

**\* SCHEDULE OF QUANTITY \***

Estimated cost:- Rs. 186656.00

Name of work:- Annual repair and maintenance of water supply scheme Deol Phatahar in Tehsil Baijnath District Kangra(HP)  
(SH)Replacement of filter media 1 no filter units.

Earnest money:- Rs. 3740.00

Time :- Three months

Sr. No.	Description of items.	Qty.	Rate in		Unit	Amount.
			Figure	Words.		
1	Extraction/removal of old filter media from filter bed as specified below as per the direction of Engineer-in-charge within all leads and lifts.					
a)	Top layer:- Find sand(Eff.size 0.20 milimetre to 0.40 milimetre and uniformity co-efficient 2.00 to 3.00.	33.14 cubic metre			Per cubic metre	
b)	Second layer:- Coursed sand screened cleaned washed and graded from 3 milimetre to 6 milimetre.	6.63 cubic metre			Per cubic metre	
c)	Third layer:- Bajri coursed washed screened and graded from 6 milimetre to 20 milimetre.	4.42 cubic metre			Per cubic metre	
d)	Fourth layer:- Bajri coursed screened washed and graded from 20 milimetre to 25 milimetre	4.42 cubic metre			Per cubic metre	
e)	Bottom layer:- Broken stone screened, clean, washed and graded form 50 milimetre to 75 milimetre.	6.63 cubic metre			Per cubic metre	
2	Placing of 50% old filter media in the filter beds as specified below as per the direction of Engineer-in-charge within all leads and lifts.					
a)	Third layer:- Bajri coursed washed screened and graded from 6 milimetre to 20 milimetre.	2.21 cubic metre			Per cubic metre	
b)	Fourth layer:- Bajri coursed screened washed and graded from 20 milimetre to 25 milimetre	2.21 cubic metre			Per cubic metre	
c)	Bottom layer:- Broken stone screened, clean, washed and graded form 50 milimetre to 75 milimetre.	3.32 cubic metre			Per cubic metre	
1	Providing and placing in horinzatal layers filtering media dully graded,screened,washed and cleaned as specified below as per the direction of Engineer-in-charge within all leads and lifts.					
a)	Top layer:- Find sand(Eff.size 0.20 milimetre to 0.40 milimetre and uniformity co-efficient 2.00 to 3.00.	33.14 cubic metre			Per cubic metre	
b)	Second layer:- Coursed sand screened cleaned washed and graded from 3 milimetre to 6 milimetre.	6.63 cubic metre			Per cubic metre	
c)	Third layer:- Bajri coursed washed screened and graded from 6 milimetre to 20 milimetre.	2.21 cubic metre			Per cubic metre	
d)	Fourth layer:- Bajri coursed screened washed and graded from 20 milimetre to 25 milimetre	2.21 cubic metre			Per cubic metre	
e)	Bottom layer:- Broken stone screened, clean, washed and graded form 50 milimetre to 75 milimetre.	3.32 cubic metre			Per cubic metre	
3	Finishing wall with water proofing cement paint of approved brand and manufacture and of required shade on undecorated wall surface (two coats) to give an even shade after thoroughly brushing the surface to remove all dirt and remains of loose powdered materials within all leads and lifts as per the direction of Engineer-in-charge.	153.79 square metre			Per square metre	

Terms and conditions:-

- Nothing shall be paid for the rejected work/material.
- The work shall be completed with in stipulated period.
- Crushed stone aggregate shall be used.
- Steel shuttering shall be used at site of work.
- The work should be carried out as per specifications.

**SCHEDULE OF QUANTITY**

**C/O Lift Irrigation Scheme Mungal Ropa Gadiara in Tehsil Jaisinghpur Distt. Kangra (HP)**

**Estimated Cost Rs.  
Earnest Money Rs.**

**371250.00  
7425.00**

**Sub Head : Providing & erection of Pumping machinery with allied accessories for 1st and 2nd Phase)**

**Time :-**

**6 Months**

S. No.	Sub-Head and item of work	Quantity	Rate In Fig. In words	Unit	Amount
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**Phase-I**

