MINIMUM REQUIREMENTS

FOR

DIPLOMA IN HYDROPWER ENGINEERING

PROGRAMME

Council for Technical Education and Vocational Training

Polytechnic Division

Sanothimi, Bhaktapur

NEPAL

2076

k|Fljlws lzIff tyf Jofj;flos tfnLd kl/ifb\ lgodfjnL 2051 sf] lgod 17, 18, 19 / 24 df Joj:yf eP cg";f/ l*Knf]df Og xfO{*f]kfj/ O{lGhlgol/é sfo{qmd ;+rfng ug]{ ;+:yfx?n] k'/f ug"{kg]{ k'jf{wf/x?M

1= cfj]bgM

1=1 :jLs[ltsf] u¢§c §ôú³Ñô §Ñ½Ñ¢ ö§š Ü¢Ñ¤u³ ʃa³a· j¢½é¢a· õ¢š¢p eg"{ kg]{% . pQm kmf/d kl/ifb\ sfof{noaf^ tf]lsPsf] b:t"/ afktsf] /sda· ¢µ¾a œ¹éš a"emfP kl% k|fKt ug{ ;lsg]%.

1=2 :jLs[lt lng vf]h]sf] ;+:yf;+u ;DjlGwt lj:t[t k|:tfjgf (Proposal) / cfjZos sfuhftx? ;+nUg x"g" kg]{% . k|:tfjgfdf lgDg a"+bfx?sf] lj:t[t ljj/)f pNn]v ePsf] x"g"kg]{% .

- k|:tfljt ;+:yfsf] gfd .
- &]ufgf -;+:yf vf]Ng] k|b]z÷lhNnf÷g=kf=÷ufp+ kflnsf/j*f g+=, kmf]g g+=, O{d]n, j]a;fO{^_ .
- ;Dks{ JolQmsf] gfd, &]ufgf, kmf]g g+=, O{d]n .
- sfo{qmd k|:tfljt ul/Psf] sfo{s|dsf] gfd / (f+rf .
- p@]Zo .
- ;+:yfs]f kl/ro .
- sfo{qmdsf] cfjZostf klxrfg ;DaGwL tYof° .
- cfjZostf cWoog ul/Psf] tflnsf ;do / tYox? .
- nlIft ;d'x .
- k|:tfljt efjL dfgjLo hgzlQmsf] /]vfs+g .
- egf{ Ifdtf ;DaGwdf .
- sfo{qmddf egf{ x"gsf] nflu Go'gtd cfwf/x? .
- sfo{s|dsf] ;do cjlw .
- kf&\os|d ;DaGwL hfgsf/L .
- k|lzIfsx?sf] Joj:yf .
- k|:tfljt tfnLd sfo{s|dsf] nflu cfjZos kg]{ ef}lts k'jf{wf/x? .
- z}lIfs ;fdfu|L, k|of]uzfnf ;fdfu|L / k|of]uzfnfsf] Joj:yf jf/] .
- cfly{s k|:tfjgf .
- k":tsfnosf] Joj:yf .
- %fqfjf;sf] Joj:yf .
- ;+rfns ;ldltsf] Joj:yf .
- ;+:yfksx?s]f gfdfjnL .
- ;+:yfsf] sd{rf/L ;+u&g tflnsf .
- sfo{qmd ;+:yf ;+rfng ug]{ JolQmx?sf] gful/stf k|df)f kqsf]] k|ltlnlk .
- k|:tfljt sfo{qmd ;+:yf JolQmn] ;+rfng ug]{ jf ;+:yfn] ;+rfng ug]{

v"nfpg" kg]{ .

2= ;+:yf :jLs[lt lb+bf ;+:yf ;DaGwg z"Ns afkt kl/ifb\n] tf]s] cg";f/sf] z"Ns kl/ifb\sf] a}+s vftfdf hDdf ug"{ kg]{ % .

3= ljBfyL{ egf{ ;DjGwL zt{ / k|lqmof (Criteria / Procedure)

3=1 CTEVT ;+u ;DjGwg k|fKt ug]{ ;+:yfx?n] CTEVT åf/f lgwf{l/t u/]sf] zt{ / k|lqmofx? ckgfpg" kg]{% .

3=2 ;a} k/LIffyL{x? -cfj]bsx?_ k|j]z k/LIffdf ;lDdnt x"g" kg]{ % . cfj]bssf] Go'gtd z}lIfs of]Uotf tf]lsP cg";f/ x"g]% .

3=3 k|j]z k/LIffdf ;lDdlnt x"g] dWo]x?jf^ of]Uotfqmdfg";f/ egf{ ug"{ kg]{% .

3=4 CTEVT n] lgwf{/)f u/]sf] eGbf leGb} ;d'x cflbsf] nflu sf]^f /fVg kfOg] %}g .

3=5 %fqj[lQ sf]^f tyf egf{ ;DaGwL cGo k|lqmof k|f=lz= tyf Jof=tf= kl/ifb\, kl/Iff lgoGq)f sfof{nosf] egf{ lgb]{lzsf cg";f/ ug"{kg]{% .

4= kf&\oqmd

4=1 ;DaGwg lng rfxg] ;+:yfn] CTEVT sf] kf&\oqmd dxfzfvfaf^ kfl/t u/]sf] kf&\oqmd nfu" ug"{ kg]{% .

4=2 s"g} klg sfo{qmdsf] gfd ;dfg zAbx? /flv kl/jt{g ug{ kfOg] %}g .

5= cfly{s kIfM

6=1 ;DaGwg k|fKt ug{ rfxg] z}lIfs ;+:yf cfly{s ?kdf ;jn x"g" kg]{% .

6= ejg tyf k'jf{wf/x?

sfo{s|d ;+rfng ubf{ Ps ;d'xdf j(Ldf 48 hgf k|lzIffyL{x? /fvL ;}$flGts sIff ;+rfng ug"{ kg]{% . oxf+ pNn]lvt k'jf{wf/x?sf] ;'rL Ps ;d'x -48 hgf k|lzIffyL{_ sf] nflu cfjZos kg]{% .

