

ipra=krhy dFkkæ/kuu i frfcfcr jk"Vh; , dkRerk

कु. बागवान तायराशगुफ्ता इकबाल
यशवंतराव चव्हाण इन्स्टिट्यूट ऑफ
सायन्स. सातारा.

Lkkj ka k

I | i fjfLFkrhe/; s eW; f'k{k.k gh dkGkph xjt vkgS R; keG s i kFkfed Lrjki kl u
vH; kl Øeke/; s ngk eW; kpk I ekos'k dj.; kr vkyk vkgS R; k ngk eW; kã sdh jk"Vh; , dkRerk gs
eW; jk"Vh; k fodkl kl kBh egRRokps vkgS fo | kF; kãe/; s jk"Vh; , dkRerk #to.kud dj.; kl kBh
døG mi n s kps i kB i g d s ukghr- R; keG s fo". kq kekZ foj fpr ipra=krhy dkgh fuoMd dFkkæ/kuu
i frfcfcr gkS kkh jk"Vh; , dkRerk ; kps foopu i Lr r 'kks'kfucakke/; s d s vkgS
cht 'kGn **key words** -- ipra= jk"Vh; , dkRerk] eW; f'k{k.k

'kks'ki) rh

ipra=kph Hkk"kk gh eG I d'r vkgS i Lr r 'kks'kfucakkl kBh ipra=krhy dkgh dFkkph
fuoM d s vkgS fgnh Hkk"kkar jkP; k vk/kkjs vFkZ ykou] ejkBhe/; s FkkMD; kr dFkkps foopu d s vkgS
vkgS R; kl kBh I d kks'kukP; k foopu i) rhpK LohdKj d#u I k/kk ekM.kh d s vkgS

i Lrkouk

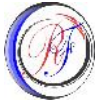
I d'r I kfgR; j Rukdj kpk døG fdukU; ko: up vLokn ?ks kU; kpk vl k xj I et vkgS dhj
I d'r I kfgR; ke/; s døG /kkfed vkf.k 'kækfjd I kfgR; kpkp I ekos'k vkgS i jarq
I d'r I kfgR; j Rukdj /kkfed vkf.k 'kækfjd I kfgR; kcjkscjp uoj I kauh; Ør vusd ekfyd
I kfgR; j Rukauh i fji wkZ vkgS ; k I kfgR; j Rukdj ke/; s dFkkI kfgR; kps nkyu n s [khy foLr r vkf.k
I e) vkgS R; ke/; s ipra=] fgrk s n s k] cgRdFkk] dFkkI fjRI kxj ; kl kj [; k vusd cks'ki j
dFkkI kfgR; kpk I ekos'k vkgS
vktP; k dkGkph xjt Eg.kuu i kFkfed Lrjki kl u vj k d s vkgS; k eW; f'k{k.k.krhy jk"Vh;
, dkRerk ; k eW; kph #to.kud dj.; kP; k fopkj kus ipra=krhy dkgh fuoMd dFkkps foopu
i Lr r 'kks'kfucakke/; s d s vkgS

fo"K; fuoMhpk gsrw

- 1- ipra=krhy dFkkæ/kjk fo | kF; kãe/; s jk"Vh; , dkRerk ; k eW; kph tk s kl uk dj .ks
- 2- døG vf/kdkf/kd xqk feGou n s kjk fo"K; ; k mn-n s kks I d'rph fuoM dj .kkU; k
fo | kF; kãe/; s I d'r I kfgR; kcnfy vkoM fuekZ k dj .ks
- 3- ipra=krhy dFkkæ/kjk gkS kU; k 0; ogkj Kkukpk fofu; ks n s fnu thoukr dj .ks

eW; f'k{k.k dkGkph xj t

ful xkP; k fu; eku d kj vkf.k vk/kfud ; æ I keqthP; k I kgk; kus i kphu dkGki kl u
vkti; ;r i R; d {ks=ke/; s vusd cny gkr vkgr- Nothing is impossible ; k vkRefo'okl kus
ekuokus vMp.khøj ekr djhr vusd {ks=kæ/; s fodkl ?kMfoyk vkf.k ; 'k I a knu d s i jarq ; k
I okæG s euq; kus Hkk'rd I qk tjh feGoys vl ys rjh ekufI d I ek/kku ek= gjoys vkgS