1	Providing of horigental spindle, horizontal/ radial split casing/end suction(backpull out arremgement single/double/Multistage centrifugal pumps or combination of pumps in series/parallel of recommended make such as KSB/Mather & Platt/Kirloskar /Beaconweir/BE/Maxflow as per BIS 1520-1980 with upto date ammendments read with IS 9137-1978 or latest addition suitable for lifting water for under mentioned characteristics with bronze impellers/priming funnels: casingring and saftsleeves of bronze,saft of steel grade .... with cast iron casing coupled directly through a flexible coupling on a common CI/ cast steel base plate( base plate to be from manufacturer of the pumping unit only) to slip ring/squirrel cage screen protected drip proof induction motor/motors of standered make such as Kirlosker/ BHEL NGEF/ GEC/ Crompton/ Siemen/Joti/ABB and suitable for operation on 415(+/-) 5% volts 50 cycles/second,3 phase AC electric supply. The power of electric motor/motors should be at least+15% in excess of the maximum power required by the pump/pumps in the operation range of (+) 10% and (-) 15% of duty point head. The motor/motors as per IS:325-1978 with upto date ammendments raed with IS: 900-1972. It should include cost of bearing, nuts,bolts and painting etc. and should meet the following requirements:	2 set of 15 HP	30.00	Per H.P.	
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**A) SITE CONDITIONS**

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 i) Location of Site Palampur Jaisingh Pur Road Near Chadhiar  
 ii) The altitude of place in which the motor is intended to work in ordinary service if it exceeds 1000 mt.  
 iii) Humidity Weather generally remains humid during monsoon season.  
 iv) Nature of atmosphere As normally encountered in Shivalik Range  
 v) Detail of quality of water Clear cold water  
 vi) Water free from sand or not Yes  
 vii) Water corosive or not Not  
 viii) Turbidity (if any) up to 500PPM  
 ix) NPSH available Mts Postive suction  
 x) Any other information or requirement

**B) OPERATING CONDITIONS**

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 i) Type of current AC three/single phase  
 ii) Operating frequency 50 HZ  
 iii) Rated voltage 400 (+/-) 10% volts  
 iv) System of earthing if any to be adopted. Double loop earthing as per BIS 3043-1987 latest with upto date ammendments  
 v) No. of working hours per day 20.00 hours  
 vi) Speed of revolution in RPM To be quoted by tenderer  
 vii) Direction of rotation To be quoted by tenderer  
 viii) The max. Temp. of cooling air & water in the place in which 25 Degree Centigrade

the motor is intended to work in ordinary service.

C) MOTOR

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- i) Ref to BIS code                      BIS 325-1978 read with BIS 900-1992 (latest)with upto date ammendments
- ii) Type of enclosure of motor        SPDP(as per BIS 4691-1985 (latest)
- iii) Type of duty                         Continuous
- iv) Mechanical out put in KW            Suitable for driving centrifugal pumps required for duties specified against pumps.To avoid overloading of motor a margin of about 15-20% may be kept in the rated out put of prime mover.
- v) Class of insulation                    Class ~B~/Class "F"
- vi) Max.permissible temp.rise of motor reqd. if different from given in B(viii) above                ---
- vii) Particulars of test reqd. & where they are to be conducted.    As per terms & conditions
- viii) Particulars as to whether voltage limiting device will be employed        ATS/star delta starter /Statar Rotor starter oil immersed,fully automatic to be installed between bus bar & motor. Shunt capacitor is also proposed to be installed for improving the power factor at site.  
NOTE:- Star delta starter upto 37.5 KW, ATS between 37.5 KW to 50 KW & Stator rotor starter with slip ring motor
- ix) Motor whether squirrel cage or slipring                                    Squirrel cage
- x) Details of shaft extension reqd.        Just sufficient to provide direct drive by flexible coupling to pump.
- xi) Type of slip ring gear whether continously rated or for starting purposes only & whether to be fitted with brush lifting or short circuiting arrangements or both if interlocks are rquired.                                Continously rated for Squirrel cage/ Slipring motor
- xii) Breakway torque in terms of rated load torque & the corresponding breakway starting current which may be taken from the supply with the starting apparatus in circuit.        Breakway torque to be given by the tenderer but the starting current should not exceed 2.5 times of the full load current.
- xiii) Nature of load & any information regarding the driven machine which has a bearing upon the torque reqd. during the accelerated period, the        To work the pump offered

kinetic energy of the moving parts  
to be accelerated & No.of starts  
during a specified period.

- xiv) Where possible fault capacity of the system to which the motor is connected. The motor should be able to withstand initial current of 2.5 times the rated current for two minutes without suffering damages or permanent deformations.

**D) PUMP (BIS 1520-1980 ) read with BIS 9137-1978 both latest with up to date ammendments**

- a) Nos of pumps reqd. 2 no. pumps
- b) Spare parts required For Two years normal maintenance as recommended by manufacturer.
- c) Optional fittings reqd. Air cock for exhausting air from each stage.

