkUu fufgr gkrk gA

mnkgj.k d fy, % $1\frac{1}{2}, 3\frac{2}{3}, 7\frac{5}{9}$

नोट : fefJr fHkUu ge'kk vufpr fHkUu e ifjofrr gk ldrk g rFkk Bhd bld foifjr Hkh gk ldrk gA

mnkgj.k d fy, % $7\frac{5}{9}=\frac{7\times 9+5}{9}=\frac{63+5}{9}=\frac{68}{9}$

rFkk $\frac{19}{2}=\frac{9\times 2+1}{2}=9+\frac{1}{2}=9\frac{1}{2}$

(d) rY; fHkUu@ leku fHkUu % leku eku oky fHkUuA

mnkgj.k d fy, % $\frac{2}{3}, \frac{4}{6}, \frac{6}{9}, \frac{8}{12}\left(=\frac{2}{3}\right)$

(e) leku fHkUu % o fHkUu ftud gj leku gkr gA

mnkgj.k d fy, % $\frac{2}{5}, \frac{3}{5}, \frac{9}{5}, \frac{11}{5}$

(f) vleku fHkUu % o fHkUu ftud gj vleku gkr gA

mnkgj.k d fy, % $\frac{2}{5}, \frac{4}{7}, \frac{9}{8}, \frac{9}{2}$

नोट : vleku fHkUu] leku fHkUu e ifjofrr gk ldr gA

mnkgj.k d fy, % $\frac{3}{5}$ rFkk $\frac{4}{7}$

$\frac{3}{5}\times\frac{7}{7}=\frac{21}{35}$ rFkk $\frac{4}{7}\times\frac{5}{5}=\frac{20}{35}$

(g) ljy fHkUu % ftldk v'k rFkk gj i.kkd gkA

mnkgj.k d fy, % $\frac{3}{7}$ rFkk $\frac{2}{5}$

(h) lfeJ fHkUu % ftldk v'k ;k gj ;k nkuk fHkUu l[;k gkA

mnkgj.k d fy, % $\frac{2}{5}, \frac{2\frac{1}{3}}{5\frac{2}{3}}, \frac{2+\frac{1+\frac{2}{7}}{3}}{2}$

(i) n'keyo fHkUu % ftldk gj 10 dk ?kkr gkA

mnkgj.k d fy, % $\frac{2}{10}=0.2, \frac{9}{100}=0.09$

(j) vHkn fHkUu % ftldk gj 10 dk ?kkr u gkA

mnkgj.k d fy, % $\frac{3}{7}, \frac{9}{2}, \frac{5}{193}$

n'keyo dk i.kkfdr djuk ¼lfUudVfdj.k½

n'keyo oky dN fHkUu ,l gkr g ftle n'keyo d ckn vdk dh l[;k cgr vf/d gkrh gA

mnkgj.k d fy,] 3.457891358940789

ijUr vud ckj ge n'keyo d ckn dN [kkl vdk rd dh n'keyo l[;kvk dh vko';drk gkrh gA blfy,] ge n'keyo l[;kvk e l dN vd nkfguh vkj l NkM nr gA ijUr ,lk] djr le; NkMu oky vdk e l lcl ck;k vd ;fn 5 ;k 5 l vf/d gk rk nkfguh vkj l vdk dk NkMu d i'pkr cph n'keyo l[;k d lcl nkfguh vkj d vd e 1 tkMuk iMrk gA NkMu oky vdk e l lcl ck;k vd ;fn 5 l de gk rk nkfguh vkj l vdk dk NkMu ij fdlh Hkh vd e dN Hkh tkMuk ;k ?kVkuk ugh iMrk gA

lfØ;k,¡

okLrfod l[;kvk d fy, ;kx rFkk x.ku dh fuEufyf[kr lfØ;k, ekU; gA

(a) ;kx dk Øefofu;kx x.k %

$$a + b = b + a$$

(b) ;kx dk lkgp; x.k %

$$(a + b) + c = a + (b + c)$$

(c) x.ku dk Øefofu;kx x.k %

$$a \times b = b \times a$$

(d) x.ku dk lkgp; x.k %

$$a \times (b \times c) = (a \times b) \times c$$

(e) ;kx ij x.ku dk forj.k x.k %

$$(a + b) \times c = a \times c + b \times c$$

lfEeJ l[;k,¡

$a + ib$:i dh l[;k] tgk a rFkk b okLrfod l[;k, g ,o $i = \sqrt{-1}$ (dkYifud l[;k) dk lfEeJ l[;k dgr gA bl C }kjk fu:fir fd;k tkrk gA

mnkgj.k d fy, %

$5i$ ($a = 0$ rFkk $b = 5$), $\sqrt{5} + 3i$ ($a = \sqrt{5}$ rFkk $b = 3$)

$i = \sqrt{-1},\ i^2 = -1,\ i^3 = -1,\ i^4 = 1$

foHkkT;rk d fu;e

2 l[foHkkT;rk

;fn fdlh l[;k dk bdkb vd le ;k 0 gk rk] og l[;k 2 l foHkkT; gkrh gA

3 l[foHkkT;rk

;fn fdlh l[;k d lHkh vdk dk ;kx 3 l foHkkT; gk] rk og l[;k 3 l foHkkT; gkrh gA

4 l[foHkkT;rk

;fn fdlh l[;k dk vfUre nk vd 4 l foHkkT; ;k 'kU; gk] rk og l[;k 4 l foHkkT; gkrh gA

5 l[foHkkT;rk

;fn fdlh l[;k dk bdkb vd 5 ;k 0 gk] rk og l[;k 5 l foHkkT; gkrh gA

6 l[foHkkT;rk

;fn dkb l[;k 2 rFkk 3 nkuk l foHkkT; gk] rk og l[;k 6 l foHkkT; gkrh gA

7 l[foHkkT;rk

foHkkT;rk tkp d fy, ge ykx (osculator) (–2) dk mi;kx djr gA

$99995 : 9999 - 2 \times 5 = 9989$

$9989 : 998 - 2 \times 9 = 980$

$980 : 98 - 2 \times 0 = 98$

vc 98, 7 l foHkkT; g] blfy, 99995, 7 l Hkh foHkkT; gA

11 l[foHkkT;rk

;fn fdlh l[;k d le LFkkuk d vdk dk ;kx rFkk fo"ke LFkkuk d vdk dk ;kx dk vUrj ;k rk 0 gk ;k 11 x.kd gk] rk l[;k 11 l foHkkT; gkrh gA

