Assignment 5

AdderSubtractor Composite Unit

The Addition and Subtraction operations can be comb[in]ed into one common circuit by including an exclusive – OR gate with each full-adder. A 4 bit The mode input C_{in}control is the operation. When C_{in}=0 the circuit is an adder and when C_{in}=1 the circuit becomes a subtractor. Each exclusive –OR gate receives input C_{in} and one of the inputs of B when C_{in}=0. We have B X-OR 0 =B. The full adder receive the value of B when C_{in}=0. The input carry is 0, and the circuit performs A plus B when C_{in}=1 we have B X-OR 1=B' and C_0=1. The B inputs are all complemented and a1 is added through the input carry. The circuit performs the operation A plus the 2's complement of B. For unsigned numbers, this given A-B if A>=B or the 2's complement of (B-A) if A<B for Signed Numbers, the Result is A-B provided that there is no overflow.

A (A_4 A_3 A_2 A_1)

B (B_4 B_3 B_2 B_1)

TRUTH TABLE:-

A	B	X
0	0	0
0	1	1
1	0	1
1	1	0

From Figure:-

If , B_4=1 O/P=1

B_3=0 O/P=0

B_2=1 O/P=1

B_1=1 O/P=1

When:- $C_{in}=0$

Then B

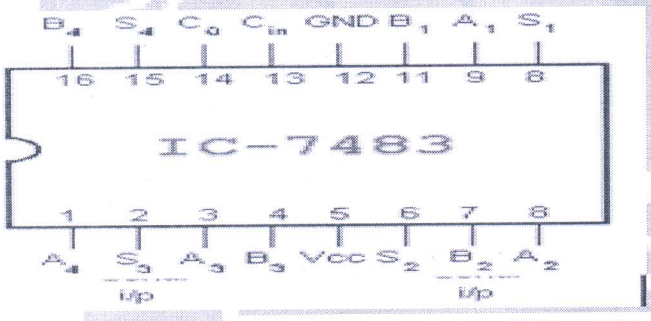
$B_4=1$ O/P=0

$B_3=1$ O/P=0

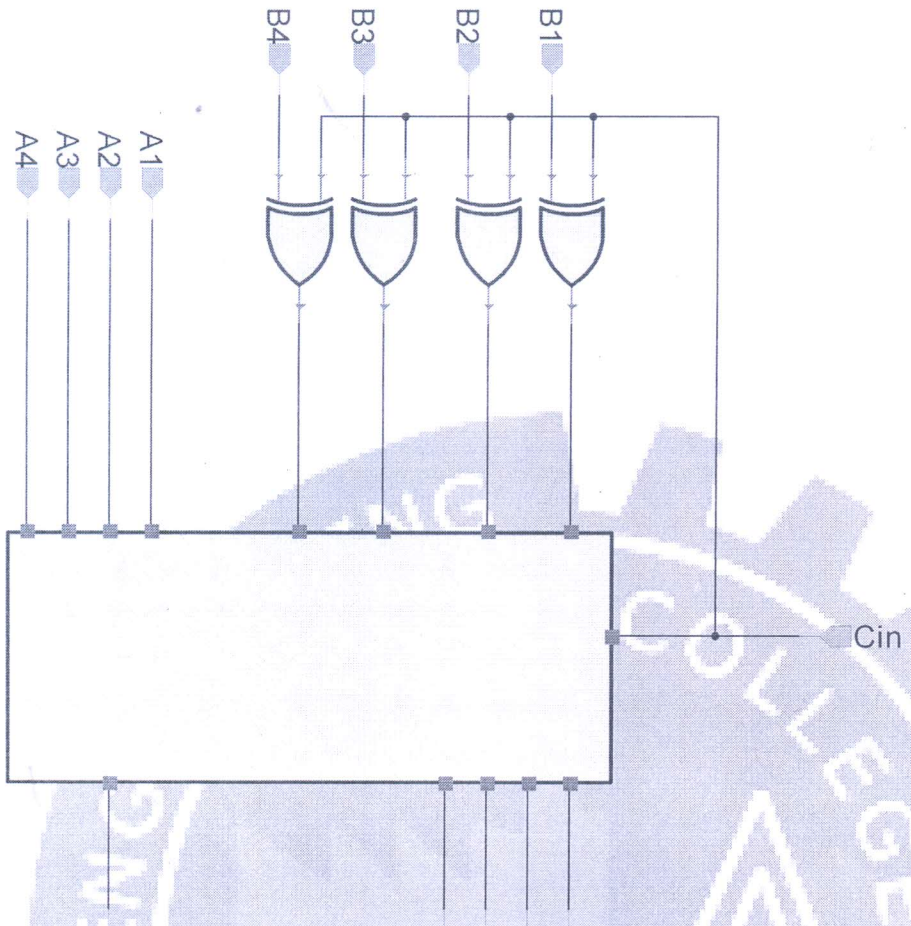
$B_2=0$ O/P=1

$B_1=1$ O/P=1

Pin Diagran of 7483:-



Circuit Diagram:-



DR. B.C. ROY ENGINEERING COLLEGE, DURGAPUR

Laboratory Computer Organization Lab

REPORT

Title 4-bit adder Subtractor Composite unit

Name UTPAL

Department CSE-1-X

Semester 3rd Roll No. 12

Signature

Date of Experiment 3/8/19

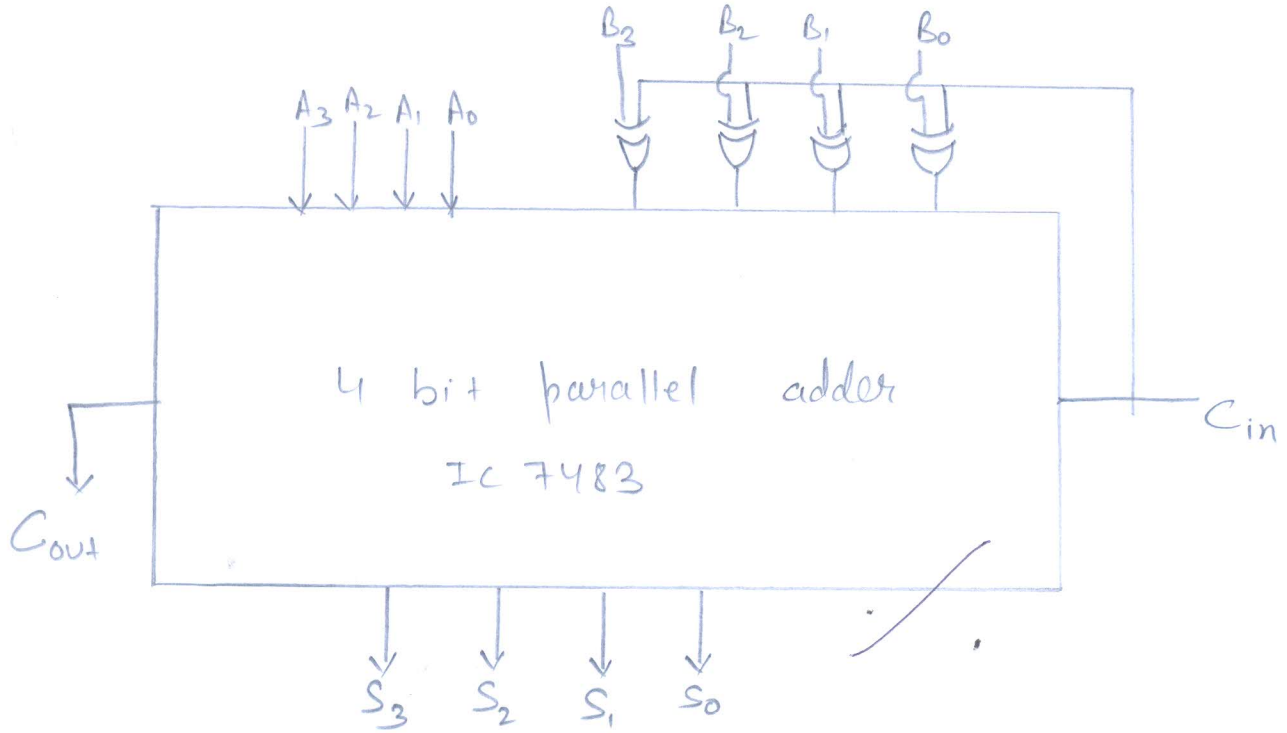
Experiment - 6

AIM:- To design 4-bit adder substractor Composite unit.

APPARATUS:- Bread board, Connecting wires, IC 7483 (4 bit parallel adder), IC 7486 (XOR), LED

THEORY: Here we design an adder Substractor Composite unit. A 4 bit adder Substracter is a circuit that is Capable of adding or substracting two 4-bit numbers. Here, 9 inputs are taken as 4-bit positive binary number A and B and 1 C_{in}. 5 outputs are obtained in the circuit. We are using 2's Complement of B to perform Substraction using IC7486 (XOR). The other gates used are IC7483 (4 bit parallel adder).