**E) PUMP OPERATING CONDITIONS**

- i) Capacity 5.40 lps for each pump.
- ii) Total head in Mts. 112.14 mts

If total head is not known then  
following details be provided:-

- i) Static head 107 mts  
ii) Minimum depth of water -- Postive suction  
iii) Variation in water level -- mts  
iv) Ground level to max. water level --- mts  
v) Ground level to delivery point 694 mts  
vi) Pressure in the suction tank \_\_\_\_\_ Kg/cm<sup>2</sup>  
vii) Pressure in the delivery tank ..... Kg/cm<sup>2</sup>

- iii) Length of R/Main 350 mts
- iv) Dia of R/Main 150 mm
- v) Drive arrangement Direct through flexible coupling on a common base plate/ suitable for reciprocating pump
- vi) Drive type Electric driven
- vii) NPSH reqd. To be quoted by the tenderer
- viii) Limits of total head in which the pump is reqd. to operate. (-) 15% to (+) 10% of total head.
- ix) Suction/delivery size of pump To be specified by the tenderer
- x) Efficiency of pump at  
a) duty head  
b) (+)10 % head  
c) (-)15 % head  
To be specified by the tenderer
- xi) Material of construction To be specified by the tenderer  
(manufacturer--s certificate to be appended)

2	Supply of suitable oil immersed star delta starter of standard make such as MEI/Kilburn/Jyoti/ Siemens conforming to BIS-8544-1979 latest with up to date amendments for squirrel cage/slipring motor (make to be specified by the tenderers) mounted on panel board with magnetic type over load release & dashpot, time lag, under voltage release with initial oil filling .	2 Nos	each
3	Providing & fixing M S sheet 16 SWG steel fabricated floor mounted closed almirah type switch board including angle iron post of suitable height and size ISA 40x40x6mm duly painted comprising and capable of mounting the following accessories with all internal electric connections. The drawing of panel board shall be subject to approval of Engineer in charge.	1 No.	Each
a)	Ammeter of 60 Amp.AC supply, 100 mm circular dial Auto electric/IMP/Havells make of suitable range for above motor with selector switches conforming to BIS 1248-1983 latest with up to date amendments.	2 No.	Each
b)	Voltmeter ( 0-500 volts)AC supply, 100 mm circular dial Auto electric/AE/IMP/Havells make of suitable range for above motor with selector switches conforming to BIS 4064-1978 with up to date amendments.	1 No.	Each
c)	ICTP 63 Amp. switches with HRC fuses Kilburn/Larsen & turbo/Standard/Siemens make and having capacity 30% extra of the operational rating of motor as per BIS 4064-1978 with up to date amendments immediately after the power meter of HPSEB.	2 Sets	Each
d)	Busbar chamber having 3 copper bars of suitable rating for full length equal to width of board of 3 live phases and one copper bar of half rating of full length for neutral conforming to BIS 8084-1976 and 11353-1985 read with 5578-1985 all latest with up to date amendments.	1 No	Each
e)	MCB of 63 Amp. capacity of Kilburn/LT/LK/MEI/Standard make on incoming feeder for motors offered by the tenderer conforming to BIS 2516-1985 latest with up to date amendments with neutral linked under voltage release.	1 No.	Each
f)	3 phase indicating lamps complete with toggle switches for individual motors conforming to BIS 3452 part I & II latest with up to date amendments.	1 Sets	Per set
g)	Earth leakage circuit breaker of recommended (Kilburn/L&T/MET/GEC as per BIS-2516-1977 with up to date amendments and of suitable range with which should have control box, operating handle and trip/reset button on/ off indicators, re-indicating off spring condition of the circuit breaker for over current protection. The circuit should be equipped with magnet thermal release with metallic tap CTS. It should also be fitted earth fault for tripping of breaker on occurrence of earth fault on/ of breaker load side.	1 No.	Each
h)	Hour run meter of reputed make of four digit capacity conforming to BIS-722(latest edition)/ recommendations.	2 Nos.	Each
i)	Suitable three phase voltage monitor relay with all protections & usual indicators with electrical sirens against single phasing, no voltage, high voltage & overloading & phase voltage difference	1 No.	Each
j)	Change over Switch of reputed make & suitable capacity	1 No.	Each
k)	Single phase preventor of reputed make & suitable capacity	2 No.	Each
4 (a)	Supply of Kirloskar/Kilburn/IVC/Fouress/Gled/BHEL/Leader/ Pelicon/KSB of reputed make of suitable size cast iron double flanged PN-1.6 sluice valve having size one step higher to delivery of pump and capable of with standing nominal seat pressure of 16 kg/cm <sup>2</sup>	2 Nos	Each
(b)	Supply of Kirloskar/Kilburn/IVC/Fouress/Gled/BHEL/Leader Pelicon/KSB of suitable size cast iron PN-1.6 double flanged swing check type reflux valve having bye pass arrangement & size one step higher to delivery of pump for withstanding nominal seat pressure of 16 kg/cm <sup>2</sup>	2 Nos	Each