mnkgj.k d fy,] $12342 \div 11$

le LFkkuk oky vdk dk ;kx $= 2 + 4 = 6$

fo"ke LFkkuk oky vdk dk ;kx $= 1 + 3 + 2 = 6$

vUrj $= 6 - 6 = 0$

$\therefore$ 12342, 11 l foHkkT; gA

13 l[foHkkT;rk

ge ykx (+4) dk (osculator) dh rjg mi;kx djr gA

mnkgj.k d fy, $876538 \div 13$

$876538 : 8 \times 4 + 3 = 35$

$5 \times 4 + 3 + 5 = 28$

$8 \times 4 + 2 + 6 = 40$

$0 \times 4 + 4 + 7 = 11$

$1 \times 4 + 1 + 8 = 13$

13, 13 l foHkkT; gA

$\therefore$ 876538 Hkh 13 l foHkkT; gA

17 l[foHkkT;rk

ge (–5) dk (osculator) dh rjg mi;kx djr gA

mnkgj.k d fy,] $294678 : 29467 - 5 \times 8 = 29427$

$29427 : 2942 - 5 \times 7 = 2907$

$2907 : 290 - 5 \times 7 = 255$

$255 : 25 - 5 \times 5 = 0$

$\therefore$ 294678, 17 l i.k :i l foHkkT; gA

19 l[foHkkT;rk

ge (+2) dk (osculator) dh rjg mi;kx djr gA

mnkgj.k d fy,] $149264 : 4 \times 2 + 6 = 14$

$4 \times 2 + 1 + 2 = 11$

$1 \times 2 + 1 + 9 = 12$

$2 \times 2 + 1 + 4 = 9$

$9 \times 2 + 1 = 19$

19, 19 l foHkkT; gA

HkkT; l[;k }kjk foHkkT; rk

;fn dkb l[;k fdlh HkkT; l[;k d lHkh x.ku[k.Mk }kjk foHkkT; gk] rk og l[;k ml HkkT; l[;k l foHkkT; gkrh gA

foHkktu dh dyu fof/k

HkkT; = (Hkktd × HkkxiQy) + 'k"kiQy
tgk] HkkT; = og l[;k g] ftle Hkkx nuk g
Hkktd = og l[;k g] ftld }kjk Hkkx nuk g
HkkxiQy = Hkkx nu ij ikIr lcl cMh l[;k
'k"kiQy = HkkT; dk 'k"k Hkkx tk Hkktd }kjk vkx foHkkT; ugh gkrk

i.k 'k"kQy

i.k 'k"kiQy og 'k"kiQy gkrk g tk mRrjkRrj foHkktu }kjk ikIr gkrk gA

i.k 'k"kiQy = [I Hkktd + II 'k"kiQy] + I 'k"kiQy

$$\text{i.k 'k"kiQy} = d_1 r_2 + r_1$$
$$\text{i.k 'k"kiQy} = d_1 d_2 r_3 + d_1 r_2 + r_1$$

- tc fdlh nk l[;kvk x rFkk y dk D }kjk foHkkftr dju ij 'k"kiQy Øe'k% r_1 rFkk r_2 ikIr gk rFkk nkuk 'k"kiQyk d ;kx dk mlh Hkktd D }kjk iu% foHkkftr dju ij 'k"kiQy r_3 ikIr gk] rk

$$\text{Hkktd } D = r_1 + r_2 - r_3$$

fdlh Hkh HkkT; l[;k N dk fofHkUu foHkktdk ¼;k x.ku[k.Mk½ ¼1 rFkk l[;k Lo;a dk ydj½ dh l[;k ikIr djus dh fofèk%

pj.k 1% N dk vHkkT; l[;kvk d x.ku[k.M d :i e fuEu idkj l 0;Dr dhft,%

$$N = x^a \times y^b \times z^c \ldots\ldots\ldots$$

pj.k 2% dy foHkktdk dh l[;k (1 rFkk l[;k Lo; dk ydj)

$$= (a+1)(b+1)(c+1) \ldots\ldots\ldots$$

'kU;k dh l[;k dh x.kuk

dHkh-dHkh gekj lkeu ,l i'u vkr g ftle ge fdlh l[;k d ---------] d vUr e 'kU;k dh l[;k dh fxurh djuh iMrh gA mnkgj.k d fy, 10! d vUr e 'kU;k dh l[;k

$$10! = 10 \times 9 \times 8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1$$

;gk eyr% ge ikp dh l[;k Kkr djuh iMxh] D;kfd 5 dk fdlh Hkh le l[;k d ikFk x.kk dju ij vUre x.kuiQy d vUr e 0 ikIr gkrk gA 10! e 2 ikp g] blfy, 'kU;k dh dy l[;k 2 gA

☞ *y?kq nf"Vdk.k*

n! d eku d vUr e 'kU;k dh l[;k gkxh

$$\frac{n}{5} + \frac{n}{5^2} + \frac{n}{5^3} + \frac{n}{5^4} + \ldots\ldots$$

bl l[;k dk i.kkd eku 'kU;k dh l[;k gkxhA

उदाहरण **1. 100!** d vUr e 'kU;k dh l[;k Kkr dhft,A

gy: $\frac{100}{5} + \frac{100}{5^2} + \frac{100}{5^3} + \ldots\ldots\ldots$

i.kkd eku gkxk

$= 20 + 4 = 24$ 'kU;

उदाहरण **2. 126!** d vUr e 'kU;k dh l[;k

gy :

$$\frac{126}{5} + \frac{126}{5^2} + \frac{126}{5^3} + \ldots\ldots\ldots$$

$\Rightarrow$ i.kkd eku gkxk

$= 25 + 5 + 1 = 31$ 'kU;

उदाहरण **3. 90!** d vUr e 'kU;k dh l[;k Kkr dhft,

gy:

$$\frac{90}{5} + \frac{90}{5^2} + \frac{90}{5^3} + \ldots\ldots\ldots = 18 + 3 = 21 \text{ 'kU;k}$$

Øexf.kr e fLFkr fdlh l[;k dh ?kkr

N! e vHkkT; l[;k P dh vf/dre ?kkr

$$= \left[\frac{N}{P}\right] + \left[\frac{N}{P^2}\right] + \left[\frac{N}{P^3}\right] + \text{---} + \left[\frac{N}{P^r}\right],$$;gk [x], x l de ;k mld cjkcj vf/dre i.kkd d fu:fir djrk g vkj ,d ikÑfrd l[;k gkrk g rkfd $P^r < n$.