CIRCUIT DIAGRAM:-



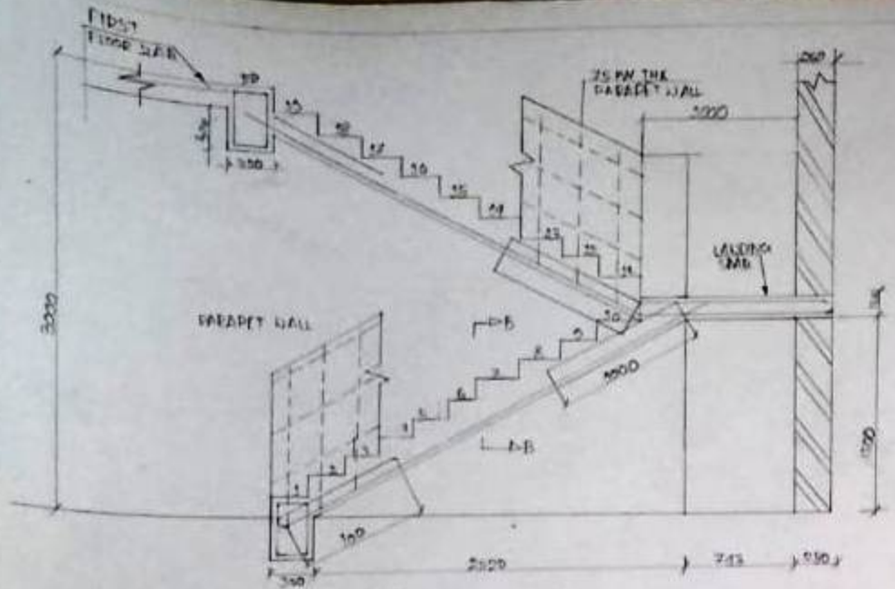
Truth table

A_3	A_2	A_1	A_0	B_3	B_2	B_1	B_0	C_{in}	C_{out}	S_3	S_2	S_1	S_0
1	0	0	0	0	1	1	0	0	0	1	1	1	0
1	0	0	0	0	0	1	0	0	0	1	0	1	0
1	0	0	0	1	0	1	0	0	1	0	0	1	0
1	0	0	0	1	1	0	1	0	1	0	1	0	1
1	0	0	0	0	1	0	0	1	1	0	1	0	0
1	0	0	0	0	1	0	1	1	1	0	0	1	1
1	0	0	0	1	0	1	1	1	0	1	1	0	1
1	0	0	0	1	1	0	0	1	0	1	0	1	1

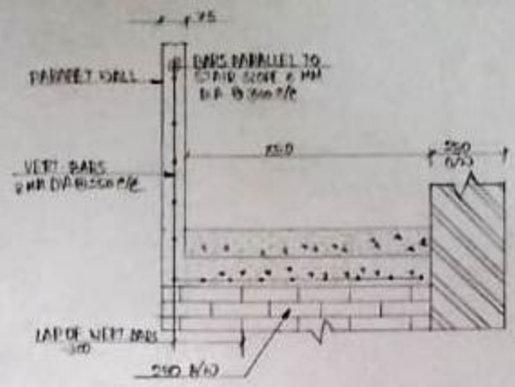
Conclusion:

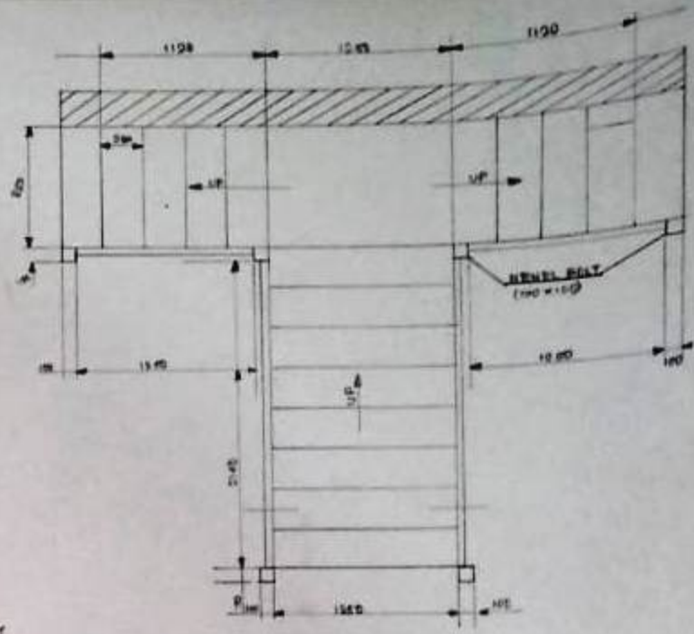
Thus, we design the 4-bit adder subtractor using IC 7483 and IC 7486 and verify our output using the truth table successfully. Thus, the realization and working is understood.