I æ.kdkP; k vkf.k uWuks VDUkly/klttHP; k ; ækr v/; ; u dj .kkU; k vktP; k fo | kF; kps Kku gs dG I æ.kdkiek.ks I kM|Vosj vkf.k gMbsvj I kj [kP e; kTnr vkf.k uWuks VDUkly/klttHi æk.ks I ædfr >kys vks dkj.k vktpk fo | kFkhz KkukFkhz u curk dG ijh{kFkhz cuyk vks iR; æ o"khz feGfoysys Kku rks vki Y; k euke/; s I kM|VosjP; k Lo: ikus Borks vkf.k ijh{kæ/; s isjP; k ek/; ekru gMbsvjP; k Lo: ikus iLræ djhr vl rks vkf.k R; k o"kkz jrs ; 'k I æknu djrks ijarq R; k ekfgrhpk 0; ogkje/; s mi ; ksx dj. ; kl kBh th oþkfjd{kerek yxrs rh {kerek cktkje/; s mi yC/k vl ys/; k xkbM] vi f{kR} I qj] uksVt ; keGs nqobkus yki ikor vks

ijh{kki) rheGs vl æ; fo | kFkhz xqkkRed ; 'k I æknu djr iþM I æ; sus ckgj iMr vkgr- ijarq 0; ogkje/; s fo | kFkhz I q ædkfjr u gsrk dG f'kf{kR >Y; keGs ekuokup 'kks'k ykoyS; k fofo/k iædkjP; k 'kDrh ekuokP; k fo#) tkr vl Y; kus ekuorpk ugkl gsr pkyk vks ikphu dkGh cæp; kUe] xgLFkkJe] okuiLFkkJe vkf.k I æ; kl kJe ; k pkj vkJeke/; s 0; DrhP; k vk; q; kph foHkkx.kh dsysyh gkri- cæp; kUe]e/; s xq xgh jkgu Kku xg.k dsys tkr vl Y; keGs KkukcjkcjP eW; kph #to.k ns[khy vki ksvki p gsr vl s vktP; k dkGkr xq xgkph tkx ol frxgkaih ?kryh vks rl p okuiLFkkJe vkf.k I æ; kl kJekps : ikarj o) kJe vkf.k vukFkkJe ; kæ/; s >kys vks ; k I oZ cnykajkcjP ekuoræ/khy ^ekuo*] Hkkous e/khy ^Hkko*] I q'kf{kR vkf.k I q ædr ; kæ/khy ^I q ; kapk yki gsr vks vkrk i qgk cæp; kUe] vkf.k xq dny i) rhpk voyæ dj .ks v'kD; vks R; keGs u0; k ; ækph vk0gkus isy. ; kl kBh I okæup I q'kf{kR R; kpcjkcj I {ke cufo. ; kph ns[khy xjt vks

vktP; k fo | kF; kbj m | kpk Iekt voyæu vks m | kP; k Iektph bekjr etar dj. ; kl kBh fo | kF; kbj eW; I ædkj gksks vko'; d vks gh dkGkph xjt y{kkr ?kÅu ckyeukoj eW; f'k{k.kkpk Jhx.kskk fxjoyk tok ; k gms vxnh ikFked Lrjki kl u eW; kf/kf"Br f'k{k.kkpk i j æk >kyk vks R; k vrxr fofo/k mi Øe jkcoys tkrk- R; ki æh , d mi Øe Eg.kts ckskdFkk gks -

eW; f'k{k.kkrxr ngk eW; s

egkj k"VæP; k f'k{k.k fo"k; d dk; Øeke/; s T; k ngk eW; kapk i keq; kus I ekos'k vks rh i qhyi æk.k&