उदाहरण **4. 50!** e 7 dk mPpre ?kkr Kkr dhft,A

gy:

50! e 7 dh mPpre ?kkr

$$= \left[\frac{50}{7}\right] + \left[\frac{50}{7^2}\right] = 7 + 1 = 8$$

a^n dk vUre vad ;k bdkbZ okyk vad Kkr djuk

(i) ;fn a dk vUre vad ;k bdkbZ vad 1, 5 ;k 6 gk rk pkg n dk eku dN Hkh gk a^n dk bdkbZ vad ge'kk Øe'k% 1, 5 ;k 6 gh gkxkA

$(\ldots\ldots 1)^n = (\ldots\ldots 1)$
$(\ldots\ldots 5)^n = (\ldots\ldots 5)$
$(\ldots\ldots 6)^n = (\ldots\ldots 6)$

(ii) ;fn a dk vUre vad ;k bdkbZ vad 2, 3, 5, 7 ;k 8 gk] rk a^n dk vUre vad n d eku ij fuHkj djrk g rFkk y d ink e ngjkr Lo#i dk vuqj.k djrk gA tSk fd uhp fn;k x;k g%

n	(....2)^n dk vUre vad	(....3)^n dk vUre vad	(....7)^n dk vUre vad	(....8)^n dk vUre vad
4x+1	2	3	7	8
4x+2	4	9	9	4
4x+3	8	7	3	2
4x	6	1	1	6

(iii) ;fn a dk vfUre vd ;k bdkb vd 4 ;k 9 gk] rk a^n dk vfUre vd n d eku ij fuHkj djrk g rFkk 2 d ink e ngjkr Lo:i dk vulj.k djrk g tls fd uhp fn;k x;k g %

n	(.....4)^n dk vfUre vd	(.....9)^n dk vfUre vd
$2x$	6	1
$2x+1$	4	9

उदाहरण **5. $963^{63} \times 73^{73}$** dk bdkb vd Kkr dhft,

gy: 963^{63} dk bdkb vd = 7

73^{73} dk bdkb vd = 3

blfy, $963^{63} \times 73^{73}$ dk bdkb vd $= 7 \times 3 = 21$.

i.e. 1.

उदाहरण **6. $17^{17} \times 27^{27} \times 37^{37}$** dk bdkb vd Kkr dhft,A

gy: 17^{17} dk bdkb vd = 7

27^{27} dk bdkb vd = 3

37^{37} dk bdkb vd = 7

blfy, $17^{17} \times 27^{27} \times 37^{37}$ dk bdkb vd $= 7 \times 3 \times 7 = 147$

vFkkr bdkb vd = 7

उदाहरण **7. $18^{18} \times 28^{28} \times 288^{288}$** dk bdkb vd Kkr dhft,A

gy :

18^{18} dk bdkb vd g 4.

28^{28} dk bdkb vd g 6.

288^{288} dk bdkb vd g 6

blfy, $18^{18} \times 28^{28} \times 288^{288}$ dk bdkb vd

$= 4 \times 6 \times 6 = 144$ vFkkr 4

उदाहरण **8. $11^{11} + 12^{12} + 13^{13} + 14^{14} + 15^{15}$** dk bdkb vd Kkr dhft,A

gy :

11^{11} dk bdkb vd = 1

12^{12} dk bdkb vd = 6

13^{13} dk bdkb vd = 3

14^{14} dk bdkb vd = 6

15^{15} dk bdkb vd = 5

blfy, fn, x, ;kx dk bdkb vd gkxk

1 + 6 + 3 + 6 + 5 = 21 vFkkr 1

उदाहरण **9. $21^{21} \times 22^{22} \times 23^{23} \times 24^{24} \times 25^{25}$** dk bdkb vd Kkr dhft,A

gy :

25^{25} dk bdkb vd 5 gkxkA tc 5 e fdlh le l[;k vFkkr 0, 2, 4, 6, 8 l xuk djr g rk bdkb d LFkku ij 'kU; ikIr gkrk gA vr% fn, x, i'u d bdkb d LFkku ij 'kU; gkxkA

'k"kQy ie:;

$\frac{a \times b \times c}{n}$ [vFkkr $a \times b \times c$ e tc n l Hkkx fn;k tkrk g] dk 'k"kiQy $\frac{a_r \times b_r \times c_r}{n}$ [vFkkr $a_r \times b_r \times c_r$ e tc n l Hkkx fn;k tkrk g], d 'k"kiQy d cjkcj gkrk g] tgkA

a_r 'k"kiQy g tc a dk n l Hkkx fn;k tkrk gA

b_r 'k"kiQy g tc b dk n l Hkkx fn;k tkrk g rFkk

c_r 'k"kiQy g tc c dk n l Hkkx fn;k tkrk gA

उदाहरण **10. $15 \times 17 \times 19$** dk 7 l Hkkx nu ij ikIr 'k"kiQy Kkr dhft,A

gy :

0;td $\frac{15 \times 17 \times 19}{7}$ dk 'k"kiQy gkxk $\frac{1 \times 3 \times 5}{7} = \frac{15}{7} = 2\frac{1}{7}$

i.e. 1

15 dk 7 l Hkkx nu ij 'k"kiQy 1 ikIr gkrk gA

17 dk 7 l Hkkx nu ij 'k"kiQy 3 ikIr gkrk gA

19 dk 7 l Hkkx nu ij 'k"kiQy 5 ikIr gkrk gA

l;Dr 'k"kiQy $\frac{15}{7}$ dk 'k"kiQy vFkkr 1 d cjkcj gkxkA

उदाहरण **11.** 0;td $\frac{19 \times 20 \times 21}{9}$ dk 'k"kiQy Kkr dhft,A

gy :

fn, x, 0;td dk 'k"kiQy $= \frac{1 \times 2 \times 3}{9} = \frac{6}{9}$ tk dh 6 d cjkcj gA

cgin ie;

;g 'k"kiQy Kkr dju dk cgr vPNk ie; gA bld vulkj

$(x + a)^n = x^n + {}^nc_1\, x^{n-1} \cdot a^1 + {}^nc_2\, x^{n-2}\, a^2 + {}^nc_3\, x^{n-3}\, a^3 + \ldots\ldots\ldots {}^nc_{n-1}\, x^1 a^{n-1} + a^n \quad \ldots(i)$

$\therefore \quad \frac{(x+a)^n}{x} =$

$\frac{x^n + {}^nc_1\, x^{n-1}\, a^1 + {}^nc_2\, x^{n-2}\, a^2 + \cdots\cdots + {}^nc_{n-1}\, x^1\, a^{n-1} + a^n}{x} \ldots(ii)$

0;td dk 'k"kiQy $\frac{a^n}{x}$ d 'k"kiQy d cjkcj gkxk D;kfd 'k"k ink e fLFkr x, x }kjk ijh rjg foHkkT; gA

उदाहरण **12.** $\frac{9^{99}}{8}$ dk 'k"kiQy Kkr dhft,A

gy :

$\frac{9^{99}}{8} = \frac{(8+1)^{99}}{8}$

cgin ie; d vulkj 'k"kiQy 0;td $\frac{1^{99}}{8}$ d 'k"kiQy d cjkcj gkxk tk dh 1 gA