6=1 ejg — **M** sIffsf]&f, clkm;, Nofj, k|of]uzfnf / k":tsfno nufot ;a} ;"ljwfsf nflu ;"/lIft, e'sDk k|lt/f]ws ejg x"g" kg]{% . ax'tn] -w]/} tNnf ePsf]_ ejg ePdf yk sfo{qmdsf] nflu hUUff yk gePklg ;~rfng ug{ ;lsg] % .

6=2 sIff sf]&f — **M** k|lt ljBfyL{ 0=75 ju{ ld^/sf] b/n] 3 jif]{ sfo{qmdsf] nflu -k|yd, låtLo / t[tLo jif{_ 3 j^f sIff sf]&f x"g" kg]{% . sIff sf]&fdf k|lzIfs / ljBfyL{sf] nflu cfjZos ^]jn, *]S; tyf s"rL{sf] Joj:yf x"g" kg]{% .

6=3 k|of]uzfnf÷js{;k — **M** ;fdfGo lj!fgsf] nflu cfjZos k|of]uzfnfx? Physics, Chemistry, Computer, Drawing, Welding and Metal, Electrical Workshop Pp^f eGbf a(L sfo{qmd ;+rfng ePdf ;a} sfo{qmdsf] nflu ;+o"Qm x"g]% . Od]n OG^/g]^sf] ;"ljwf ljBfyL{x?sf] ;xh kx+"r x"g] u/L Joj:yfkg ug"{ kg]{% . t/ ;+:yfn] Py]i^ k|of]u u/fpg] ul/ pkof]u ug"{ kg]{% / ;Dk')f{ ljBfyL{x?nfO{ k|of]ufTds cEof; u/fpg] ;"lglZrt ;do tfnLsf x"g" kg]{% . cGoyf yk k|of]uzfnf÷js{;k x"g" kg]{% . Chemistry Lab df cfjZos Tap, Sink/Basin ;lxt Water Supply sf] Joj:yf x"g" kg]{% .

6=4 ljifout k|of]uzfnf M kf&\oqmdn] tf]s] cg";f/sf] %"^\^f %"^\^} ljifout k|of]uzfnfx? x"g" kg]{% . k|of]uzfnfsf] If]qkmn k|lt ljBfyL{ sDtLdf 1 ju{ ld^/ pknAw x"g" kg]{% . o; sfo{qmdsf nflu k|of]uzfnfsf] Go"gtd If]qkmn tfnLsf g+= 1 df pNn]v eP adf]lhd x"g"kg]{% .

6=5 k":tsfno sIf M sfo{qmdsf] nflu sDtLdf 40 ju{ ld^/ If]qkmnsf] k":tsfno sIf x"g" kg]{% . Pp^f eGbf a(L sfo{qmd ;~rfng x"g] ePdf yk sfo{qmdsf] nflu 15 ju{ ld^/ yk If]qkmn x"g" kg]{% . k":tsfnodf kf&\oqmddf pNn]v eP adf]lhdsf k|To]s ljifosf] nflu ljBfyL{ ;+Vofsf] slDtdf 50 k|ltzt kf&\ok":ts x"g" kg]{% .

6=6 k|lzIfs sIf M k|lzIfsx?sf] nflu cWoog / k|lzIf)f tof/Lsf] nflu k|lt k|lzIfs sDtLdf 2=0 ju{ ld^/ If]qkmn pknJw x"g] sfo{ sIfx? x"g" kg]{% .

6=7 k|frfo{ sIf M ;+:yfdf k|frfo{sf] nflu %"^\^}} sfo{ sIfsf] Joj:yf x"g" kg]{% .

6=8 k|zf;g sIf M ;+:yfdf n]vf/k|zf;g sIf %"§} x"g" kg]{% .

6=9 ;f]wk"% sIf M ljBfyL{, cleefjs / cGo ;/f]sf/jfnfx?nfO{ ;]jf lbg %"§} ;f]wk"% sIf x"g" kg]{% .

6=10 zf}rfno M k|lzIfs, sd{rf/L / k|lzIffyL{sf] nflu dlxnf / k'?if %"§f %"§} x"g] u/L 1M20 sf b/n] zf}rfnosf] Joj:yf x"g" kg]{% .

6=11 vfg]kfgL M vfg]kfgLsf] nflu Water Filter/ Euro Guard or Equivalent Water Purifier sf] Joj:yf x"g" kg]{% jf z"$ lkpg] kfgLsf] Joj:yf x"g" kg]{% .

6=12 rd]gf u[x M ;+:yfdf sDtLdf 20 hgfn] vfg;Sg] &fp+ (Dining Room) ePsf] rd]gfu[x x"g" kg]{% . -20 ld^/sf] j/Lk/L ePsf] rd]gf u[xsf] ;Demf}tf u/L k|of]u ug{ ;lsG% ._

6=13 v]ns"b ;DaGwL M elnjn, af:s]^jn, Jof*ld)^g / ^]an^]lg; dWo] sDtLdf Pp^f Outdoor jf Indoor sf]^{sf] Joj:yf x"g" kg]{% .

6=14 k|fylds pkrf/ sIf M ;+:yfdf Ifl)fs tyf cfktsfnLg :jf:Yo ;]jfsf nflu rflxg] cf}ifwLx?sf] Joj:yf x"g" kg]{% ;fy} dlxnf %fqfx?sf] nflu dlxgfjf/Lsf] ;dodf ;]lg^/L Kof*sf] Joj:yf x"g" kg]{% .

6=15 O{G^/g]^ tyf jfO{kmfO{ Pl/of M ljBfyL{ tyf cfuGt"sx?sf] nflu ;'rgf k|bfg ug]{ u/L Go"gtd txsf] O{G^/g]^ tyf jfO{kmfO{ Pl/ofsf] Joj:yf x"g" kg]{% .