- 1. Jei fr"Bk] 2- jk"VHkDrh] 3- L=h&i# "k I ekurk] 4- I oZkeZ fg".kqk] 5- jk"Vh; , dkRerk] 6- oKkfud nf"Vdku] 7- I ænu'khyrk] 8- I kStU; 'khyrk] 9-oDr'khji .kk] 10- uhVuS/dsi .kk- iLræ 'kks'kfucakke/; s jk"Vh; , dkRerk ; k eW; kpk fopkj dsyk vks

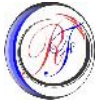
dk; kRed 0; k[; k

/ke] oæk] Hkk"kk] Pkyhjhrh] vkgkjfoggj] dyk] I ædrh] ØhMK] I .k&mRI o] Hkkskfyd i fjfLFkrh ; krhy oxGsi .kk vl ugh Hkkjrcnnyph vfLerk] vknj vkf.k Hkkofud , dI ækrpk dfr'khy /kxk ; kru jk"Vh; , dkRerk 0; Dr gksræ VæW; kps f'k{k.k f'k{kdkd kBh gLri(Lrdk] egkj k"Væ jkT; 'ks'kf.kd I ækks'ku o i f'k{k.k i fj"kn] i q ks 411030%

iLræ 'kks'kfucakke/; s jk"Vh; , dkRerk ; k eW; kph tksi kl uk dj. ; kl kBh mi ; Ør Bj.kkU; k ipra=krhy dkgh dFkk fuoMY; k vkgr- ijarq rRiwhz ipra=kpk ifjp; d: u nsks xjt ps vks

ipra= ys[kukpk bfrgkl

ipra=kpk drkz fo".kqkekZ b-l - iæz 1 Y; k 'krdr gksÅu xyk vl kok- efgykjkd; ukokP; k uxjke/; s vej'kDrh ukokpk jktk jkT; djhr gsrk- R; kyk cgq kDrh] mXkz kDrh]



vuar'kDrh vl s rhu eyxs gksrs rs fr?ks fo|ki jk³ed[k vkf.k 0; ogkj Kku'kM; vl s eu[kz gksrs Hkfo"; dkGkr jkT; kph fpRkk vl yS; k jktkus l oZ i fMarkauk vki Y; k eykauk fonoku dj.; kfo" k; hps vkOgku dsys l okauh fo".kq kekZps uko l pfoys jktkus fo".kq kekZyk ckykouu l kfxryj ^tj rw ek0; k eykauk 0; ogkjprj dsys rj eh rnyk vusd ns kX; kauh vyaNr djsu-^{*}R; koj fo".kq kekZ Egk.kkyk]^ ns kX; kd kBh eh fo|pk fo0; dj.kkj ukgh- i.k r0; k eykauk ek=vo?; k l gk efgU; krp 'kgk.ks djsu-^{*} fo".kq kekZus R; k eu[kz eykauk 'kgk.ks dj.; kl kBh doG jVKG minskaps /kMs fnys ukghr rj cskdFkph i) r voycyh vkf.k R; knup ipra=kph jpk l kdkjyh-

vkt ns[khy eW; f'k{k.kkrhy eW; kph #to.kpl ckyi.kki kl u dj; ph vl sy rj fo".kq kekZ kj [; k xq ph vkf.k R; kauh voyfcyS; k dFkanokjk f'k{k.kkph xjt vkgs foLrkjHk; kLro doG jk"Vh; , dkRerk ; k , dkp eW; kpk fopkj ; fks dsyk vkgs

ipra= foLrkj

i qhy ikp ra=kpk Eg.ktp Hkxkpk l ekosk vl Y; kus ipra= vl s ukedj.k vkgs , d eU; dFkk vkf.k R; k dFkP; k vuUkxkus vusd midFkk v'kk l oZ feGuu 87 dFkpk l ekosk ipra=ke/; s vkgs