उदाहरण **13.** $\frac{8^{99}}{7}$ dk 'k"kiQy Kkr dhft,

gy :

$$\frac{8^{99}}{7} \Rightarrow \frac{(7+1)}{7} = \frac{1^{99}}{7} \text{ i.e. } 1$$

उदाहरण **14.** $\frac{11\times13\times17}{6}$ dk 'k"kiQy Kkr dhft,A

gy :

$$\frac{11\times13\times17}{6} = \frac{5\times1\times5}{6}$$

$$\frac{1}{6} \Rightarrow 1$$

उदाहरण **15.** $\frac{9^{100}}{7}$ dk 'k"kiQy Kkr dhft,A

gy :

$$\frac{9^{100}}{7} \Rightarrow \frac{(7+2)^{100}}{7}$$

$$= \frac{2^{100}}{7} = \frac{2^{99}\times2}{7} = \frac{2^{3\times33}\times2}{7} = \frac{8^{33}\times2}{7}$$

$$= \frac{(7+1)^{33}}{7}\times2 = \frac{1\times2}{7} = \frac{2}{7}. \text{ i.e. } 2$$

उदाहरण **16.** $\frac{9^{50}}{7}$ dk 'k"kiQy Kkr dhft,A

gy :

$$\frac{9^{50}}{7} = \frac{(7+2)^{50}}{7} = \frac{2^{50}}{7} = \frac{\left(2^3\right)^{16}\times2^2}{7} = \frac{8^{16}\times4}{7}$$

$$\Rightarrow \frac{(7+1)^{16}\times4}{7} = \frac{1\times4}{7} \text{ vFkkr } 4$$

उदाहरण **17.** $\frac{25^{100}}{7}$ dk 'k"kiQy Kkr dhft,A

gy :

$$\frac{25^{100}}{7} = \frac{(3\times7+4)^{50}}{7} = \frac{4^{50}}{7}$$

$$= \frac{2^{100}}{7} \Rightarrow \frac{\left(2^3\right)^{33}\times2}{7} \Rightarrow \frac{(7+1)^{33}}{7}\times2 \Rightarrow \frac{1\times2}{7}$$

$\Rightarrow$ 'k"kiQy g 2.

उदाहरण **18.** $\frac{3^{50}}{7}$ dk 'k"kiQy Kkr dhft,A

gy :

$$\frac{3^{50}}{7} = \frac{(3^2)^{25}}{7} \Rightarrow \frac{(7+2)^{25}}{7} = \frac{2^{25}}{7} = \frac{(2^3)^8\times2}{7}$$

$$= \frac{(7+1)^8\times2}{7} = \frac{1\times2}{7}$$

$\Rightarrow$ 'k"kiQy g 2.

उदाहरण **19.** $\frac{3^{250}}{7}$ 'k"kiQy Kkr dhft,A

gy :

$$\frac{(3^2)^{125}}{7} = \frac{(7+2)^{125}}{7} = \frac{2^{125}}{7}$$

$$= \frac{(2^3)^{41}\times2^2}{7} = \frac{1\times4}{7}$$

$\Rightarrow$ 'k"kiQy g 4.

dj.kh dk fu;e

- $\left(a^{\frac{1}{n}}\right)^n = a$
- $a^{\frac{1}{n}}b^{\frac{1}{n}} = (ab)^{\frac{1}{n}}$
- $\left(a^{\frac{1}{n}}\right)^{\frac{1}{m}} = a^{\frac{1}{mn}}$

?kkrkad dk fu;e

- $a^m \times a^n = a^{m+n}$
- $a^m \div a^n = a^{m-n}$
- $(a^m)^n = a^{mn}$
- $a^{\frac{1}{m}} = \sqrt[m]{a}$
- $a^{-m} = \frac{1}{a^m}$
- $a^{m/n} = \sqrt[n]{a^m}$
- $a^0 = 1$

dj.kh;k dk ;kx rFkk 0;odyu

mnkgj.k: $5\sqrt{2} + 20\sqrt{2} - 3\sqrt{2} = 22\sqrt{2}$

mnkgj.k: $\sqrt{45} - 3\sqrt{20} + 4\sqrt{5} = 3\sqrt{5} - 6\sqrt{5} + 4\sqrt{5} = \sqrt{5}$

प्रश्नावली

1- nk lrr le l[;kvk dk x.kuiQy 12768 gA bue l cMh l[;k D;k g\
(a) 110 (b) 108
(c) 114 (d) 112

2. ;fn ` 50,176 dh jkf'k dk 320 ;fDr;k d chp cjkcj&cjkcj ckVk tk; rk iR;d 0;fDr dk fdruh jkf'k feyxh\
(a) ` 1,555 (b) ` 1,478
(c) ` 1,460 (d) ` 1,568

3. yxkrkj pkj le l[;k A, B, C vkj D dk ;kx 180 gA vxyh pkj yxkrkj le l[;kvk d leg dk ;kx D;k gkxk\
(a) 214 (b) 212
(c) 196 (d) 204

4. ,d f}vdh; l[;k vkj bl f}vdh; l[;k d nkuk vdk dk ijLij cnyu d ckn ikIr l[;k d chp dk vrj 18 gA bl l[;k d nkuk vdk dk ;kx 12 gA bl f}vdh; l[;k d nkuk vdk dk x.kuiQy D;k g\
(a) 35 (b) 27
(c) 32 (d) Kkr ugh fd;k tk ldrk

5. ,d ckDl e 15 ntu ekecfÙk;k gA ,l 39 ckDl gA lHkh ckDl k e feydj fdruh ekecfÙk;k g\
(a) 7020 (b) 6660
(c) 6552 (d) 3510

6. nk Øekxr l[;kvk dk x.kuiQy 8556 gA bue l NkVh l[;k D;k g\
(a) 89 (b) 94
(c) 90 (d) 92

7. 1500 e NkVh l NkVh dku&lh l[;k tkMh tk, fd ;g i.k ox cu tk,\
(a) 20 (b) 21
(c) 22 (d) 23

8. rhu Øfed i.kkdk dk ;kx 39 gA mu rhuk e l lcl cMk fuEufyf[kr e l dku g?
(a) 12 (b) 15
(c) 13 (d) 14

9. 3 dfl;k vkj 10 Vcyk dh dher ` 9,856 gA 6 dfl;k vkj 20 Vcyk dh dher D;k gkxh\
(a) `17227 (b) `18712
(c) `19172 (d) 19712

10. ;fn fHkUu $\frac{1}{2}, \frac{2}{3}, \frac{5}{9}, \frac{6}{13}$ vkj $\frac{7}{9}$ dk vkjkgh Øe e ltk, tk, rk bue l dku lk fHkUu pkFkk Øe ij gkxk\
(a) $\frac{2}{3}$ (b) $\frac{6}{13}$ (c) $\frac{5}{9}$ (d) $\frac{7}{9}$