A++

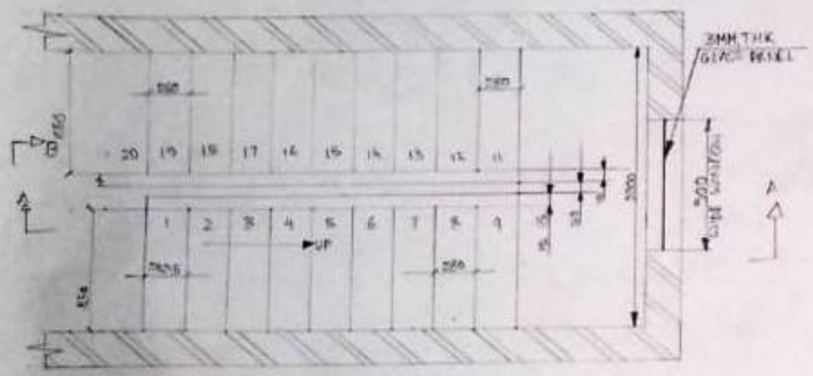


SECTION ON A-A
SCALE 1:20

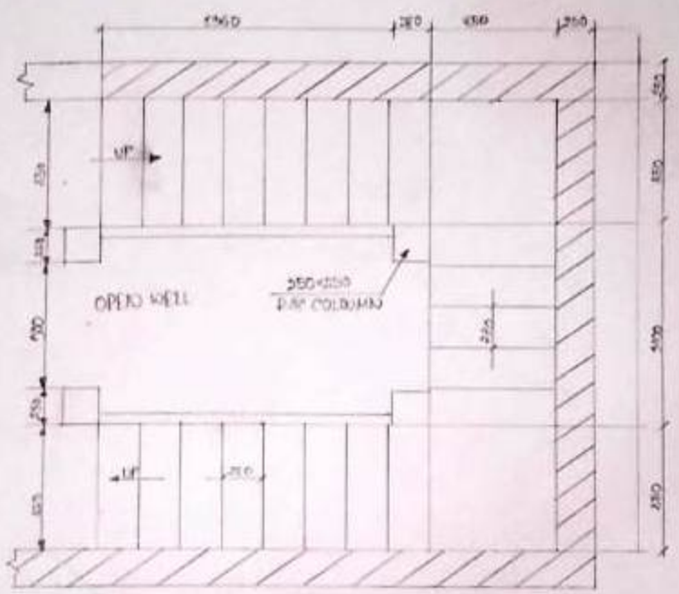




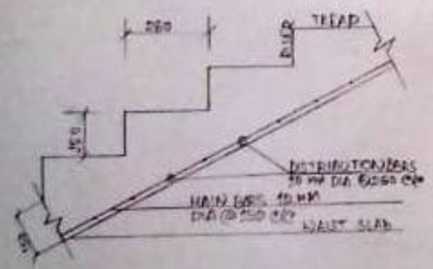
PLAN OF REINFORCED WIRE MESH STAIR
SCALE - 1:25



PLAN OF R.C.C. DOG LEG STAIR
SCALE - 1:25



PLAN OF HALF TURN OPEN WELL STAIR
SCALE - 1:20



DETAILS OF RISER, TREAD & WAIST SLAB
SCALE - 1:10

16/9/2016

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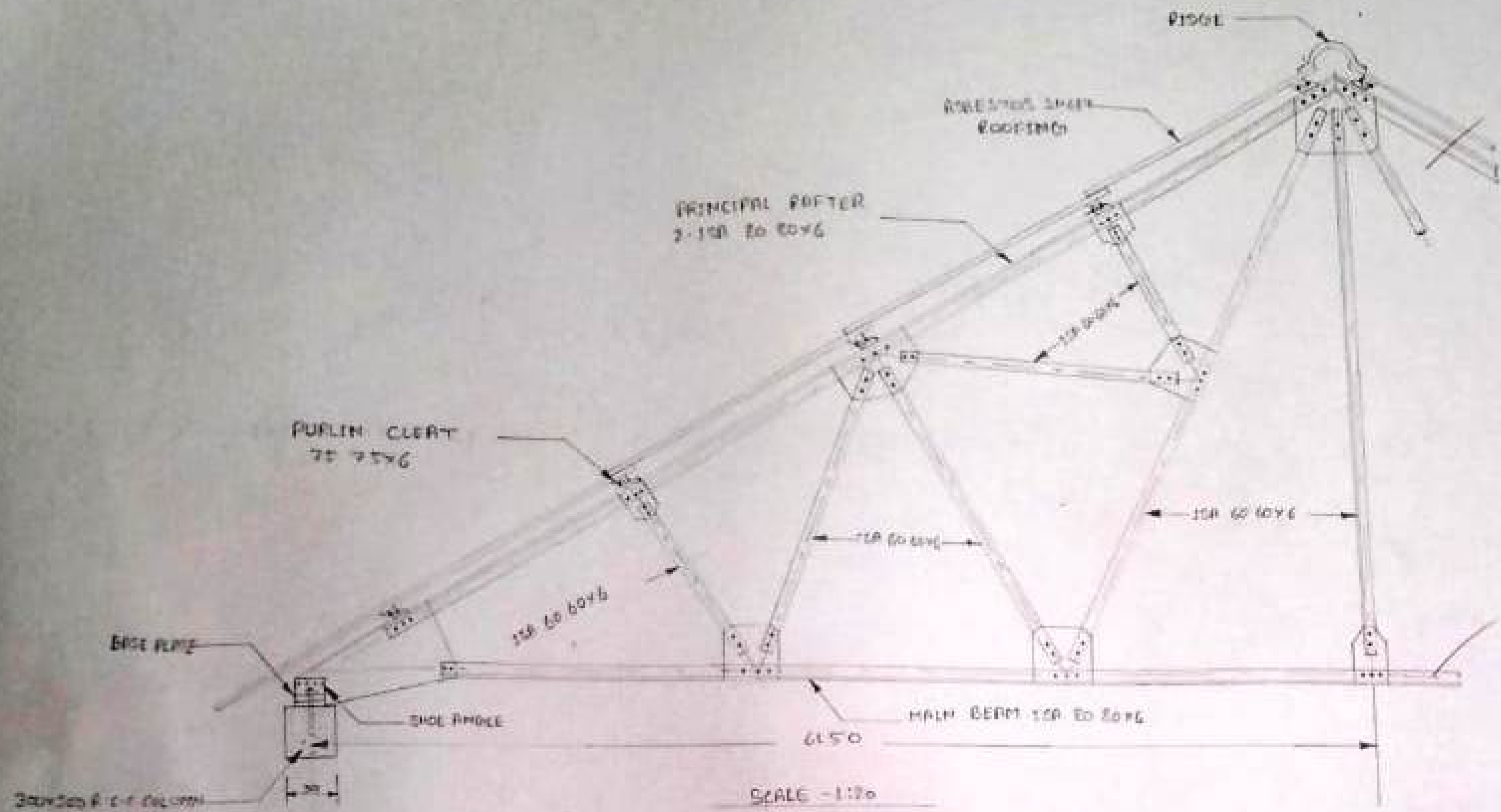
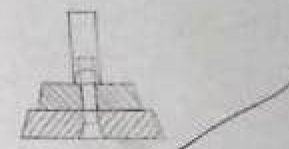
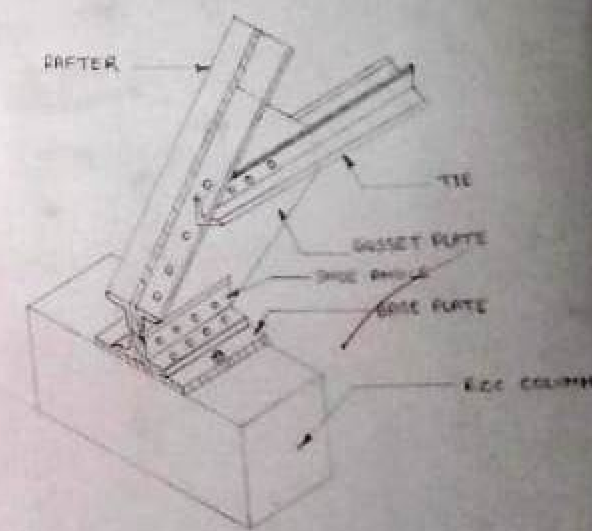
THIRD	BUILDING DESIGN AND DRAWING
CE-383	
GROUP	STAIRS
	AS STATED