(c) Supply of Kirloskar/Kilburn/IVC/Fouress/Gled/BHEL/Leader/Pelicon/KSB of suitable size Cast iron PN-1-6 double flanged swing check type reflux valve having bye pass arrangement & size equal to dia of R/main ie 100 mm diafor withstanding nominal seat pressure of 16 kg/cm <sup>2</sup>	1 Nos.	Each
(d) Supply of Kirloskar/Kilburn/IVC/Fouress/Gled/BHEL/Leader/Pelicon/KSB of reputed make of suitable size cast iron double flanged sluice valve confirming IS 780, size equal to dia of suction pipe ; with hand wheel /cast iron cap and capable to with and knoing nominal sheet pressure of 16 kg/cm <sup>2</sup>	2 Nos.	Each
5 (a) P/L 6 sqmm copper PVC insulated armoured power 3 1/2 core cable conforming to BIS 1554 (Part I) -1988 or latest with up to date ammendments Siemen/Gloster/ICC make from meter of HPSEB to OCB & from OCB to Busbar switch & starter (one cable carrying all three phases) including all other electrical equipment/accessories such as thimbles,flexible pipe,solder,nuts & bolts,cable glands etc. laid in pipes or trenches under floor .The type,size & make will be subject to approval of HPSEB authorities.In case of non acceptance by HPSEB authorities it shall have to be replaced by the tenderer free of cost..	5 Rmt	Per Rmt
5(b) P/L 4 sq. mm copper PVC insulated armoured power three core cable conforming to BIS 1554(part I)-1988 or latest with up to date ammendments Siemen/Gloster/ICC make from switch to starter & starter to motor (one cable for carrying all three phases) including all other electrical equipment /acesories such as thimbles,flexible pipes, solder,nuts & bolts,cable glands etc. laid in pipes or trenches under floor. The type,size & make will be subject to approval of HPSEB authorities.In case of non acceptance by HPSEB authorities it shall have to be replaced by the tenderer free of cost.	5 Rmt	Per Rmt
5 (c) P/L double loop earthing with copper plate 600x600x3mm thick electrode complete with material such as charcoal, common salt ,GI pipes,thimbles,nuts & bolts,digging of pits,GI wiring & 25x5mm copper strips of required capacity conforming to BIS 3043-1987 latest with up to date ammendments for above motors & other electrical equipment.	1 Job	LS
5 (d) Supply & errection of floor/wall mounted power factor shunt capacitor conforming to BIS 2834-1986 latest with upto date ammendments BHEL/GEC/Machneil/ Mager/Bajaj make to raise the prevailing power factor at site to 0.95 for direct connection to induction motor individually,of 2x 4 KVAR according to HP of motor offered including cable Siemens/ Gloster/ICC make from busbar chamber to capacitor & also including LT/LK/Kilburn make ICTP switches conforming to BIS 4064-1978 or latest with HRC fuses (Range to be specified by the tenderer.	2 Nos 2x4 KVAR =8KVAR	Each set or per KVAR
6(a) Supply of standarad make 100mm dia circular dial pressure gauge of suitable range Fiebeg/ Bourden/ Precision make with all accessories such as stop cock,copper tubing etc. conforming to BIS 3624-1987 latest with up to date ammendments.	2 Nos	Each
7 Providing Laying suction,delivery pipe considering site requirements,NPSH required & available & common header having area to two times the area of delivery branch of pump including tapers,flanges,rubber gaskets,3mm thick as per BIS-2712-1978 nuts & bolts as per 1364-1983 & special up to 5 mtrs. away from the outer wall of pump house as per layout drawings approved by Engineer-in-Charge The pipes shall be capable of withstanding 1.5 times the total presure indicated in item no. 1e(ii).		
Suction pipe ----- mm dia Delivery pipe -----mm dia Common header 150 mm dia	5 Rmt 5 Rmt 8 Rmt	Per Rmt Per Rmt Per Rmt
8 Erection of all equipment including cost of tees,bends,tapes & any others fittings required as per site conditions and as per direction of Engineer-in -Charge.	1 Job	LS

**2nd Phase**

1 Providing of horigental spindle, horizontal/ radial split casing/ end suction (backpull out arrangement single/double/Multistage centrifugal pumps or combination of pumps in series/parallel of recommended make such as KSB/Mather & Platt/Kirloskar /Beaconweir/BE/Maxflow as per BIS 1520-1980 with upto date ammendments read with IS 9137-1978 or latest addition suitable for lifting water for under mentioned characteristics with bronze impellers/priming funnels: casing ring and shaft sleeves of bronze, shaft of steel grade .... with cast iron casing coupled directly through a flexible coupling on a common CI/ cast steel base plate (base plate to be from manufacturer of the pumping unit only) to slip ring/squirrel cage screen protected drip proof induction motor/motors of standard make such as Kirloskar/ BHEL NGEF/ GEC/ Crompton/ Siemen/Joti/ABB and suitable for operation on 415(+/-) 5% volts 50 cycles/second, 3 phase AC electric supply. The power of electric motor/motors should be at least +15% in excess of the maximum power required by the pump/pumps in the operation range of (+) 10% and (-) 15% of duty point head. The motor/motors as per IS:325-1978 with upto date ammendments read with IS: 900-1972. It should include cost of bearing, nuts, bolts and painting etc. and should meet the following requirements:

2 set of 25.00 Per HP  
12.50 HP

A) **SITE CONDITIONS**  
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- i) Location of Site Palampur Jaisingh Pur Road Near Chadhiar
- ii) The altitude of place in which the motor is intended to work in ordinary service if it exceeds 1000 mt.
- iii) Humidity Weather generally remains humid during monsoon season.
- iv) Nature of atmosphere As normally encountered in Shivalik Range
- v) Detail of quality of water Clear cold water
- vi) Water free from sand or not Yes
- vii) Water corrosive or not Not
- viii) Turbidity (if any) up to 500PPM
- ix) NPSH available Mts Positive suction
- x) Any other information or requirement

B) **OPERATING CONDITIONS**  
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- i) Type of current AC three/single phase
- ii) Operating frequency 50 HZ
- iii) Rated voltage 400 (+/-) 10% volts
- iv) System of earthing if any to be adopted. Double loop earthing as per BIS 3043-1987 latest with upto date ammendments
- v) No. of working hours per day 20.00 hours
- vi) Speed of revolution in RPM To be quoted by tenderer
- vii) Direction of rotation To be quoted by tenderer
- viii) The max. Temp. of cooling air & water in the place in which 25 Degree Centigrade

the motor is intended to work in ordinary service.

C) MOTOR

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- |       |  |   |
|-------|--|---|
| i)    | Ref to BIS code  | BIS 325-1978 read with BIS 900-1992 (latest)with upto date ammendments  |
| ii)   | Type of enclosure of motor   | SPDP(as per BIS 4691-1985 (latest)  |
| iii)  | Type of duty   | Continuous  |
| iv)   | Mechanical out put in KW   | Suitable for driving centrifugal pumps required for duties specified against pumps.To avoid overloading of motor a margin of about 15-20% may be kept in the rated out put of prime mover.  |
| v)    | Class of insulation  | Class ~B~/Class "F"   |
| vi)   | Max.permissible temp.rise of motor reqd. if different from given in B(viii) above  | ---   |
| vii)  | Particulars of test reqd. & where they are to be conducted.  | As per terms & conditions   |
| viii) | Particulars as to whether voltage limiting device will be employed   | ATS/star delta starter /Statar Rotor starter oil immersed,fully automatic to be installed between bus bar & motor. Shunt capacitor is also proposed to be installed for improving the power factor at site.<br>NOTE:- Star delta starter upto 37.5 KW, ATS between 37.5 KW to 50 KW & Stator rotor starter with slip ring motor |
| ix)   | Motor whether squirrel cage or slipring  | Squirrel cage   |
| x)    | Details of shaft extension reqd.   | Just sufficient to provide direct drive by flexible coupling to pump.   |
| xi)   | Type of slip ring gear whether continously rated or for starting purposes only & whether to be fitted with brush lifting or short circuiting arrangements or both if interlocks are rquired. | Continously rated for Squirrel cage/ Slipring motor   |
| xii)  | Breakway torque in terms of rated load torque & the corresponding breakway starting current which may be taken from the supply with the starting apparatus in circuit.                       | Breakway torque to be given by the tenderer but the starting current should not exceed 2.5 times of the full load current.  |
| xiii) | Nature of load & any information regarding the driven machine which has a bearing upon the torque reqd. during the accelerated period, the   | To work the pump offered  |



kinetic energy of the moving parts  
to be accelerated & No.of starts  
during a specified period.

- xiv) Where possible fault capacity of the system to which the motor is connected. The motor should be able to withstand initial current of 2.5 times the rated current for two minutes without suffering damages or permanent deformations.

**D) PUMP (BIS 1520-1980 ) read with BIS 9137-1978 both latest with up to date ammendments**

- a) Nos of pumps reqd. 2 no. pumps
- b) Spare parts required For Two years normal maintenance as recommended by manufacturer.
- c) Optional fittings reqd. Air cock for exhausting air from each stage.