6=16 j]j;fO{^ M ;+:yfsf] cflwsf/Ls ;'rgf tyf hfgsf/L k|bfg ug]{ u/L bf]xf]/f] ;Dafb ug{ ;lsg] txsf] j]j;fO{^ Joj:yf x"g" kg]{% .

6=17 sfo{qmd ;DaGwgsf] nflu cfzokq (Letter of Intent) k|fKt u/]sf ;+:yfx?n] k|yd / låtLo jif{sf] nflu cfjZos ejg tyf cGo k'jf{wf/x? tof/ ug"{ kg]{% .

7= <u>sIff sf]&fx?M</u>

;}$flGts sIff sf]&f tyf k|of]ufTds sfo{zfnfsf] Joj:yf ubf{ qmdzM 48 hgf tyf 24 hgfsf] nflu b]xfo cg";f/sf] Joj:yf x"g" kg]{ . k|yd jif{sf] nflu dfq pknAw kf&\oqmd cg";f/ .

tfnLsf g+= 1

qm=;=	ljj/)f	ljBfyL{ Ifdtf - hgf_	sf]&fsf] Go'gtd If]qkmn - j=dL=_	s}lkmot
1=	;}$flGts sIff sf]&f	48 hgf	36=00	
2=	ef}lts zf:q k|of]uzfnf	24 hgf	24=00	
3=	/;fog zf:q k|of]uzfnf	24 hgf	24=00	
4=	sDKo'^/ Nofj	24 hgf	24=00	
5=	On]lS^«sn tyf On]S^«f]lgS; Nofj	24 hgf	24=00	

gf]^M dfly pNn]lvt sf]&fx?sf] If]qkmndf pks/)fx?sf] nflu cfjZos kg]{ :^F]/sf] If]qkmn ;dfj]z %}g .

8= k|lzIfs sd{rf/Lsf] Joj:yf M z}lIfs sfo{qmdnfO{ :t/o"Qm agfpg ;+:yfnfO{ cfjZos kg]{ k|frfo{ / k|lzIfs sd{rf/Lsf] Joj:yf b]xfo cg"?k x"g"kg]{% .

- ;+:yfsf] nflu cfjZos k|frfo{x?, k|lzIfsx? / ljefluo k|d"vx? k')F{sflng ;]jf (Full time) sfnflu x"g"kg]{ . -Ps eGbf a(L sfo{qmd % eg] ._
- hDdf sIff -;}$flGts tyf k|of]ufTds_ #)^Fsf] Go'gtd krf; k|ltzt sIff k')f{sflng ;]jfsf lzIfsx?åf/f g} ;+rfng ug"{kg]{% .
- Pp^f sfo{qmd ;+rfngsf] nflu cfjZos k')f{sflng tyf cf+lzs lzIfsx?sf] egf{ ;DjlGw ;Dk')F{ sfo{ of]hgf k]z ug"{kg]{ .
- cGo s"g} ;+:yfdf sfo{/t JolQmnfO{ k')f{sflng lzIfs tyf sd{rf/Lsf] ?kdf sfddf /fVg kfOg] %}g .
- ;+:yfdf Faculty / Staff Category Pattern b]xfo jdf]lhd x"g kg]{% . ;fy} of]Uotf / ;+Vof kf&\oqmdf pNn]v eP adf]lhd x"g" kg]{% .

  Principal

  Heads of Department

  Teaching Faculty

  Lab Technician

9= k|To]s ;]d]i^/df cWofkg x"g] lbgx?M

k|To]s ;]di^/df sIDtdf 15 xKtfsf] sIff -sDtLdf 90 cWofkg lbg_ x"g" kg]{% h:df cltl/Qm lqmofsnfk / k/LIff ;do ;dfj]z x"g]%}g .

9=1 Ps lbgdf 7 lkl/o*sf] sIff ;~rfng ug"{ kg]{ / k|To]s lkl/o* 50 ldg]^sf] x"g" kg]{% .

9=2 ljBfyL{ tyf lzIfs cg"kft b]xfo cg";f/ x"g"kg]{M

- ;}$flGts sIff 48M1
- ^\o'/f]^l/on 24M1

- *«O{é 24M2
- k|of]ufTds -k|of]uzfnf, sfo{zfnf, (Field Work) sIff 12M1
- k|f]h]S^ sfo{ 6M1

10= k|zf;g tkm{M

k|zf;lgs sd{rf/L tkm{ n]vf tyf k|zf;g ;xfos, sDKo'^/ ck/]^/, nfOa|]l/og, sfof{no ;xof]uL / ;"/Iff uf*{x?sf] Joj:yf x"g"kg]{% .

11= ef}lts ;'ljwfx?sf] Joj:yf¿

11=1 ljBfyL{x?sf] cg"kftdf ;a}nfO{ a:g k"Ug] u/L s";L{, a]Gr, *]:ssf] Joj:yf x"g"kg]{% . *«O{é sIffdf *«O{é ^]jn, :^"nsf] Joj:yf x"g"kg]{% .

11=2 sfo{zfnfsf] nflu cfjZos kg]{ k|of]uzfnf ^]a"n, s";L{, ¥ofs, b/fhx?sf] Joj:yf x"g"kg]{% .

11=3 lzIfs tyf sd{rf/Lx?sf]nflu cfjZos ^]a"n, s";L{, ¥ofs, b/fhx?sf] Joj:yf x"g"kg]{% .

12= sDKo'^/ g]^jls{é M

12=1 ljBfnosf sIff sf]&fdf, k|frfo{ tyf lzIfs sIf, n]vf tyf k|zf;g ;d]t If]qdf Go"gtd dfkb)* cg";f/sf] sDKo'^/ g]^js{ u/]sf] x"g" kg]{% .