SCALE - 1:20

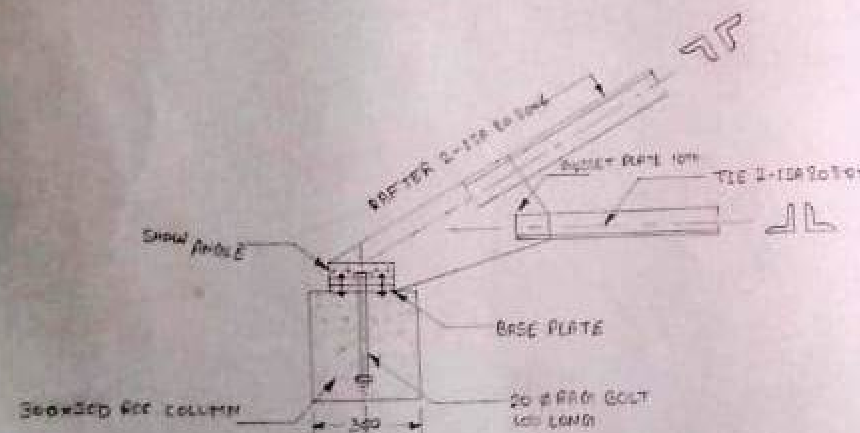


FLAT COUNTER SUNK HEAD

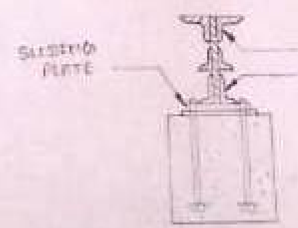


ISOMETRIC VIEW

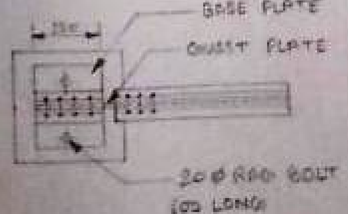
SCALE - 1:10



ELEVATION

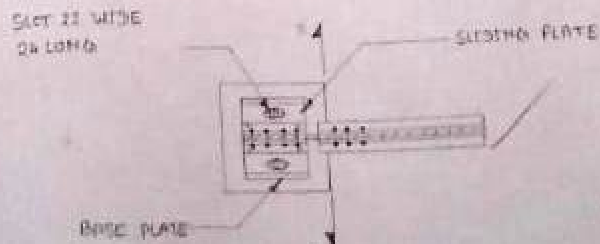


SECTION AT Y-Y



PLAN - FIXED END

SCALE - 1:10



PLAN - SLIDING END

988

ALL DIMENTION ARE IN MM

ANKUSH KUMAR	DR. B.C. Roy Engg COLLEGE	
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CIVIL (Y)	SCALE 1:20	
DOS - 1		
DOS - 29/04/16	SCALE - 1:10	CHECK

Dr. B. C. Roy Engineering College
Civil Engineering Department
Fluid Mechanics Laboratory (CE 491)
Technical Manual

Determination of Efficiency of a Pelton Wheel Turbine

Objective:

To study the performance of pelton wheel turbine model through plotting its main characteristic/constant head curves at 25%, 50%, 75% and 100% nozzle openings respectively, i.e.

1) Q_u vs N_u
2) P_u vs N_u
3) η_o vs N_u

Where N_u= unit speed= $N/\sqrt{H_a}$ Q_u= unit discharge= $Q/\sqrt{H_a}$
T_u = unit torque=T/H_a P_u= unit power (output) = $P/H_a^{3/2}$
η_o = overall efficiency
Q = Discharge through turbine under a head H
N = Speed of the turbine under a head H
P = power developed by the turbine under a head of H
H_a = head of water on the turbine

Theory:

A Fluid Machine is a device which converts energy stored in a fluid into mechanical energy. The energy stored in a fluid mass is potential energy, Kinetic energy and inter molecular energy. The mechanical energy is transmitted by a rotating shaft. Machines using water as medium are known as hydraulic machines. The hydraulic machines which convert hydraulic energy into mechanical energy are known as turbines.
Pelton wheel is an impulse turbine used efficiently under high heads. Pelton are used in power plants with heads more than 250 meter. The advantage of Pelton wheel is that it uses small quantity of water.