11. ;fn bu fHkUuk $\frac{7}{8}, \frac{4}{5}, \frac{8}{14}, \frac{3}{5}$ vkj $\frac{5}{6}$ dk vojkgh Øe e yxk;k tk, rk k[kyk e vfre dku lk gkxk\
(a) $\frac{8}{14}$ (b) $\frac{7}{8}$
(c) $\frac{4}{5}$ (d) $\frac{3}{5}$

12. ;fn ,d l[;k d ox l (12)³ ?kVk;k tk,] rk mÙkj 976 ikIr gkrk g] rk l[;k D;k g\
(a) 58 (b) 56
(c) 54 (d) 52

13. A, B, C, D vkj E Øekxr 5 fo"ke l[;k, gA A vkj C dk ;kx 146 gA E dk eku D;k g\
(a) 75 (b) 81
(c) 71 (d) 79

14. nk Øekxr le l[;kvk d oxk dk ;kx 6500 gA bue l NkVh l[;k dku lh g\
(a) 54 (b) 52
(c) 48 (d) 56

15. vuØe 0, 3, 8, 15, 24, 35, ... dk ukok in Kkr djA
(a) 63 (b) 70
(c) 80 (d) 99

16. vuØe 2, 6, 11, 17, ... dk Nok in Kkr djA
(a) 24 (b) 30
(c) 32 (d) 36

17. 120 vkj 300 d chp e fdruh i.k ox l[;k vkrh gA
(a) 5 (b) 6
(c) 7 (d) 8

18. 3^{21} dk 5 l foHkkftr dju ij 'k"k Kkr djA
(a) 1 (b) 2
(c) 3 (d) 4

19. $(1001)^{2008} + 1002$ e bdkb dk vd gA
(a) 0 (b) 3
(b) 4 (d) 6

20. ;fn $x * y = (x + 3)^2 (y - 1)$ g] rk 5 * 4 dk eku gA
(a) 192 (b) 182
(c) $\sqrt{2}$ (d) 356

21. ;fn $a * b = a^b$, rk 5 * 3 dk eku gA
(a) 125 (b) 243
(c) 53 (d) 15

22. 75070 d fudVre og dku&lh l[;k g tk 65, l HkkT; gA
(a) 75070 (b) 75075
(c) 75010 (d) 75065

23. k[kyk – 1, 6, 25, 62, 123, 214, _____ e vxyk in Kkr djA
(a) 345 (b) 143
(c) 341 (d) 343

24. k[kyk 1, 5, 12, 24, 43 e vxyk in Kkr djA
(a) 51 (b) 62
(c) 71 (d) 78

25. 1 + 3 + 5 + 7 + 9 + 11 + 13 + 15 + ... dk 15oh in rd ;kx Kkr djA
(a) 250 (b) 240
(c) 225 (d) 265

26. ;fn $1^3 + 2^3 + ... + 9^3 = 2025$, rk $(0.11)^3 + (0.22)^3 + ... + (0.99)^3$ dk eku Kkr djA
(a) 0.2695 (b) 0.3695
(c) 2.695 (d) 3.695

27. vuØe $\left(1+\frac{1}{2}\right), \left(1+\frac{1}{2}\right)\left(1+\frac{1}{3}\right), \left(1+\frac{1}{2}\right)\left(1+\frac{1}{3}\right)\left(1+\frac{1}{4}\right), \_\_$ dk vxyk in Kkr djA
(a) 3 (b) $\left(1+\frac{1}{5}\right)$
(c) 5 (d) $\left(1+\frac{1}{2}\right)\left(1+\frac{1}{5}\right)$

28. ,d l[;k e tc 114 l Hkkx fn;k tkrk g] rk 21 'k"k cprk gA ;fn bl l[;k e 19 l Hkkx fn;k tk, rk fdruk 'k"k cpxk\
(a) 1 (b) 2
(c) 7 (d) 17

29. ,d l[;k dk tc 136 l Hkkx fn;k tkrk g] rk 'k"kiQy 36 ikIr gkrk gA ;fn mlh l[;k dk 17 l Hkkx fn;k tk,] rk 'k"kiQy D;k gkxk\
(a) 9 (b) 7
(c) 3 (d) 2

30. nk vdk dh l[;kvk dh iujkofÙk d }kjk ,d pkj vdk dh l[;k cuk;h tkrh g tl 1515] 3737 vkfnA bl rjg dh dkb Hkh l[;k fdlh foHkkftr gkxh\
(a) 7 (b) 11
(c) 13 (d) 101

31. ;fn 'n' dkb ikÑr l[;k g] rk $(n^3 - n)$ dk foHkkftr dju okyh l[;k gkxh\
(a) 3 (b) 6
(c) 12 (d) 18

32. ,d l[;k e tc 49 l Hkkx fn;k tkrk g rk 32 'k"k cprk g] rc mlh l[;k dk 7 l Hkkx nu ij 'k"k D;k cpxk\
(a) 4 (b) 3
(c) 2 (d) 5

33. ;fn 17^{200} dk 18 l foHkkftr fd;k tk; rk 'k"kiQy gkxkA
(a) 1 (b) 2
(c) 16 (d) 17

34. $(124)^{372} + (124)^{373}$ d ;kx e bdkb LFkku dk vd D;k gkxk\
(a) 5 (b) 4
(c) 2 (d) 0

35. fuEu e l dku $5^{71} + 5^{72} + 5^{73}$ dk i.kr% foHkkftr dj nxk\
(a) 150 (b) 160
(c) 155 (d) 30

36. tc 'n' dk 5 l foHkkftr fd;k tkrk g rk 2 'k"k ikIr gkrk g] rc n^2 dk 5 dk foHkkftr fd;k tk, rk 'k"k D;k gkxk\
(a) 2 (b) 3 (c) 1 (d) 4

37. tc 'a' 228 dk foHkkftr djrk g vkj 18 'k"k cprk gA 'a' dk nk vdk dk lcl cMk eku gA
(a) 21 (b) 70
(c) 35 (d) 30

38. ;fn 100 vkj 1000 d chp d fdlh i.kkd d vdk dk ;kx] l[;k l ?kVk;k tk; rk ifj.kke lno gkrk gA
(a) 5 ; HkkT; (b) 6 l HkkT;
(c) 2 l HkkT; (d) 9 l HkkT;

39. fdlh l[;k x dk 289 l foHkkftr dju ij 'k"kiQy 18 ikIr gkrk g tc mlh l[;k dk 17 l foHkkftr fd;k tk; rk 'k"kiQy y ikIr gkrk g rk y dk eku gA
(a) 3 (b) 1
(c) 5 (d) 2