12=2 h*fg ul/Psf] g]^js{df Go'gtd ;"/Iff / uf]klgotfsf cfwf/x?sf] Joj:yf x"g" kg]{% .

12=3 ;"/Iff tyf df]lg^l/ésf] nflu xftf leq l;l; l^le h*fg tyf ;~rfng Joj:yf x"g" kg]{% .

13= sfof{no ;fdfg M

lzIf)f tyf cGo sfof{no k|of]hgsf] nflu lgDg lnlvt pks/)fx?sf] pko"Qm Joj:yf x"g"kg]{ .

Desktop Computer System

Laser Printer

Multimedia Projector

Photocopy Machine

Biometric Attendance System

Networking System (Router, Switch, Cables)

CCTV camera and Monitoring System

15= z}lIfs ;fdfu|Lx? tyf pks/)fx? (Tools and Equipments) sf] Joj:yf

TOOLS/EQUIPMENT LIST FOR PHYSICS
(Mechanics)

S. N.	Tools/Equipment Name	Quantity (Nos.)
1.	Vernier Calipers 6"	12
2.	Vernier Calipers for Demonstration 12"	1
3.	Micrometer Screw Gauge	12
4.	Spherometer	12
5.	Steel Ball 3mm Dia.	20pc
6.	Steel Ball 2mm Dia.	20pc
7.	Brass Spheres with Hook Dia. 13mm 20mm	5
8.	Lead Spheres with Hook Dia. 10-20 mm,13mm, 20mm	5
9.	Stop Watch	5
10.	Meter Scale (1m long wooden)	10
11.	Thread (for simple pendulum)	1roll
12.	Watch Glass (60,80,100 mm Dia)	6 pc
13.	Friction Board & incline Plane	4
14.	Friction Kit	2
15.	Slotted Iron Weights & Hanger (0.5 Kg each)	1 set
16.	Slotted Iron Weights & Hanger (100 gram each)	1 set
17.	Standard Weight Box Fractional (1mg -500 grams)	1 box
18.	Traveling Microscope	3
19.	Beakers Set (500,250,100 ml)	6
20.	Corks Borer Set (Set 5-19 mm Dia range)	1
21.	Corks (Dia 6 Bottom 10 mm Top, 10/13, 13/16)	1 set
22.	Capillary Tube (0.5 -0.75 mm & Dia)	2 each
23.	Digital Balance	2
24.	Sinker	2
25.	Measuring Cylinder	4
26.	Spcific Gravity Bottle (50 cc)	5
27.	Aneroid Barometer	2
28.	Tunning Fork (set)	2
29.	Rubber Pad	3
30.	Resonance Apparatus	3
31.	Cubes for Density Investigation	2 sets
32.	Retort Stand (315x 200mm & Rod)	8
33.	Large Triple Box for the above	8
34.	Clamp	8
35.	Apparatus Clamp (Set)	8
36.	Mercury	as needed

(Heat)

S. N.	Tools/Equipment Name	Quantity
1.	Thermometers (1/10,-10 to 110 Deg C)	15
2.	Thermometers (1/20,-10 to 50 Deg C)	10
3.	Maximum Minimum Thermometer	2
4.	Hypsometer	5
5.	Calorimeter (Cooper, 75 X 50mm)	8
6.	Outer Vessel for Calorimeter, Stirrer & Lid Set (for Cooper Calorimeter of sie 75 X 50 mm	8
7.	Calorimeter (Almunium)	5
8.	Steam Boiler	5
9.	Hygrometer	2
10.	Hygrometer (Wet Dry Bulb)	2
11.	Hot Plate	2
12.	Test Tubes (All size 72 sets)	2
13.	Boiling Test Tubes	2
14.	Test Tube Holder	10
15.	Test Tube Stand	5
16.	Filter Paper (Size 90 & 150, box of 200)	5
17.	Wax Parrafin (kg)	1
18.	Refrigerator (Ice Cube Maker)	1

(Optics)

S. N.	Tools/Equipment Name	Quantity
1.	Plane Mirror Glass Mounted	10
2.	Cylindrical Concave Mirror Glass	8
3.	Cylindrical Concave Mirror Stainless Steel	8
4.	Concave Mirror	10
5.	Lens Double Convex	10
6.	Plano Convex Lens	10
7.	Lens Holder	5
8.	Prism	6
9.	Glass Cube	3
10.	White Screen	2
11.	Compact light Source	3
12.	Ray Optics Box	8
13.	Optical Bench 1.5 Meters	3
14.	Light Meter	1
15.	Lycopodium powder	2 pack
16.	Adjustable (in height) pin (for expt in concave mirror	

(Magnetism)

S. N.	Tools/Equipment Name	Quantity
1.	Rectangular Section Magnets	6
2.	Horse Shoe Magnet	2
3.	Magenetizing and Demagnetizing Coil	1
4.	Vibration Magnetometer Box	2
5.	Deflection Magnetometer	3
6.	Magnetic Needle	10
7.	Plotting Compass	6
8.	Dip Circle with Needle	2

Current/Electricity

S. N.	Tools/Equipment Name	Quantity
1.	Ammeter HA, MA	3
2.	Voltmeter	3
3.	Galvanometer	2
4.	Potentiometer	4
5.	Lamp Low Voltage Lamp (LED)	8
6.	Contractor & Relay	8
7.	Plug Switch	5
8.	Connecting Wires (each)	20
9.	Crocodile clip	20
10.	Rheostat	5
11.	Resistance Coil	2
12.	Low DC Voltage Power Supply	5
13.	Battery Charger	2
14.	Inductor & Capacitor	1
15.	Different types of wire	1

(Equipment list for Chemistry)