**E) PUMP OPERATING CONDITIONS**

- i) Capacity 3.91 lps for each pump.
- ii) Total head in Mts. 108.08 mts

If total head is not known then  
following details be provided:-

- i) Static head 103 mts  
ii) Minimum depth of water -- Postive suction  
iii) Variation in water level -- mts  
iv) Ground level to max. water level 587 mts  
v) Ground level to delivery point 690 mts  
vi) Pressure in the suction tank \_\_\_\_ Kg/cm<sup>2</sup>  
vii) Pressure in the delivery tank ..... Kg/cm<sup>2</sup>

- iii) Length of R/Main 250 mts
- iv) Dia of R/Main 125 mm
- v) Drive arrangement Direct through flexible coupling on a common base plate/ suitable for reciprocating pump
- vi) Drive type Electric driven
- vii) NPSH reqd. To be quoted by the tenderer
- viii) Limits of total head in which the pump is reqd. to operate. (-) 15% to (+) 10% of total head.
- ix) Suction/delivery size of pump To be specified by the tenderer
- x) Efficiency of pump at  
a) duty head  
b) (+)10 % head  
c) (-)15 % head  
To be specified by the tenderer
- xi) Material of construction To be specified by the tenderer  
(manufacturer--s certificate to be appended)

2	Supply of suitable oil immersed star delta starter/stator rotor starter of standard make such as MEI/Kilburn/Jyoti/ Siemens conforming to BIS-8544-1979 latest with up to date amendments for squirrel cage/slipring motor (make to be specified by the tenderers) mounted on panel board with magnetic type over load release & dashpot,time lag,under voltage release with initial oil filling .	2 Nos	each
3	Providing & fixing M S sheet 16 SWG steel fabricated floor mounted closed almirah type switch board including angle iron post of suitable height and size ISA 40x40x6mm duly painted comprising and capable of mounting the following accessories with all internal electric connections. The drawing of panel board shall be subject to approval of Engineer in charge.	1 No.	Each
a)	Ammeter of 60 Amp. AC supply,100 mm circular dial Auto electric/AE/IMP/Havells make of suitable range for above motor with selector switches conforming to BIS 1248-1983 latest with up to date amendments.	2 No.	Each
b)	Voltmeter (0-500 volts) AC supply,100 mm circular dial Auto electric/AE/IMP/Havells make of suitable range for above motor with selector switches conforming to BIS 4064-1978 with up to date amendments.	1 No.	Each
c)	ICTP 63 Amp.switches with HRC fuses Kilburn/Larsen & turbo/Standard/Siemens make and having capacity 30% extra of the operational rating of motor as per BIS 4064-1978 with upto date amendments immediately after the power meter of HPSEB.	2 Sets	Each
d)	Busbar chamber having 3 copper bars of suitable rating for full length equal to width of board of 3 live phases and one copper bar of half rating of full length for neutral conforming to BIS 8084-1976 and 11353-1985 read with 5578-1985 all latest with upto date amendments.	1 No	Each
e)	MCB 63 Amp. of suitable capacity of Kilburn/LT/LK/MEI/Standard make on incoming feeder for motors offered by the tenderer conforming to BIS 2516-1985 latest with upto date amendments with neutral linked under voltage release.	1 No.	Each
f)	3 phase indicating lamps complete with toggle switches for individual motors conforming to BIS 3452 part I & II latest with up to date amendments.	1 Sets	Per set
g)	Earth leakage circuit breaker of recommended (Kilburn/L&T/MET/GEC as per BIS-2516-1977 with upto date amendments and of suitable range with which should have control box, operating handle and trip/reset button on/ off indicators, re-indicating off spring condition of the circuit breaker for over current protection. The circuit should be equipped with magnet thermal release with metallic tap CTS. It should also be fitted earth fault for tripping of breaker on occurrence of earth fault on/ of breaker load side.	1 No.	Each
h)	Hour run meter of reputed make of four digit capacity conforming to BIS-722(latest edition)/ recommendations.	2 Nos.	Each
i)	Suitable three phase voltage monitor relay with all protections & usual indicators with electrical sirens against single phasing,no voltage,high voltage & overloading & phase voltage difference	1 No.	Each
j)	Change over Switch of reputed make & suitable capacity	1 No.	Each
k)	Single phase preventor of reputed make & suitable capacity	2 No.	Each
4 (a)	Supply of Kirloskar/Kilburn/IVC/Fouress/Gled/BHEL/Leader/ Pelicon/KSB of reputed make of suitable size cast iron double flanged PN-1.6 sluice valve having size one step higher to delivery of pump and capable of with standing nominal seat pressure of 16 kg/cm <sup>2</sup>	2 Nos	Each
b)	Supply of Kirloskar/Kilburn/IVC/Fouress/Gled/BHEL/Leader Pelicon/KSB of suitable size cast iron PN-1.6 double flanged swing check type reflux valve having bye pass arrangement & size one step higher to delivery of pump for withstanding nominal seat pressure of 16 kg/cm <sup>2</sup>	2 Nos	Each