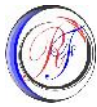
- 1- fe=Hkn& fi³xyd ukokpk fl g vkf.k l athod ukokpk cSy ; k nku fe=kæ/; s vki yk grw l k/; dj.; kl kBh , dk /kiz dks^o; kus QM i kMY; kph dFkk vkyh vkgs
- 2- fe=l ä klrh& fp=xto gal] fgj.; d manhj] y?kq rud dkoGk] fp=kæ gjh.k vkf.k eFkj dkl o ; kP; k eS=hph dFkk vkyh vkgs
- 3- dkdksydh; e& dkoGk vkf.k ?kM ; kP; k ojkph dFkk vkyh vkgs
- 4- yC/ki z kk'ke& okuj vkf.k exj ; kP; k eS=hph dFkk vkgs
- 5- vijhf{krdkjde- & ck^o.k L=h vkf.k eP; kph vfopkjpkp i fj.kke n'kfo.kkjH dFkk vkgs

ipra=krhy dFkk vkf.k eW; f'k{k.kkrhy jk"Vh; , dkRerk

foLrkjHk; kLro ipra=krhy dkgh fuoMd dFkpk fopkj ; kfBdk.kh dsyk vkgs

l athod vkf.k fi³xyd dFkk& ¼ ipra=e-ra= 1] fe=Hkn%A] iLrkouk dFkk ½

efgykjkd; ukokP; k uxjhe/; s jgk.kkU; k o/kæku ukokP; k , dk 0; ki kU; kus fopkj dsyk dh] nd U; k insk ke/; s tkoj vf/kd d"V d: u vf/kd l ä Rrh feGokoh- CkSyxkMhe/; s l oZ l keku Hk: u rks iokl kyk fu?kkyk vl rkuk ; epk unhP; k rhjkoj R; kP; k l athod ukokP; k CkSykpk ik; eij xkGY; keGs rks rFkp [kkyh cl rks nku l oDkauk R; kP; k jk[k.khyk Bowu 0; ki kjh iqs iokl kyk fu?krks ?kunkV txykrhy 'okinkP; k Hkhrhiksh rs jk[k.kknkj cSykyk rFkp l kMiu fu?kuu tkrkr o l athodkyk 'okinkaus [kkYys vl s [kkv/p l kærkr- dkgh dkGkuarj l athodkyk cjs okVw ykxrs txykrhy fgjokxkj pkjk [kkÅu rks l 'kDr gksrks , ds fno'kh fi³yd ukokpk fl g rFkuu tkr vl rkuk l athodkP; k ekB; k vkoktkus rks ?kckjrks vkf.k vki Y; ki s[kk dks khrjh cyoku i.k.kh vkyk vkgs ; k xj l etkeGs 0; kdG gksrks R; kph 0; kdGrk nij dj.; kl kBh vkf.k Lor%ps fgr l k/; dj.; kl kBh , d ykMxk R; k ik.; kpk 'kks'k ?ks; kps v'okl u nsÅu fl gkyk /khj nrks l athodkyk HkViu fl gkP; k eS=hpk iLrko Børks l athod ns[khy fi xydk}kjs vHk; nku vl Y; keGs iLrko ekU; djrks l athod vkf.k fi³xyd Hk{; Hk{k d l æ/k fol : u vkuankus , d= jgkr vl rkr- l athodkP; k rRroKkukP; k minskkus fi³ydkph fgL=ORrh ns[khy u"V gsr tkr R; kpk i fj.kke Eg.kts brj ik.; koj mi kl ekjhph oG vky; kus /kiz ykMxk nkskkæ/; s QM i kMriks vkf.k R; kr l athodkpk var gksrks