40. ;fn $1^3 + 2^3 + ... + 10^3 = 3025$, rk $2^3 + 4^3 + ... + 20^3$ dk eku D;k gkxk\
(a) 5060 (b) 12100
(c) 24200 (d) 7590

41. 1 fcfy;u ÷ 1000 D;k g\ **(RRB NTPC 2016, Stage-I)**
(a) 1 djkM (b) 1 yk[k
(c) 10 djkM (d) 10 yk[k

42. 0.000825 ÷ 0.05 dk eku D;k g\ **(RRB NTPC 2016, Stage-I)**
(a) 0.0165 (b) 0.165
(c) 0.00165 (d) 0.015

43. nk /ukRed (positive) i.kkdk dk x.kuiQy 375 gA tc ,d l[;k dk nljh l[;k l foHkkftr fd;k tkrk g rk 5/3 cprk gA lcl NkVh l[;k dk irk yxk,A **(RRB NTPCs 2016, Stage-I)**
(a) 15 (b) 25
(c) 20 (d) 12

44. ,d ijh{kk e 25 loky g] iR;d lgh tokc d fy, 4 vd fn; tkr g vkj iR;d xyr tokc d fy, 2 vd dkV fy; tkr gA ;fn lhek u 70 vd ikIr fd; g] rk mld fdru loky lgh g\ **(RRB NTPC 2016, Stage-I)**
(a) 10 (b) 15 (c) 20 (d) 22

45. ;fn ,d l[;k d 2/3 dk 1/4 100 g rk] og l[;k D;k g\ **(RRB NTPC 2016, Stage-I)**
(a) 400 (b) 600
(c) 300 (d) 500

46. lHkh vifje; l[;k, --------- l[;k, gkrh gA **(RRB NTPC 2017, Stage-II)**
(a) dkYifud (b) i.kkd
(c) okLrfod (d) i.k

47. 3 feuV vkj 20 ldM d fy, ,d VyhiQku dk fcy 35-50 :i; gA 5 feuV 30 ldM dh dher (:i; e) D;k g\ (n'keyo d ,d LFkku rd i.kkfdr djA) **(RRB NTPC 2017, Stage-II)**
(a) 58-8 (b) 58-5
(c) 58-7 (d) 58-6

48. nh x;h l[;kvk d fy, fuEu e l dku&lk vkjkgh Øe lgh g\ **(RRB NTPC 2017, Stage-II)**
(a) $\frac{2}{7}, \frac{4}{9}, 0.3$ (b) $0.3, \frac{4}{9}, \frac{2}{7}$
(c) $\frac{4}{9}, 0.3, \frac{2}{7}$ (d) $\frac{2}{7}, 0.3, \frac{4}{9}$

49. $2.\overline{56}$ dk lgh 0;td D;k g (ckj n'keyo dh iujkofRr dk n'kkrk g)\ **(RRB NTPC 2017, Stage-II)**
(a) $2\frac{56}{100}$ (b) $2\frac{56}{1000}$
(c) $2\frac{56}{99}$ (d) $2\frac{560}{90}$

50. nk l[;kvk dk ;kx 16 g vkj mudk x.kuiQy 63 gA mu nkuk l[;kvk d 0;RØe dk ;kx D;k gkxk\
(RRB NTPC-2021, Stage-I)
(a) $\frac{63}{16}$ (b) $\frac{16}{63}$
(c) $\frac{60}{63}$ (d) $\frac{8}{63}$

51. nk l[;kvk dk ;kx 25 g vkj mudh chp dk vrj 15 gA nkuk l[;kvk dk vuikr D;k gkxk\ **(RRB NTPC-2021, Stage-I)**
(a) 5 : 3
(b) 4 : 1
(c) 3 : 2
(d) 2 : 3

52. ,d d{kk e 48 Nk=k gA fdlh ,d fnu Nk=kk dh mifLFkfr mudh dy l[;k dk $\frac{3}{8}$ g_ rk ml fnu vuifLFkr Nk=kk dh l[;k _____ gkxhA **(RRB NTPC-2021, Stage-I)**
(a) 28 (b) 30
(c) 38 (d) 18

53. cMh l[;k dk NkVh l[;k l Hkkx nu ij HkkxiQy d :i e 6 vkj 'k"kiQy d :i e 5 ikIr gkrk gA ;fn nkuk l[;kvk d chp dk vrj 1540 gk] rk NkVh l[;k Kkr djA
(RRB NTPC-2021, Stage-I)
(a) 307 (b) 580
(c) 620 (d) 735

54. nk vdk okyh ,d l[;k dk $\frac{1}{7}$ ok Hkkx] ml l[;k d vkèk l 15 de gA 2 vdk okyh ml l[;k d vdk dk ;kxiQy fdruk gkxk\
(RRB NTPC-2022 Stage-II)
(a) 7 (b) 8
(c) 6 (d) 5

55. $\frac{1}{4}, \frac{2}{3}, \frac{4}{5}, \frac{5}{8}, \frac{3}{4}$ e l lcl cMh vkj lcl NkVh l[;kvk dk x.kuiQy K gA $\left[\frac{1}{K}+4\right]\left[\frac{1}{K}-2\right]$ dk eku Kkr dhft,A
(RRB NTPC-2022 Stage-II)
(a) $\frac{189}{25}$ (b) $\frac{171}{25}$
(c) 27 (d) 7

संकेत ,oa gy

1. (c) fn, x, fodYik l]
$112 \times 114 = 12768$
$\therefore$ cMh l[;k = 114

2. (d) iR;d 0;fDr dk ikIr /ujkf'k
$= ₹ \frac{50176}{32} = 1568$

3. (b) $A + A + 2 + A + 4 + A + 6 = 180$
$4A + 12 = 180$
$A = 42.$
$\therefore$ vxyh 4 oQekxr le l[;k, gA
$50 + 52 + 54 + 56 = 212$

4. (a) ekuk fd l[;k $= 10x + y$ tgk $x > y$
i'uku lkj]
$10x + y - 10y - x = 18$
;k] $9x - 9y = 18$
;k] $x - y = \frac{18}{9} = 2$ ...(i)
,o] $x + y = 12$ ...(ii)
lehdj.k (i) ,o (ii) l
$2x = 14 \Rightarrow x = \frac{14}{2} = 7$
lehdj.k (i) l
$y = 7 - 2 = 5$
$\therefore$ vHkh"V x.kuiQy $= xy = 7 \times 5 = 35$