(c) Supply of Kirloskar/Kilburn/IVC/Fouress/Gled/BHEL/Leader/Pelicon/KSB of suitable size Cast iron PN-1.6 double flanged swing check type reflux valve having bye pass arrangement & size equal to dia of R/main ie 125 mm dia for withstanding nominal seat pressure of 16 kg/cm <sup>2</sup>	1 Nos.	Each
(d) Supply of Kirloskar/Kilburn/IVC/Fouress/Gled/BHEL/Leader/Pelicon/KSB of reputed make of suitable size cast iron double flanged sluice valve confirming IS 780, size equal to dia of suction pipe ; with hand wheel /cast iron cap and capable to with and knoing nominal sheet pressure of 16 kg/cm <sup>2</sup>	2 Nos.	Each
5 (a) P/L 6 sq.mm copper PVC insulated armoured power 3 1/2 core cable conforming to BIS 1554 (Part I) -1988 or latest with up to date ammendments Siemen/Gloster/ICC make from meter of HPSEB to OCB & from OCB to Busbar switch & starter (one cable carrying all three phases) including all other electrical equipment/accessories such as thimbles,flexible pipe,solder,nuts & bolts,cable glands etc. laid in pipes or trenches under floor .The type,size & make will be subject to approval of HPSEB authorities.In case of non acceptance by HPSEB authorities it shall have to be replaced by the tenderer free of cost..	5 Rmt	Per Rmt
5(b) P/L 4 sq.mm copper PVC insulated armoured power three core cable conforming to BIS 1554(part I)-1988 or latest with up to date ammendments Siemen/Gloster/ICC make from switch to starter & starter to motor (one cable for carrying all three phases) including all other electrical equipment /acesories such as thimbles,flexible pipes, solder,nuts & bolts,cable glands etc. laid in pipes or trenches under floor. The type,size & make will be subject to approval of HPSEB authorities.In case of non acceptance by HPSEB authorities it shall have to be replaced by the tenderer free of cost.	5 Rmt	Per Rmt
5 (c) P/L double loop earthing with copper plate 600x600x3mm thick electrode complete with material such as charcoal, common salt ,GI pipes,thimbles,nuts & bolts,digging of pits,GI wiring & 25x5mm copper strips of required capacity conforming to BIS 3043-1987 latest with up to date ammendments for above motors & other electrical equipment.	1 Job	LS
5 (d) Supply & errection of floor/wall mounted power factor shunt capacitor conforming to BIS 2834-1986 latest with upto date ammendments BHEL/GEC/Machneil/ Mager/Bajaj make to raise the prevailing power factor at site to 0.95 for direct connection to induction motor individually.of 2x4 KVAR according to HP of motor offered including cable Siemens/ Gloster/ICC make from busbar chamber to capacitor & also including LT/LK/Kilburn make ICTP switches conforming to BIS 4064-1978 or latest with HRC fuses (Range to be specified by the tenderer.	2 Nos 2x4 KVAR =8KVAR	Each set or per KVAR
6(a) Supply of standarad make 100mm dia circular dial pressure gauge of suitable range Fiebeg/ Bourden/ Precision make with all accessories such as stop cock,copper tubing etc. conforming to BIS 3624-1987 latest with up to date ammendments.	2 Nos	Each
7 Providing Laying suction,delivery pipe considering site requirements,NPSH required & available & common header having area to two times the area of delivery branch of pump including tapers,flanges,rubber gaskets,3mm thick as per BIS-2712-1978 nuts & bolts as per 1364-1983 & special up to 5 mtrs. away from the outer wall of pump house as per layout drawings approved by Engineer-in-Charge The pipes shall be capable of withstanding 1.5 times the total presure indicated in item no. 1e(ii).	1 Job	LS
Suction pipe ----- mm dia Delivery pipe -----mm dia Common header 150 mm dia	5 Rmt 5 Rmt 8 Rmt	Per Rmt Per Rmt Per Rmt
8 Erection of all equipment including cost of tees,bends,tapes & any others fittings required as per site conditions and as per direction of Engineer-in -Charge.	1 Job	LS

#### Terms and conditions attched

- The firm shall forward a copy of supply order/indent placed by it for the supply of pumps and motors on the manufactures/ authorized dealers of the pumps and motors to the consignee within 30 days after the issue of the letter of intent/ award by the Engineer-in-Charge. The copy of the supply order/indent to the consignee should also accompany the dealership certificate of the dealer for the pumping machinery in case the pumps and motors are arranged from the authorized dealers.
- The firm shall arrange dispatch of offered pumps and motors to the consignee direct from the manufacturers/ their authorized dealers of the pumping machinery for which the supply order/indent has