S. N.	Tools/Equipment Name	Quantity
1.	Beaker 100 ml, 250 ml, 500 ml Set	48
2.	Glass Funnel 25mm, 75 mm, 95 mm Set	48
3.	Porcelain Basin 75 mm Dia.	48
4.	Tripod Stand Triangular (155 X 120 mm)	48
5.	Wire Gauge 140 X 140 mm	100
6.	Water Bath (12 holes) 420 mm	2
7.	Fuel Stand (Wood 450 mm)	48
8.	Test Tube Stand Plastic 250 mm	24
9.	Test Tubes 20 ml	500
10.	Hot Box Oven Size 1 (0- 500 Deg C)	2
11.	Glass rod 4 mm Dia	10 kg
12.	Test Tube 10 ml	500
13.	Conical, Round Flask 250 ml	30
14.	Glass Retort 250 ml	50
15.	Watch Glass 70 mm Dia	50
16.	Burner (gas) 130 mm	25
17.	Water Trough 230 mm Dia	25
18.	Iron Stand with Clamp 600 mm	25
19.	Pipette 10 ml	20
20.	Pipette 20 ml	50
21.	Burette 50 ml	50
22.	Volumetric Flask 250 ml	25
23.	Volumetric Flask 100 ml	105
24.	Volumetric Flask 500 ml	7
25.	Volumetric Flask 1000 ml	4
26.	Weighing Table with cap 10 ml	25
27.	Measuring Cylinder 10 ml	50
28.	Measuring Cylinder 20 ml	30
29.	Measuring Cylinder 100 ml	10
30.	Measuring Cylinder 500 ml	5
31.	Measuring Cylinder 1000 ml	5
32.	Measuring Cylinder 5000 ml	2
33.	Eudiometer Tube 50 ml	50
34.	Watch Glass 20 mm Dia	50
35.	Reagent Bottle (glass) 250 ml	100
36.	Reagent Bottle (glass) 500 ml	50
37.	Reagent Bottle (glass) 1000 ml	50
38.	Small Reagent Bottle (Plastic) 100 ml	100
39.	Dessicator 200 mm Dia	2
40.	Graduated Pipette 10 ml	25
41.	Barometer (General Lab)	1
42.	Kipp's Apparatus (Borosil)	1
43.	Distillation Unit	1
44.	Digital Balance (range 0.001 gm) Max 2	2
45.	Digital Balance (range 0.0001 gm) Max 1	2

S. N.	Tools/Equipment Name	Quantity
46.	Gas Cylinder (L.P.G. for Practical) 14	5
47.	Gas Regulator 300 mm w/c	5
48.	Gas Pipe 10 mm (meters)	3
49.	Plastic Wash Bottles	48
50.	Nicklechromed Tounge	48
51.	Small Traingular File	48
52.	Woulf's Bottle	24
53.	Thermometer 100 Deg. C	10
54.	Wire gauge	25
55.	Cork Borers different sizes	6
56.	Gas jars	24
57.	Thermometer 300 Deg. C	2
58.	Washing Brush 240 mm	25
59.	Circular Filter Paper 110 mm Dia	50
60.	Asbestoes Sheet 150 X 150 mm	25
61.	Stainles Sheet Spatula 145 mm	25
62.	Glass Tube 7 mm Dia	50
63.	Thistle funnel (for gas pre) set	25
64.	Short stem funnel (for eg. wt) set	25
65.	Glass tubes, 5mm, 6mm, 8 mm Dia	50 each
66.	Rubber Groves	24 pcs
67.	Test tube holder	50 pcs
68.	Lead a cetate	500gms
69.	Tall Jar	8 pcd
70.	Cork pressing instruments	1 set

(Plumbing Workshop – I)

S. N.	Tools/Equipment Name	Quantity
1.	Hand Grinding Machine	1
2.	Bend drilling Machine	1
3.	Electric drill Portable	1
4.	Vernier Calipers	6
5.	Combination Square set	6
6.	Outside Calipers	6
7.	Flat Square	6
8.	Steel measuring tape	6
9.	Wire and sheet gauge	4
10.	Wing Divider	6
11.	Divider	6
12.	Plumbers Plumb line	6
13.	Portable folding pipe vice	1
14.	Chain pipe vice	6
15.	Hack saw frame with blade	12
16.	Tradesman ladder	1
17.	First Aid Kit	3
18.	Fire Extinguisher ABC type 2.5 kg	3
19.	Fire bucket	3
20.	Pipe cutter	3
21.	Adjustable basin wrench	3
22.	Spanner set	4
23.	Pipe Reamer	4
24.	Tap Resealing Tools	6
25.	Rawlplug Tool set	4
26.	Twist Drill set	4
27.	River Punch	6
28.	Hollow punch	6
29.	Taps and Dies set	2
30.	Pipe yarning and caulking tools	2
31.	Link pipe cutter (chain cutter)	3
32.	Flexible steel drain cleaner	2
33.	Clamp joint runner set	3
34.	Ladle	4
35.	Melting Pot	4
36.	Compass saw	4
37.	Tenon saw	4
38.	Rip saw	4
39.	Pipe clamp (soldering vice)	3
40.	Painter's Brush	10
41.	Meter saw	4
42.	Hot plate (electric)	4
43.	Teflon	12

S. N.	Tools/Equipment Name	Quantity
44.	Thermochrome	1 doze
45.	Flat file	6
46.	Round file	6
47.	Half round file	6
48.	Rasp file	6
49.	Meter box	2
50.	Thermo chalk	2
51.	Teflon toner	6
52.	Hammer cross pin	6
53.	Hammer Ball pin	6
54.	Hammer Ball	6

(Electrical Workshop)