gh ifgY; k ræ=ke/khy eq; dFkk jk"Vh; , dkRerP; k n"Vhus eksykp k l n's k n's vki Yks fgr l k/; dj. kks ykMX; kl kj [ks vud l ekt dā/d l ektke/; s QM i kM. ; kps dke djr vl rkr- vkf.k fi 3yd fl gkl kj [kh gyD; k dkukph ek.kl s ; k l ekt dā/dkps , sduu jk"Vh; , dkRerph ?kMh foLdVuu Vkdrkr- R; keGs v'kk l ekt dā/dkP; k cksy. ; kdMs ngyZk d: u jk"Vh; , dkRekrk fVdow Bō. ; kl kBh l rr iz Ru'khy jgkos vl k cks'k ; k dFksuu feGrks vki Y; k vktoktuyk vl .kkū; k /krZ fgr'k=uk vkG[kuu oGhp R; kauk nij djkos ykxrs ukghrj gdukd l oLk'k vkskorks gs l athodkP; k dFko: u y{kk ?; k; yk gos

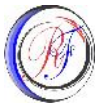
fpe.kh vkf.k gRrh dFkk& ¼ i pra=e- 1-16 fe=Hkn&pVd dqtj dFkkA½

, d gRrh , dk fpe.khps ?kjVs m/oLr djrks frph vMh QM/Y; keGs rh foyki d: ykxrs R; keGs l rki {kh frP; k toG ; Au foyki kps dkj.k fopjrk l rki {; kph , d e/kek'kh e=h.k vl rj vkf.k frpk , d cMud fe= vl rks gs l ozt.k feGuu gRRkpk uk'k dj. ; kps Bjorkr- e/kek'kh vki Y; k e/kij vkoktkus gRrhk cskn djrs frps xhr , d. ; ke/; s exu vl yš; k gRrhus MkGs feVrk{k.kh l rki {kh R; kps MkGs QkMuu Vkdrks v'k >kysy 0; kdG gRrh i.k. ; kP; k 'kks'kl kBh l gHk >ky; koj cMdkauh vki Y; k vkoktkus ekB; k [kMM; kyk ryko vl Y; kpk Hkl fuekZ k dš; kus gRrh R; ke/; s i Mrks vkf.k R; kpk eR; w gkrks

; k dFkrhy gRrh iek.ks 'k=w fdrhgh cyk<; vl ykrjh l ol tkrh/kekph ek.kl s tj , d= vkyh rj R; kpk uk; ukV d: 'kdrkr- , dhP; k cGke/; s [kii ekBs l keF; Z vl rs vkf.k rs jk"Vh; , dkRer d kBh egRRokps Bjrs cyk<; 'k=oj ekr dj. kkl kBh , dhP; k cGkps l keF; Z l kx. kkū; k fi i hfydk Hkqt 3xe& dFkk ¼ i pra= 3-5½ rl p 'kDrhi {kk ; Prh JSB vl Y; kpk cks'k ns kkū; k 'k'kd&xt; Fki &dFkk ¼ i pra= 3-2½ vkY; k vkgr-