Terminology and Mathematical Relations:

Overall efficiency of the turbine = (output power) / (input power) i.e. $\eta_o = P_t / P_a$
Output power measure through the brake drum, $P_t = (2\pi NT) / 60.000$ KW
Where, T = braking moment = $(W_1 - W_2)$ R,
W_1 = Spring load on the tight side as shown in the dial gauge,
W_2 = Spring load on the slack side as shown in the dial gauge,
R = Moment arm of the tangential load to brake drum,
= Radius of the brake drum + Radius of the rope,
Available power $P_a = \gamma Q H_a$
Where, γ = specific weight or weight density
H_a= available working head=pressure gauge reading (kg/cm^2) x 10 m of water.

Q=discharge measured through venturimeter = $\frac{C_d a_1 a_2 \sqrt{2gh}}{\sqrt{a_1^2 - a_2^2}}$ m^3/s

Where h= $(P_1 - P_2)$ x 10 m of water, and P_1 & P_2 are the pressure gauge readings (in kg/cm^2) at inlet and throat respectively.

Apparatus & Instruments:

Pelton wheel laboratory model on test bed with brake drum, centrifugal pump-motor driving set, flow measuring venturimeter and Tachometer. (Write the specifications of the following: Pelton wheel model, Driving motor of centrifugal pump, Centrifugal pump, Tachometer. Draw a net sketch of the test rig).

Observations:

Radius of brake drum = R_1 = Radius of rope = r
Co-efficient of discharge of the venturimeter = C_d =0.98
Inlet cross-section of venturimeter = a_1 =0.003318 m^2
Throat cross-section of venturimeter = a_2 =0.00116 m^2

Procedure:

The turbine shall be tested at normal speed, 3 different speeds below normal speed and 3 different speeds above normal speed covering a range 50% of the normal speed. The run-away speed (the speed of the turbine at no load and at rated condition of supply head i.e. 40m) and pull-out torque (the maximum torque at stalled speed) may also be observed. After starting and running the turbine at normal speed for sometime, apply load on the turbine and take readings. Note the following:

1) Net supply head
2) Discharge (pressure gauge reading)
3) Turbine shaft speed
4) Brake weight (difference in spring load indicator)
5) Spring balance reading

For any particular setting of the spear first run the turbine load and then gradually load is applied on it, by adding dead weight on the hanger. The net supply head on the turbine should be maintained constant at the rated value, and this can be done by adjusting the gate valve just above the turbine.

Observation Table:

Nozzle opening- 50%

Run	Pressure gauge reading (m)	Dial gauge reading in tight side, w_1 (kg)	Dial gauge reading in slack side, w_2 (kg)	Taco meter reading, N (RPM)	Venturimeter pressure gauge reading, at inlet, p_1 (kg/cm^2)	Venturimeter pressure gauge reading, at throat, p_2 (kg/cm^2)
1	1.9 x 10	1 + 0	0.1	1100	4.1 x 10	3.8 x 10
2	1.9 x 10	1 + 1	0.1	1050	4.1 x 10	3.8 x 10
3	1.9 x 10	1 + 2	0.05	1010	4.1 x 10	3.8 x 10

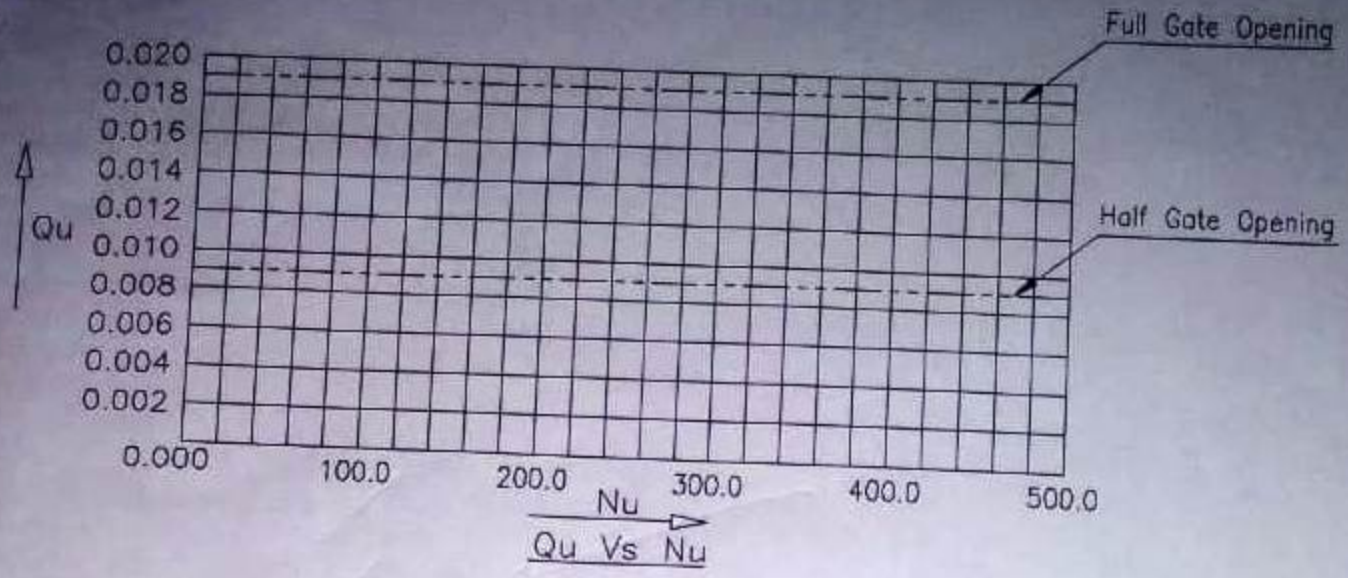
Preferably one set of observation must be taken at run-away speed of the turbine i.e. when no load is put on the brake drum and another set, say, the last one at the pull out torque of the turbine i.e. maximum torque at stalled speed.