S. N.	Tools/Equipment Name	Quantity
1.	Hammer	24
2.	Gimlet	24
3.	Hand Drill	24
4.	Portable Electrical Drill	12
5.	Pedestal Drill	1
6.	Bench Drill Press	1
7.	Combination Pliers	24
8.	Steel Rule	24
9.	Line Tester	24
10.	Side Nose Pliers	24
11.	Flat Nose Pliers	24
12.	Round Nose Pliers	24
13.	Cable Knife	24
14.	Wire Stripper	24
15.	Voltmeter	6
16.	Ammeter	6
17.	Analog Multimeter	6
18.	Wattmeter	6
19.	Kilowatt Hour Meter	6
20.	Copper Cable Shoe (4mm2)	100
21.	Copper Cable Shoe (6mm2)	100
22.	Copper Cable Shoe (10mm2)	100
23.	Tool Box	18
24.	Junior Box	18
25.	Junior Hacksaw	24
26.	Earth Resistance Tester	4
27.	Clamp on Ammeter	6
28.	Rewirable Fuse Box Set	36

S. N.	Tools/Equipment Name	Quantity
29.	HRC Fuse Box Set	36
30.	10 Amp Single Pole MCB	24
31.	25 A MCCB 25 KA.	24
32.	IHP 3 phase Induction motor	2 set
33.	Fractional Horse power 1 phase induction motor	1 set
34.	PVC Listic	100 pcs.
35.	Holder	50 pcs.
36.	a) One gang switch	30 pcs
	b) Two gang switch	30 pcs
	c) Two way switch	12 pcs
40.	Power socket	30 pcs
41.	Dol/ Starter	6 pcs

(Bricklaying workshop-I)

S. N.	Tools/Equipment Name	Quantity (Nos)
1.	Pick axe (681gm)	12
2.	Brick axe	12
3.	Shovel	12
4.	Chisel	12
5.	Float (Wooden, metal)	12
6.	Hammer (Ball pein,230gm)	12
7.	Trowel	24
8.	Line & Pins	as required
9.	Try square	12
10.	Steel rule	12
11.	Folding rule	12
12.	Plumb bob and line	24 set
13.	Straight edge (wooden)	6
14.	Sprit level (30 cm)	12
15.	Wheel barrow	6
16.	Ladder	2
17.	Letter & Name punches	2 Set
18.	Building materials (Stone, brick, sand, cement, aggregate, etc.)	as required
19.	Brick Cutter	6

1. Manufacturing Workshop

S.N.	Equipment Name	Quantity (No)
1.	Light duty spot welding machine	1 portable type
2.	Bench grinder (Rpm 1420)	1
3.	Radial drilling Machine	1
4.	Pillar type drilling machine	1
5.	Riveting	1
6.	Binding Machine	1

(Welding Workshop)

S. N.	Tools/Equipment Name	Quantity
1.	**Arc Welding set**	4 set
	Suitable for repair and maintenance work	
	Variable amperage control	
	Output current range: Approx 40 -180 A	
	Supplied with electrode earth leads	
	Supplied with following accessories	
	Welders heavy duty split leather gauntlets large size	
	Welders scratch brush made from brased steel wire	
	Welders hammer with hardened and tempered head with steel spring impact resistant handle	
	Injection moulded polypropylene flip action welding helmet made to BS679 (or equivalent)	
	Electrodes: 5 each of following diameters: 1.6 mm, 2.0 mm, 2.5mm, 3.2 mm, 4.0 mm;	
	Supplied with operation and service manuals;	
	Supply voltage: 220 V, 50 HZ.	
2.	**Gas welding and cutting set**	4 set
	Acetylene gas cylinder: Capicity approx. 40 litre filling pressure 1.5 Kpa test pressure 6 mpa, clearly mark "acetylene"	
	Oxygen gas cylinder: capacity 40 litre, nominal filling pressure 1.5 mpa. Test pressure 22.5 kpa, clearly marked "oxygen" Blackish colour	
	Complete with:	
	Welding cutting torch set - high pressure injector type for welding 0.5 to 30 mm thick mild steel and cutting thickness up to 100mm spark lighter;	
	Welding cutting torch set - high pressure injector type for welding 0.5 to 30 mm thick mild steel and cutting thickness up to 100mm spark lighter;	
	Gas welding goggles;	
	5 finger gauntlet glove;	
	With operation and service manuals	

(Bar Bending)

S. N.	Tools/Equipment Name	Quantity (Nos.)
1.	Hack saw frame with blade	24
2.	Hammer Claw (5kg)	12
3.	Crow bar	12

Computer Laboratory

S. N.	Description (Detailed Technical Specification)	Quantity
1.	Compatible Personal Computer with E-mail/Internet Facilities	**24 set**

Tools and Apparatus required for the practical of following subjects:

(2nd Year)

1. Water Supply Engineering

S. N.	Tools/Equipment Name	Quantity (No)
7.	Thermometer (1/10-0-100^{0}c,^{0}f)	2 nos
8.	Color meter (0-100^{0}H)	2 nos
9.	Turbidity meter (candle)	2 nos
10.	Turbidity meter (range 0-1000 NTU and standard cells)	2 nos
11.	PH meter (Digital)	2 nos
12.	Oven (temp up to 200^{0}c)	2 nos
13.	Vaccum filter with complete set	2 nos
14.	Multiple stirrer with paddles	2 set
15.	Gripper (tommy)	2 set
Assessors and chemical		
1.	Crucible 50, 100 ml capacity	10 nos each
2.	Dessicator	1 nos
3.	Filter paper 1.2 dia (whatman fileter paper no. 44)	100 nos
4.	Beaker 500 ml capacity	20 nos
5.	Pittle	
5.1	1 ml capacity	10 nos.
5.2	2 ml capacity	10 nos
5.3	3ml capacity	10 nos
6.	Alum	500 gm
7.	Clorine solution	1litre
8.	Burret with stand	10 nos
9.	Hyposolution (sodium thiosulphates)	250 gm
10.	Indicators (methyul orange, phenolphthalene)	50 gm each
11.	Sulfuric acid	1litre
12.	Hydrocholoric acid	1litre
13.	Potassium iodide	250 gm
14.	Postssium dichromate	250 gm
15.	Conical flask	5 nos
16.	Volumetric flask (50, 100, 200, 1000 ml capacity)	4 nos each
17.	Starch indicator	50 gm
18.	Acetic acid	1litre