dkoGk] manhj] dkl o vkf.k gjh.k dFkk& ¼ i pra=e-2 fe=l ā kflr%A½

y?kij rud ukokpk , d dkoGk , dk oVo{kkoy jgkr vl rks , d ikj/kh tkGs vFk: u i {kkauk Ql fo. ; kl kBh /kkū; kps d.k tkG; koj Vkdhr vl rks R; kpk nqV cr y?kij rud brj i {kkauk l kxrk vkf.k nk. ; kP; k eksgkus ikj/; kP; k di Vkyk cGh i Mw udk v'kh prko.kh R; kauk n'sks l ol i {kh R; kus l kfxrY; ki ek.ks R; k nk. ; kdMs ngyZk djrkr- ijarq fp=xho ukokpk dairj ek= y?kij udkps , d r ukgh rks vki Y; k brj l gdkū; kauk ns[khy tkG; kr vMdorks ijarq l ozt.k fp=xhoP; k l kx. ; ko: u , dtw/hus ikj/kh ; s; ki whp tkG; kl g vkdk'ke/; s >si ?krkr- gk l ol izdkj y?kij rud ykciu igkr vl rks vkrk ; k l ol dairjkps dk; gkskkj gs i kg. ; kl kBh rks ns[khy R; kP; k ekxs tkrks rs l ozt.k tkG; kl g fp=xhokpk fe= fgj. ; d ukokP; k manjkdMs tkrkr- fgj. ; d vki Y; k l gdkū; kauk enrhyk ?krks vkf.k tkGs djrMuu l okph ePrk djrks rs l ozt.k vkuanhr gkrkr vkf.k vki Y; k ?kjV; kdMs i jrrkr- y?kij rudkyk ns[khy fgj. ; dkckcj vkiyh e=h vl koh vl s okVrs rl k rks iLrkogh ekMrks ijarq Hk{; vkf.k Hk{kdkph e=h fo'okl kl vik= d'kh vl rs gs fofok izdkjP; k mnkgj. kkus i Vouu ns ; kpk iz Ru djrks ijarq y?kij rud ns[khy fofok n"VkarP; k l gk. ; kus R; kpk fo'okl 'koVh l ā knu djrkp vkf.k R; kph ?kfu"V e=h gkrks dkyarjkus nqdkG i M.kkj vl Y; kus LFkyarj dj.kkj vl Y; kus y?kij rud fgj. ; dkdMs fujki ?ks; kl kBh ; rks rōgk fgj. ; d ns[khy R; kP; kckcj tk. ; kph bPNk 0; Dr djrks nkskgh eFkd ukokP; k y?kij rudkP; k fe=kdMs Eg.kts dkl okdMs tkrkr- fr?kgh fe= txyke/; s fQjr vl rkuk R; kph HkV ikj/; kP; k gkruu ful Vuu vkys; k , dk gjh.kk'kh gkrks vkf.k pkskgh pkaxys fe= gkrkr- , d fnol gjh.k [kii oG >kyk rjh R; kP; k HkV/hP; k fBdk.kh vkys ul Y; keGs R; kP; k 'kks'kfkZ l ozt.k fu?krkr- rōgk rs ikj/; kP; k tkG; kr l ki Mysys fnl rs i gk , dnk manhj R; kph ePrk djr vl rkukp ikj/kh rFks ; rks dkoGk] gjh.k] manhj gs piG vl Y; kus rs fuLkVrkr ijarq eFkd dkl o ek= tkG; kr vkMdrks R; kph ePrk dj. ; kl kBh l ozt.k , d ; kstuk vk[krkr- gjh.k rykokP; k dMyk eš; kps ukVd djrkj dkoGk R; kP; k MkD; koj cl uu ekd [kr vl Y; kpk Hkl fuekZ k djrks vkf.k R; keGs gjh.k eš; kph [kk=h R; k



i kj/; kph gkrs rks gjh.kkyk vk.k.; kl kBh dkl oki kl u cktwyk gksrk{k.khp dkl o rykokr i Guu tkrks vkf.k gjh.k vkf.k dkoGk ns[khy rFkuu i l kj gksrk-

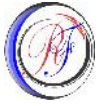
gh dFkk jk"Vh; , dkRerP; k n"Vhus cjþ dkgh f'kdouu tkrks ifgyh xksV Eg.kts dkoGk] dkl o] manhj vkf.k gjh.k gs , dkp tkrhps ul rkuk ns[khy R; kph brdh ?kVV eš-h vkgS dh] ijLij kP; k j{k.kkl kBh i d æh rs Lor%ps i k.k ns[khy viZk dj.; kph r; kjh n'kforrk- esyS; k tukojkoj dkoGs cl u R; kps eka [kk.ks ; k ful xZ fu; ekpk okij d: u gjh.k vkf.k dkl okps i k.k okpork- R; k pkSkkP; k eš-he/; s fo'okl gk l okar egRRokpk vkgS l a'khp xš Qk; nk dkoG; kyk ?krk vkyk vl rk vkf.k gjh.kkP; k eka kpk vlLokn ?krk vkyk vl rk- ijarq R; kus LokFkkškk ijekFkZ l k/kyk vkgS vkf.k rks manj kP; k fo'okl kyk ns[khy ik= Bjyk vkgS ; k dFki æk.ks i R; sdukus ijLijkoj fo'okl Boyk rj jk"Vh; , dkRerk fVdu jgk.; kl enr gkby- dkoGk vkf.k ?kM dFkk&¼i pra=e-4- 1 dkdksydh; &dkdksydoš dFkkA½