- been placed by the firm. The packing slip should indicate the details of materials the package and material of construction of pumps and motors.
- 3 The shop test for pumps and motors shall be carried out at manufactures works in the presence of representative of the department as per IS 325-1978. The test performance certificate of the pumping machinery shall be arranged by the firm fro the manufactures and get it approved from the Engineer-in-charge before actual dispatch of the pumping machinery.
  - 4 The firm shall supply the recommended list of spares and quantities required for normal working of the pumping machinery (Two years) from the manufactures of the aforesaid equipment at the time of quoting rates and shall quote items rate for the same also.
  - 5 The firm shall supply the manufacturer's manual for the operation and maintenance of the pumping equipment.
  - 6 The firm shall arrange operation and maintenance training to the operating staff for the pumping machinery (without extra cost ) for a period of seven days i.e. during the testing period.
  - 7 The characteristics curves of the pumping equipment shall be supplied with the offer, otherwise, the tender shall be rejected.
  - 8 The firm shall supply layout drawing in respect of various components, such as suction pipes, valves, cable trenches, control panel etc. from the foot valve location of the common header which shall extend up to 5 meters from the outer walls of the pump house towards rising main. The details of foundations required for various components shall also be supplied by the firm within 30 days of the
  - 9 The installation of pumping machinery above 100 HP shall be inspected by the technical representative of the manufacturers, of rank not less than that of a service Engineer, at the work site and inspection certificate shall be supplied to the Engineer-in-charge. This inspection shall be in addition to the test report and nothing extra shall be paid on this account.
  - 10 All the civil works shall be constructed by the department.
  - 11 The wiring and installation of electric equipment shall be as per HPSEB rules and regulations and subjected to the approval of the Chief Electrical Inspector and or his authorized officer. Any defect pointed out shall be rectified by the firm without any extra cost. The wiring and installation of all electrical equipment shall be done by a licensed contractor of approved class of HPSEB authorities on their approved format (Form D) for release of power connection by the firm without extra cost.
  - 12 The temporary electric connection, if required during installation shall be arranged by the firm at its own cost and energy charges shall also be paid directly by the firm to the HPSEB.
  - 13 Prices of all items shall be F.O.R. site of work inclusive of all leads and shall be inclusive of all charges of transportation, insurance, packing, taxes and duties such as sales tax, excise duty and local taxes etc.
  - 14 The rates shall be quoted only on the format of schedule of quantities which is attached with the tender document giving all specified data so desired therein.
  - 15 The rates offered for the specified marks in the schedule of quantities only shall be considered. Rates quoted for the part or non specified marks shall lead to rejection of the tender.
  - 16 The contractor is requestgd to inspect the site before quoting his rate.
  - 17 All the equipment/material shall confirm to the relevant BIS specifications wherever applicable and in its absence to any accepted National/International standards.
  - 18 The general specifications of the work shall conform to HP. PWD/Punjab PWD specifications as per direction to the Engineer-in-charge.
  - 19 The validity of the tender shall not be less than 120 days, otherwise, the tender shall be summarily rejected.
  - 20 All the equipment shall be guaranteed against any manufacturing defect including metallurgy and its performance for a period 12 (twelve) months from the date of commissioning/ 15 (fifteen) months from the date of supply which ever is earlier. Any defect if noticed within the stipulated period shall be rectified by the firm at its own cost with 15 days of bringing the same to its notice. The guarantee clause shall be substantiated by a guarantee bond of a nationalized bank for an amount equal to the cost of pumping and electrical equipment (accessories included) pledged in the name of the Executive Engineer in charge at the time of applying for refund of security deposits. The guarantee bond shall be released after the expiry of the guarantee period.
  - 21 The installed pumping machinery and other allied accessories shall be tested daily for stipulated pumping hours in the N.I.T. for a period of seven days without extra cost. However, the cost of electricity and water shall be borne by the department. During the guarantee period efficiency of the pumping and the electric equipment should not vary beyond the range of (+/-) 2.5%. If during guarantee period, the efficiency falls beyond 2.5% to a maximum of 5%, 1% cost of the pump set for 1% fall of the efficiency shall be deducted. In case of fall of efficiency beyond 5% the pump set shall be rejected and cost of the effected pump set recovered from the pledged bank guarantee and or from the security deposit as the case may be.
  - 22 80% (Eighty percent) payment of the cost of pumping machinery and equipment less 10% security and other statutory recovery shall be made after receipt of complete pumping machinery i.e. pump and motors received together at site of work in good condition. The balance 20% cost after deduction of the security and other recoveries shall be released after successful and satisfactory installation, testing of the entire equipment. Ten percent security deposit shall be released as stipulated in the agreement.
  - 23 90% (Ninety percent) installation charges shall be released after satisfactory installation of all the pumping and electrical equipment. Remaining 10 % of installation charges shall be released after testing of the entire equipment.
  - 24 In absence of performance curve, no offer will be entertained.