2. Basic Hydraulic

S. N.	Tools/Equipment Name	Quantity (No)
1.	Center of pressure with 450 gm. Weights	2 set
2.	Flume 10 cmx50cmx3m	2 set
3.	Orifice meter	2 set
4.	Venturimeter	2 set
5.	Hydraulic benches volumetric type	2 set
6.	Different types of weirs for flume experiments	
6.1	Broad crested weirs	2nos
6.2	Sharp crested weirs	2nos
6.3	V-notches	2nos
6.4	Rectangular notches	2nos
7.	Stop watch	6 pieces
8.	Vernire caliper	2 nos
9.	Metal scale	10 nos
10.	orifices	
10.1	5 mm dia	2 piece
10.2	8 mm dia	2 piece
10.3	10mm dia	2 piece
11.	Spare parts for ventuimenter apparatus, peizometer tubes	10 pieces
12.	Head loss measurement set for pipe fitting	1 Set

3. Engineering Materials

S. N.	Tools/Equipment Name	Quantity (No)
1.	Sieve no. 9	1 set
2.	Consistency of cement a. VICAT apparatus with flat and sharp pin set (one pair spare for each set)	2 set
3.	a. Compression machine, 3 tons , cement cube test b. Standard sand (Ottawa sand grade-3 grades are available) c. Vibrator machine for laboratory use (table)	1 set As required 1 set
4.	a. Tensile test machine for cement b.Briquette mould c.Standard sand (Ottawa sand grade-3, 3 grades are available)	1 Set 1 set As required
5.	Slump test equipment	2 set

4. Engineering Mechanics

S. N.	Tools/Equipment Name	Quantity (No)
1.	Coplanar forces equilibrium testing (board linkage, pulley set	1 set
2.	Moment verification equipment set	1 set
3.	Equipment to determine the moment of inertia of fly wheel	1 set
4.	Bending moment & shear force observation equipment set	1 set
5.	Universal Testing Machine (min 30 KN)*	1 set
6.	Universal frame with different models for Truss	1 set
7.	Torsion testing equipment (torque 150 Nm)	1 set

*Universal Testing Machine can be hired and/or rented.

5. Survey

S. N.	Tools/Equipment Name	Quantity (No)
1.	Engineering chain	2 nos
2.	Arrows	10 nos
3.	Ranging rod 2 m	18 nos
4.	Wooden pegs	as required
5.	Prismatic compass with tripod	6 nos
6.	Level (Dumpy)	6 nos
7.	Tripod	6 nos
8.	Staff 5 m	12 nos
9.	Measuring Tape	10 nos
9.1	30 m.	8 nos
9.2	50 m.	6 nos
10.	Clinometer	6 nos
11.	Abney level	6 nos
12.	Surveyor compass (for Demonstration)	1 nos
13.	Plain table set (for Demonstration)	1 nos
14.	Telescopic alidade for demonstration	1nos
15.	Vernier Theodolite with tripod (for Demonstration)	1 nos
16.	Theodolite (digital)	6 nos
17.	Optical square	6 nos
18.	Plumbing fork	6 nos
19.	Plumb bob	1 nos
20.	3-5m staff	6 nos.
21.	Substance bar (for Demonstration)	1 nos.
22.	EDM (Total Station)	6 nos.
23 .	Turning Plate	12 nos.
24.	GPS (for demonstration)	2 nos.

6. Soil Mechanics

S. N.	Tools/Equipment Name	Quantity (No)
1.	Oven (interior non-corroding material, thermostatically controlled upto 200^0c)	1 complete set
2.	Aluminum containers with air tight cap	20 nos.
3.	Electronic balance (0.1 gm. accuracy) with air tight cap	1 set
4.	Desicator + moisture absorbent crystals	2 set
5.	Gongs	1 set
6.	Metal tray	10 nos
7.	Pycnometer with conical brass cap (100 ml. capacity)	1 complete set
8.	Balance (accuracy to 0.1 gm)	1 set
9.	Glass rod	2 set
10.	Thermometer (0 to 50^0c)	4 nos
11.	Distilled water	as required
12.	Density bottle with stopper (50ml. capacity)	2 sets
13.	Vacuum pump	1 set
14.	Electronic balance accurate to 0.01 gm	1 complete set
15.	Glass rod	2 sets
16.	Constant temperature water bath	1 complete set
17.	Cassagrande's liquid limit device complet set	2 set
18.	A.S.T.M and B.S. grooving tool Glass plate size 45cmX45cm (6mm thick)	2 set
19.	Glass plate size 45cmX45cm (6mm thick)	1 nos
20.	I.S. sieve size 425 um	1 nos
21.	3 mm dia. rod and 100 mm long	2sets
22.	Electronic balance accuracy to 0.001 gm	1 complete set
23.	Spatula	1 set
24.	Measuring cylinder	2 nos
25.	Wash bottle	2 nos
26.	First set of I.S. sieves 100mm, 80mm,. 63mm, 40mm, 20mm, 10mm, and 4.75mm	complete set
27.	Second set of I.S. sieves 2mm, 1mm, 850um, 600um, 425um, 150um, and 75m	complete set
28.	Balance (mechanical/triple beam) 10 kg capacity, 1 gm accuracy with weight and weight box	1 set
29.	Mechanical sieve shaker (optional)	1 complete set
30.	Brush	2 nos
31.	Sodium hexa metaphoshate	as required
32.	Cylindrical core cutter (internal ida. 10 cm and height 13cm.)	1 complete set
33.	Steel rammer	1 set
34.	Steel doily (2.5cm. high and 10cm. internal dia)	1 complete set
35.	Electronic balance (accuracy to 0.01gm. and 200gm. capacity) and	1 set each