5. (a) ekecfUk;k dh dy l[;k $= 15 \times 12 \times 39 = 7020$

6. (d) ekuk fd nk Øekxr l[;k, Øe'k% x rFkk $(x+1)$ gA
$\therefore x(x+1) = 8556$
;k] $x^2 + x - 8556 = 0$
;k] $x^2 + 93x - 92x - 8556 = 0$
;k] $(x+93)(x-92) = 0$
$\therefore$ NkVh l[;k $x = 92$

7. (b) $38^2 = 1444$
$39^2 = 1521$
$\therefore$ vHkh"V l[;k $= 1521 - 1500 = 21$

8. (d) ekuk fd rhu Øfed i.kkd l[;k, Øe'k% x, x + 1 vkj $x + 2$ gA
i'uku lkj]
$x + x + 1 + x + 2 = 39$
;k] $3x + 3 = 39$
;k] $3x = 39 - 3 = 36$
;k] $x = \frac{36}{3} = 12$
$\therefore$ vHkh"V lcl cMh l[;k $= x + 2 = 12 + 2 = 14$

9. (d) ekuk fd ,d dlh dh dher = x ,o ,d Vcy dh dher = `y
i'uku lkj]
$3x + 10y =$ `9856
;k] $2 \times (3x + 10y) = 2 \times 9856$
$\therefore 6x + 20y =$ `19712

10. (a) fn, x, fHkUuk dk n'keyo ler Y;:

$\frac{1}{2} = 0.5$; $\frac{2}{3} = 0.67$;

$\frac{5}{9} = 0.56$; $\frac{6}{13} = 0.46$;

$\frac{7}{9} = 0.78$

$\therefore 0.46 < 0.5 < 0.56 < 0.67 < 0.78$

$\frac{6}{13} < \frac{1}{2} < \frac{5}{9} < \frac{2}{3} < \frac{7}{9}$

$\therefore$ vHkh"V fHkUu = $\frac{2}{3}$

11. (a) fHkUuk dk n'keyo ler Y;%

$\frac{7}{8} = 0.875$, $\frac{4}{5} = 0.8$

$\frac{8}{14} = 0.57$, $\frac{3}{5} = 0.6$

$\frac{5}{6} = 0.83$

$\therefore 0.875 > 0.83 > 0.8 > 0.6 > 0.57$

$\therefore \frac{7}{8} > \frac{5}{6} > \frac{4}{5} > \frac{3}{5} > \frac{8}{14}$

12. (d) ekuk l[;k x gA
$\because x^2 - 12^3 = 976$
$\Rightarrow 976 + 1728 = 2704$
$\therefore x = \sqrt{2704} = 52$

13. (d) A + C = 146
;k A + A + 4 = 146
(yxkrkj fo"ke l[;k)
;k $A = \frac{146 - 4}{2} = 71$
$\therefore$ E = A + 8 = 71 + 8 = 79

14. (d) ekuk nkuk l[;k, o"e'k% x vkj $(x + 2)$ gA
rk $x^2 + (x + 2)^2 = 6500$
$\Rightarrow x^2 + x^2 + 4x + 4 = 6500$
$\Rightarrow 2x^2 + 4x - 6496 = 0$
$\Rightarrow x^2 + 2x - 3248 = 0$
$\Rightarrow x^2 + 58x - 56x - 3248 = 0$
$\Rightarrow (x + 58)(x - 56) = 0 \Rightarrow x = 56$

15. (c) $0 + 3 = 3$
$3 + 5 = 8$
$8 + 7 = 15$
$15 + 9 = 24$
$24 + 11 = 35$
$35 + 13 = 48$
$48 + 15 = 63$
$63 + 17 =$ 80

16. (c) $2 + 4 = 6$
$6 + 5 = 11$
$11 + 6 = 17$
$17 + 7 = 24$
$24 + 8 =$ 32

17. (c) $11^2 = 121, 12^2 = 144, 13^2 = 169, 14^2 = 196$
$15^2 = 225, 16^2 = 256, 17^2 = 289$
120 l Åij i.k ox = 11 dk 121
300 l de ox l[;k = 17 dk 289
dy 11, 12, 13, 14, 15, 16, 17, tkfd 7 gA

18. (c) $3^1 = 3; 3^2 = 9; 3^3 = 27; 3^4 = 81; 3^5 = 243$
bdkbo l[;k gj 4 ?kkr d ckn nkgjk jgh gA
21 dk 4 l Hkkx nu ij 'k"k = 1
$\therefore (3)^{21}$ 0;td e bdkbo vd = 3
$\therefore$ 5 l Hkkx nu ij 'k"k = 3

19. (b) $(1001)^{2008} + 1002$ dk vfre vad = 1 + 2 = 3

20. (a) $x \star y = (x + 3)^2 (y - 1)$
$\therefore 5 \star 4 = (5 + 3)^2 (4 - 1)$
$= 64 \times 3 = 192$

21. (a) $a * b = a^b$
$\therefore 5 * 3 = 5^3 = 5 \times 5 \times 5 = 125$

22. (b) 75070 dk 65 l Hkkx nu ij 'k"k = 60
okafNr l[;k = 75070 + (65 - 60) = 75075

23. (c) ifr:i dN bl idkj g
$n^3 - 2$
$7^3 - 2 = 341$

24. (c) ifr:i dN bl idkj g
$1 + 4 = 5$
$5 + 7 (= 4 + 3) = 12$
$12 + 12 (= 7 + 5) = 24$
$24 + 19 (= 12 + 7) = 43$
$43 + 28 (= 19 + 9) =$ 71

25. (c) ;g k[kyk ,d lekUrj J.kh cukrh gA
iFke in (a) = 1
lekUrj (d) = 2
15 in dk ;kx = $\frac{n}{2}(2a + (n-1)d)$
;kx = $\frac{15}{2}(2 \times 1 + (15 - 1)2)$
$= \frac{15}{2} \times 30 = 225$

26. (c)

27. (a) vxyk in gkxk
$\left(1 + \frac{1}{2}\right)\left(1 + \frac{1}{3}\right)\left(1 + \frac{1}{4}\right)\left(1 + \frac{1}{5}\right)$
$= \frac{3}{2} \times \frac{4}{3} \times \frac{5}{4} \times \frac{6}{5} = 3$

28. (b) ;fn igyk Hkkt d nlj Hkkt d dk x.kd g rk nlj Hkkt d l Hkkx nu ij
$\therefore$ 'k"k = 21 ÷ 19 = 2

29. (d) ;fn igyk Hkkt d nlj Hkkt d dk x.kd g rk vif{kr 'k"k = igyh l[;k l Hkkx fn, tku ij ikIr fd, x, 'k"k (36) dk nlj Hkkt d (17) l Hkkx nu ij 'k"k
$\because$ 17, 136 dk Hkkt d gA
$\therefore$ tc 36 dk 17 l Hkkx fn;k x;k 'k"k = 2