x: M gk i {kkpk jktk ijarq rks fo". kkkDr vl Y; keGs i {kkadMs R; kps y{k ukgh vl k fopkj d: u l oZ i {kh R; kP; k , oth ?kMkyk jktk dj.; kpk fopkj djrkr- R; kyk , dVl dkoGk fojksk djrks vkf.k brjkauk ns[khy rks ; k fopkjki kl u ijkoRr djrks rŋgki kl u ?kM vkf.k dkoG; kae/; s 'k=fo vl rs R; keGs njjst ?kM dkoG; kauk ekjhr vl s R; keGs dkoG; kpk jktk fparr vl rks R; koj mik; Eg.kuu , d dkoGk iLrko ekMrks dh] eh ?kMkP; k i {kkr i osk djrks R; kps eeZ tk.kuu ?krks vkf.k ; kX; oG ; srkp , dtw/hus R; kP; koj gYyk d: ; k- gk iLrko l oZkU; gkrs , d fnol brj dkoG; kauh t [keh dš; kps o gkdyu l kuu ?kMkpk fgrfpar d vl Y; kpk fo'okl fueZk djrks fo'okl ul sy rj eyk vki Y; k ?kjV; kr u ?krk ?kjV; ktoG jgk.; kph ijokuxh rjh | k v'kh ; kpuK djrks vkf.k ijokuxh l a'knu djrks ?kMkP; k ?kjV; ktoG njjst okGyS; k dkVD; k ?kjV; kl kBh vk.kuu Vkdirs vkf.k <hx l kBorks vkf.k , ds fno'kh ?kMkauk fnol k fnl r ukgh ; k l a'khp Qk; nk ?ksÅu vki Y; k fe=ka g i šyS; k dkM; k ?ksÅu ; srks o rks dkVD; kpk <hx i švouu Vkdirs v'kki zdks 'k=ii {kkpk pk.kk{ki .ks ; Ørhus [kkrek d: u Vkdirs

jk"Vh; , dkRersyk ck/kd vl .kkU; k ng'krok | kP; k vuod l a'kVuk dk; j r vkgS- 'k= w fdrhgh izG vl yk rjh 'kDrh vkf.k ; Ørhpk okij d: u ekr djrk ; srs vl k cksk ; k dFksru feGrks ?kMkauk fnol k fnl r ukgh ; k eeLFkGkpk okij R; kP; k uk'kkl kBh dkoG; kauh dš; ki æk.ks ng'kroknh l a'kVukokps[khy uk'k d: u jk"Vh; , dkRerk of) xr djrk ; by- cMnd vkf.k l iz dFkk&¼i pra=e-4-1 yC/ki z kk'k&x³xnRr &fiz; n'ku; k% dFkkA½