S. N.	Tools/Equipment Name	Quantity (No)
	mechanical balance (accuracy to 1gm, capacity 10kg)	
36.	Spade and pick axe	1 no. each
37.	Straight edge	1 nos
38.	Knife	2 nos.
39.	Tongs	2 nos.
40.	Sand pouring cylinder, mounted on a pouring cone and separated by a shutter	1 complete set
41.	Cylindrical calibrating container	1 complete
42.	Standard sand (clean, oven dried, passing 600 um sieve)	as required
43.	Trowel or bent spoon	10 nos
44.	Scrape tool	1 nos
45.	Desicator	1 nos
46.	Glass plate (about 45 cmx 45cm, 9mm thick)	1 piece
47.	Measuring jar (1000ml, capacity)	1 nos
48.	Cylindrical mould (capacity 1000cc or 2250cc)	1 complete
49.	Rammer for light compaction, wt. 2.6kg)	1 set
50.	Mould accessories detachable base plate, removal collar	1 complete set

Tools and Apparatus required for the practical of following subjects:

(3rd Year)

1. Road Engineering

S. N.	Tools/Equipment Name	Quantity (No)
1. Los Angeles Abrasion Test		
1.1	Los Angeles Machine, complete set	one set
1.2	Set of sieves	
1.2.1	80 mm,	one set
1.2.2	63 mm,	one set
1.2.3	50 mm,	one set
1.2.4	40 mm,	one set
1.2.5	25mm,	one set
1.2.6	20mm,	one set
1.2.7	12.5mm,	one set
1.2.8	10mm,	one set
1.2.9	6.3mm,	one set
1.2.10	4.75mm,	one set
1.2.11	2.36mm	one set
1.2.12	1.70mm	one set
1.2.13		
1.3	Number of steel balls (diameter approx.= 4.8cm each of weight 390 to 445gm)	12 nos
1.4	Electric oven, complete set	one set
1.5	Weighting balance, 1 gm accuracy(Capacity=15kg)	one set
2. California bearing ration (CBR) test		
2.1	CBR test machine (loading machine with penetration rate 1.25 mm/min) complete set at least capacity of 5000kg	one set
2.2	Cylindrical moulds (Ø150mmx height 175mm) complete set, provided with a detachable extension collar 50mm height and a detachable preferred base plate 10mm thick	one set
2.3	Compaction rammer (weight 2.6kg with drop of 310mm or 4.89kg with a drop of 450mm))	one set
2.4	Adjustable steam	one set
2.5	Tripod and dial gauge readings to 0.01mm	two set
2.6	g. Annular metal weight and several slotted weights, each of weight 2.5kg and each of weight 2.5 kg and Ø147mm	one set
2.7	Sieve size, 20mm and 4.74 mm	one set
2.8	Weighing balance (1 gm accuracy	one set
3. Penetration test of bitumen		
3.1	Penetrometer	One set
3.2	Container: A flat bottomed cylindrical metallic dish 55mm in	one set

S. N.	Tools/Equipment Name	Quantity (No)
	diameter and 35mm in depth or 70mm diameter and 45mm depth	
3.3	Needle: Straight, highly polished, cylindrical hard steel rod	one set
3.4	Water bath	one set
3.5	Transfer dish or Tray	one set
3.6	Time measuring device(accuracy of 1 sec)	one set
3.7	Cotton gloves	one set
3.8	Thermometer (0-100^{0}c)	one set
4. Ductility test		
4.1	Ductility machine, complete set	one set
4.2	Water bath unit, complete set	one set
4.3	Briquette moulds, (75mmx10mmx10mm) complete set with base plate	3 set
4.4	Thermometer (0-100^{0}c)	one nos
4.5	Electric oven, complete set	one set
4.6	electric motor with gear mechanism	one set
4.7	Benzene or thinner	as required
4.8	Stainless steel scale and pointer	
4.9	control panel	one pair
4.10	carriage holding upto three standard briquette moulds	one pair
4.11	Jute gloves, cotton gloves	one pair
4.12	Pouring tray	two nos
5. Softening point test of bitumen		
5.1	Glass beaker	one
5.2	Ring and ball apparatus (steel balls and brass rings	as per specs
5.3	Metallic support	one set
5.4	Water bath unit, complete set	one
5.5	Thermometer (0-100^{0}c)	one nos
5.6	Heating plate thermostatically controlled, complete	one
5.7	Electric oven, complete set	one set
5.8	Jute glove	one pair
5.9	Cotton glove	one pair
5.10	Pouring tray	two nos

2. Hydrology and Irrigation Engineering

S. N.	Tools/Equipment Name	Quantity (No)
1.	Current meter	1 nos.
2	Measuring tape(50m)	2 nos.
3	Staff(3-5m)	2 nos.
5	Stop Watch	2 Nos.

Basic Electrical Engineering

S.N.	Equipment Name	Quantity (No)
1.	Voltmeter AC (0-220V)	12
2.	V oltmeter AC (0-220V)	12
3.	Ammeter AC (0-1, 0-10A)	12
4.	Ammeter DC (0-500 mA, 0-100 mA, 0-1 mA)	12
5.	Multimeter (Digital)	12
6.	Multimeter (Analog)	12
7.	Power supply (0-30V) 2A	12
8.	Auto transformer (0-250) 500 VA	12
9.	AC power supply (0-50V) 1A	12

Drawing

S.N.	Equipment Name	Quantity (No)
1.	Drawing board with table	24
2.	Drawing pen set	4
3.	Scriber	1

Engineering Geology

S.N.	Equipment Name	Quantity (No)
1	Geological Compass	6 Sets
2	Practical observation for drilling at field	1 time

Hydropower Engineering

S.N.	Equipment Name	Quantity (No)
1	Hydropower test set with pelton and francis turbine (Minimum 1KW)	1 Sets

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pbfx/)fsf] nflu Fire Hazards – Fire Extiquisher, Helmet, Goggles, Gloves, Masks, Eye washing facilities etc.

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