30. (d) $xyxy = xy \times 100 + xy$
$= xy(100 + 1) = 101 \times xy$
vr% ;g l[;k 101 l i.kr% foHkkftr gA

31. (b) $n^3 - n = (n^2 - 1)$
$\Rightarrow n(n+1)(n-1)$
For $n = 2, n^3 - n = 6$
$2^3 - 2 = 6$
vFkkr $n^3 - n$, 6 l ge'kk foHkkftr gkxkA

32. (a) ;gk igyk Hkkt d 49 nlj Hkkt d 7 dk x.kd gA
$\therefore$ vif{kr 'k"k = 32 dk 7 l Hkkx fn, tku ij 'k"k = 4

33. (a) $(x-1)^n$ dk $(-1)^n$ l Hkkx nu ij 'k"k
$\therefore (17)^{200} = (18-1)^{200}$
$\therefore$ 'k"k = $(-1)^{200} = 1$

34. (d) $4^1 = 4; 4^2 = 16; 4^3 = 64; 4^4 = 256; 4^5 = 1024$
372 dk 4 nkokjk Hkkx nu ij 'k"k = 0
373 dk 4 nkokjk Hkkx nu ij 'k"k = 1
$\therefore$ okfNr bdkbZ vd
= ;kx dk bdkbZ vd = 6 + 4 = 0

35. (c) $5^{71} + 5^{72} + 5^{73}$
$= 5^{71}(1 + 5 + 5^2) = 5^{70} \times 5 \times 31$
$= 5^{71} \times 155$ tkfd 155 l i.kr% foHkDr gA

36. (d) okfNr 'k"k = 2^2 dk 5 l Hkkx dju ij vk;k 'k"k = 4

37. (b) 228 – 18 = 210 dk foHkkftr dju okyh lcl cMh nk vdk dh l[;k = 70

38. (d) $(100x + 10y + z) - (x + y + z) = 99x + 9y$
$= 9(11x + y)$

39. (b) ;gk igyk Hkkt d (289) nlj Hkkt d (17) dk x.kd gA
okfNr 'k"k = 18 dk 17 l Hkkx fn, tku ij 'k"k = 1

40. (c) $2^3 + 4^3 + 6^3 + ...+ 20^3$
$= 2^3(1^3 + 2^3 + 3^3 + ...+ 10^3)$

$$= 2^3 \times \left(\frac{(n)(n+1)}{2}\right)^2 8 \times \left(\frac{10 \times 11}{2}\right)^2$$

$= 8 \times 3025$
$= 24200$

41. (d) vko';d mÙkj $= \frac{10^9}{1000} = 10^6 = 10$ yk[k

42. (a)

43. (a) i'uku lkj]
ekuk fd NksVh l[;k x vkj cMh l[;k y gA
rk] $xy = 375$

$$\therefore y = \frac{375}{x}$$

vc]

$$\frac{y}{x} = \frac{5}{3}$$ (y dk eku j[ku ij)

$$\frac{375}{x \times x} = \frac{5}{3}$$

$\Rightarrow 5x^2 = 375 \times 3 \Rightarrow x^2 = 225$
$\therefore x = 15$

(lek/ku 32 & 34) i'u d vuqlkj]

P (+)
↑
A (+) ⟺ L (–)
↑
S (+) ⟷ K (–)

44. (c) ekuk fd lgh tokc i'uk dh l[;k = x
xyr tokc i'uk dh l[;k = $(25 - x)$
i'uku lkj]
$4x - 2(25 - x) = 70$
$4x - 50 + 2x = 70$
$6x = 120$
$x = 20$
$\therefore$ dy lgh tokc i'uk dh l[;k = 20

45. (b) ekuk fd l[;k x g rk
$$x \times \frac{2}{3} \times \frac{1}{4} = 100$$
$$\Rightarrow x = \frac{100 \times 4 \times 3}{2} = 600.$$

46. (c) lHkh vifje; l[;k, okLrfod l[;k, gA

47. (d) 3 feuV 20 ld.M = 200 ld.M
$\therefore$ 200 ld.M dk fcty fcy = 35.50
$\therefore$ 5 feuV 30 ld.M dk eY; (5 feuV 30 ld.M = 330 ld.M)

$$= \frac{35.50}{200} \times 330 \Rightarrow 58.575 \approx 58.6.$$

48. (d) $\frac{2}{7} < 0.3 < \frac{4}{9}$

49. (c) $2.\overline{56} = 2 + \frac{56}{99} = 2\frac{56}{99}$

50. (b) ekuk igyh l[;k = x
nljh l[;k = y
x + y = 16 ...(i)
xy = 63 ...(ii)

leh (i) vkj (ii) l

$x = 9, y = 7$

nkuk l[;kvk oQ 0;RØe dk ;kx

$$= \frac{1}{9} + \frac{1}{7}$$

$$= \frac{16}{63}$$

51. (b) ekuk igyh l[;k = x

nljh l[;k = y

$x + y = 25$ (i)

$x - y = 15$ (ii)

leh (i) vkj leh (ii) l

$x = 20, y = 5$

vko';d vuikr $= 20 : 5$

$= 4 : 1$

52. (b) d{kk e dy Nk=k = 48

Nk=kk dh mifLFkfr $= 48 \times \frac{3}{8} = 18$

vuifLFkr Nk=kk dh l[;k

$= 48 - 18 = 30$

53. (a) ekuk igyh l[;k = x

nljh l[;k = y

i'uku lkj

$x - y = 1540$ ...(i)

$x = 6y + 5$

x dk eku lHkh (i) e j[ku ij

$6y + 5 - y = 1540$

$5y + 5 = 1540$

$5y = 1535$

$\boxed{y = 307}$

54. (c) ekuk l[;k x gA

i'uku lkj]

$$\frac{1}{7} \times x = \frac{x}{2} - 15$$

$$\Rightarrow \frac{x}{2} - \frac{x}{7} = 15 \Rightarrow \frac{7x - 2x}{14} = 15$$

$$\Rightarrow 5x = 15 \times 14$$

$$\Rightarrow x = 3 \times 14 = 42$$

vr% ml l[;k d vdk dk ;kxiQy $= 4 + 2 = 6$

55. (c) $\frac{1}{4} = 0.25$ (lcl NkVh)

$\frac{2}{3} = 0.66$

$\frac{4}{5} = 0.80$ (lcl cMh)

$\frac{5}{8} = 0.625$

$\frac{3}{4} = 0.75$

blfy, $K = \frac{1}{4} \times \frac{4}{5} = \frac{1}{5}$

$$\Rightarrow \frac{1}{K} = 5$$

vr% $\left(\frac{1}{K} + 4\right)\left(\frac{1}{K} - 2\right) = (5 + 4)(5 - 2)$

$= 9 \times 3 = 27$