vki Y; kp cka'kokā kl u =kl yS; k x³xnRr ukokpk cMnd cka'kokokp cnyk ?ks ; kP; k bPNus fofgjhp; k jgkVxkMX; koj p<uu oj ; srks cnyk dl k ?; k; pk ; k fopkjkr vl rkukp R; kph n"Vh , dk fckGkr tk.kkU; k d".kl ikbj i Mrs cnyk ?ks ; kP; k fopkjkyk d'rhr mrjfo.; kP; k gsmus rks d".kl ikP; k fckGktoG tkÅu eš-hpk iLrko ekMrks vXuh vkf.k xorki æk.ks Hk{k vkf.k Hk{kcd ; kph eš-h gkr ukgh vl s d".kl iz l etkor vl rkuk ns[khy 'fouk'kdys foi fjr cf) %A* >kysyk x³xnRr dkgh , d.; kP; k eufLFkrhe/; s ul rks myV rks Eg.krkš ^rw ek=: k fofgjhr ek=: k di kjhe/; s jgk; yk ; s vkf.k njjst eh nk[koyS; k cMdkauk [kk ek=: k dVqch; kauk ek= [kkÅ udkl -* l iz ns[khy Lor%ps ok/kD; y{kkr ?ksÅu iLrko ekU; djrks vkf.k cMdkP; k di kjhe/; s jkgw ykxrs , dkekxu , d v'kk l oZ cMdkauk rks QLR djrko f'kok; x³xnRrkP; k dVqch; kauk ns[khy QLR djrks l oZ cMnd l a'Y; koj rks x³xnRrktoG vk.k[kh cMdkaph ekx.kh djrks x³xnRr R; kyk nq Ū; k fofgjhr cMnd vk.k.; kps v'okl u nsÅu R; k fofgjhr ckgj i MY; koj l dVqch fu'okl Vkdirs

Lor%pk tho eBhr ?ksÅu ckgj i MyS; k x³xnRr cMdkph dFkk esykpk l ns'k nrs Locka'kokpk uk'k dj.; l kBh ijD; k 'k=ph enr ?ksryh vl rk Lor%ojp l dV vk<kors jk"Vh; , dkRer d kBh ns[khy vki Y; k jk"V'cka'kokoj fo'okl egRokpk vl rks dkgh dkj.kkeGs ijLij kae/; s



erHkn gkr vl ys rjh R; kpk uk'k dj.; kl kBh 'k=q {kkph enr ?ksryh vl rk Lor%pk ns[khy uk'k gkrks

fu"d"kz

v'kki zdkjs jk"Vh; , dkRerk of) ær dj.; kl kBh vkf.k jk"Vh; , dkReræ/; s ; s kkU; k vMp.khøj ekr dj.; kl kBh i pra=ke/; s vusd cks'k dFkk vkY; k vkgr- jk"Vh; , dkRerP; k dōG : {k mi ns kki s'kk dFkkP; k ek/; ekru eW; kph #to.k vf/kd ifj.kke dkjd gkbŷy vl k fo'okl okVrks ^, dhps cG feGrs OG* gk l ans'k ns kkU; k ; k v'kk dFkk ckyeukoj fuf'prp , dhps ekgrE; fcæfo.; kl kBh mi ; Ør Bjrrk- R; kpcjkcj vki Y; kp cka'kokP; k uk'kl kBh dsysy mi k; vki Y; kl kBhgh frrdkp ?kkrd B: 'kdrks gs ns[khy fo|kF; kŷuk l eto.; kl kBh ; k dFkk mi ; Ør vkgr- ckyo; kr >kyŷ; k ; k , D; kP; k dFkk l ddkjkeGs gs m|kps Hkkj rh; ukxfjd , dhpk ea=y{kkR Bōrhy vkf.k Hkkoh thoukr gh egys ns'kfgrkP; k] l ek'fgrkP; k n"Vhus uDdhp 0; ogkj prij curhy v'kh vk'kk ckGxŷ k-

I nHkzFk

- 1- Jh' ; kekpj.ki k. Ms ŷ0; k[; kdkj ¼ ^Jh fo".kq kekŷ z khra i (EprU=e²) ekrhyky cukj l h nkl] okjk.kl h] 1975]f}rh; l ddkj.k-
- 2- v: .k nRrk=s l kdjh dj ¼ i karj.kdkj ¼ ^i pra= ¼i | : i ½] ok³e; l ok i zdk'ku] ukf'kdj kM] 2003] i FkekoRrh-
- 3- eW; kps f'k{k.k f'k{kdkal kBh gLri fLrdk] egkj k"V² jkT; 'kq{kf.kd l d kks'ku o i f'k{k.k i fj"kn] i q ks 411030-
- 4- tks kh egknō 'kkL=h] ^Hkkj rh; l d d'rhdks k*] [kM 5-