Result Sheet:

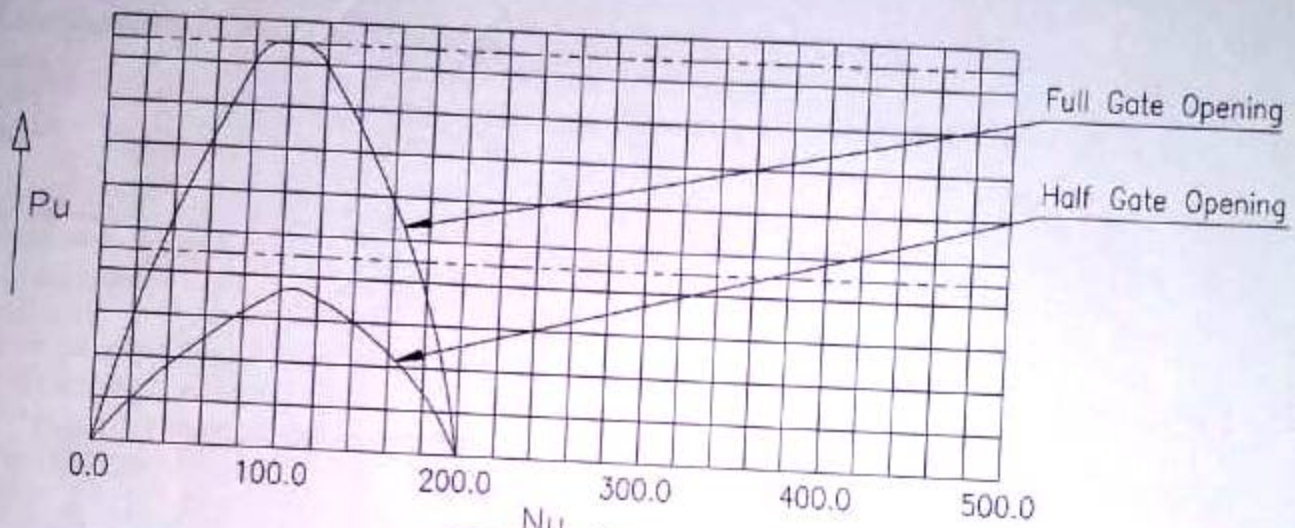
Guide vane Opening	Set	Input Head H_a in m	Speed N in RPM	Unit Speed (Nu)	Discharge Q in m^3/s	Unit Discharge (Qu)	Torque on the Drum $T=(W_1-W_2)Rx9.81$ in Nm	Output $Pt = (2\pi NT/60) x1000$ in Kw	Unit Power (Pu)	Input $Pa=\rho g Q Ha/1000$ in Kw	Efficiency $\eta_0=$ (Pt/Pa) 100%

Sample Result Sheet:

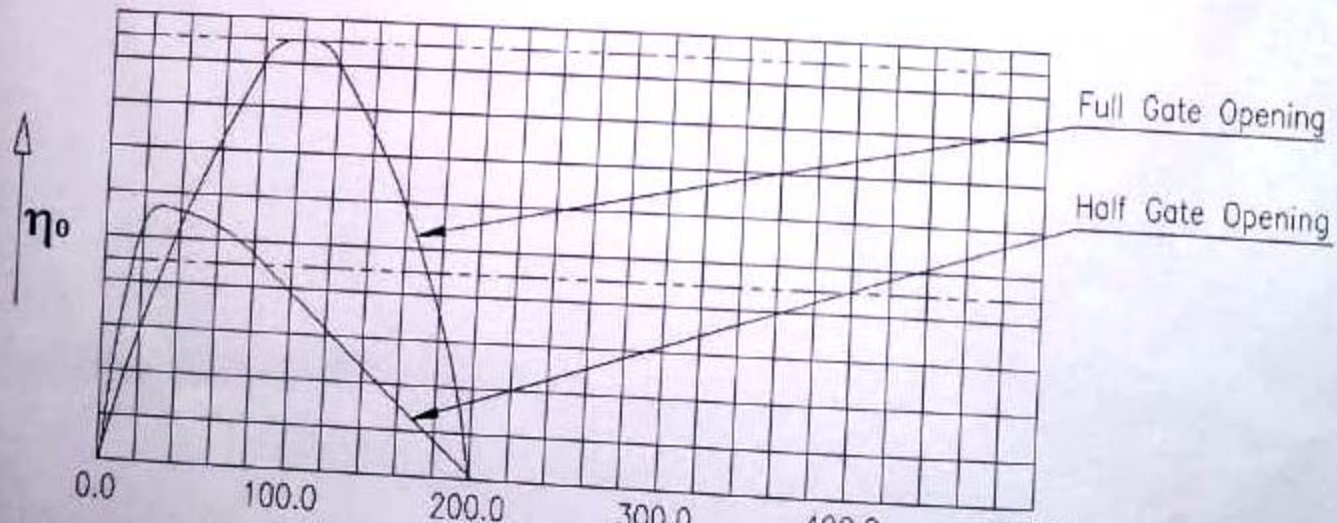
Guide vane Opening	Set	Input Head Ha in m	Speed N in RPM	Unit Speed (Nu)	Discharge Q in m^3/s	Unit Discharge (Qu)	Torque on the Drum $T=(W_1-W_2)Rx9.81$ in Nm	Output Pt = $(2\pi NT/60) x1000$ in Kw	Unit Power (Pu)	Input $Pa=\rho gQ Ha/1000$ in Kw	Efficiency $\eta_0=$ (Pt/Pa)100 %
50%	1	1.9x10	1100	252.3	0.0093	0.0021	0.949	0.109	0.0013	1.731	6.29
	2	1.9x10	1050	240.9	0.0093	0.0021	2.003	0.219	0.0026	1.731	12.69
	3	1.9x10	1010	231.7	0.0093	0.0021	3.110	0.327	0.0039	1.731	18.49
	4	1.9x10	971	222.8	0.0093	0.0021	4.112	0.416	0.0050	1.731	23.50
	5	1.9x10	875	200.7	0.0093	0.0021	7.226	0.666	0.0080	1.731	37.50
	6	1.9x10	798	183.1	0.0093	0.0021	8.278	0.691	0.0083	1.731	38.90
100%	1	3.8x10	1540	249.82	0.015	0.0024	1.054	0.169	0.0007	5.591	3.02
	2	3.8x10	1510	245.00	0.015	0.0024	2.109	0.333	0.0014	5.591	5.96
	3	3.8x10	1486	241.1	0.015	0.0024	3.110	0.483	0.0020	5.591	8.64



Qu Vs Nu



Pu Vs Nu



η_0 Vs Nu

arks:

chnical Specification:

Pelton Turbine Model:

1)	Rated supply head	: 40 meters
2)	Discharge	: 400 lpm
3)	Normal speed	: 1000 rpm
4)	Output power	: 2 HP (max)
5)	Jet diameter	: 22 mm max.
6)	Pitch circle diameter	: 260 mm
7)	Jet ratio	: 12(approx.)
8)	No. of buckets	: 18 nos.
9)	Brake drum diameter	: 200 mm
10)	Rope diameter	: 15 mm.

Driving Motor & Centrifugal Pump Set:

1)	Rated head	: 39 m.
2)	Discharge	: 570 lpm
3)	Normal speed	: 2880 rpm
4)	Power required	: 7.5 HP
5)	Size	: 65 mm × 50 mm
6)	Type	: High speed, centrifugal, single suction volute
7)	Model	: CRI; 7.5H3

Flow Measuring Unit:

1)	Size of venturimeter	: 50 mm
2)	Diameter ratio	: 16
3)	Area ratio	: 0.35
4)	Throat diameter	: 38.454 mm.
5)	Inlet cone angle of venturimeter	: 20^0
6)	Diverging cone angle of venturimeter	: 10^0
7)	Pressure gauge	: 0-7 kg/cm^2
8)	K value	: 3.183×10

EXPT. NO.

PAGE NO. 1

PERFORMANCE TEST OF PELTON WHEEL TURBINE

• OBJECTIVE:

To study the performance of pelton wheel turbine model through plotting its main characteristics/constant head curves at 25%, 50%, 75% and 100% nozzle opening respectively, i.e.

1) Q_u vs N_u i.e. $Q_u = f(N_u)$
2) T_u vs N_u i.e $T_u = f(N_u)$
3) P_u vs N_u i.e $P_u = f(N_u)$
4) H_u vs N_u i.e $H_u = f(N_u)$

Where, N_u = Unit speed = $N/\sqrt{H_a}$, Q_u = Unit discharge = $Q/\sqrt{H_a}$ and N_o = overall efficiency.

Q = Discharge through turbine under a head H
N = Speed of a turbine under a head H.
P = Power of a turbine under a head H.
H_a = Head of water on the turbine.
H_u = Unit head of water.

• THEORY:

A fluid machine is a device which converts energy stored in a fluid mass into mechanical energy. The energy stored in a fluid mass is potential energy, Kinetic energy and inter-molecular energy. The mechanical energy is transmitted by a rotating shaft. Machines using water as medium are known

as hydraulic machines. The hydraulic machines which convert hydraulic energy to mechanical energy are known as turbines.

Pelton wheel is an impulse turbines used efficiently under high heads. Pelton wheels are used in power plants with heads more than 250 m. The advantage of pelton wheel is that it uses small quantity of water.

- TERMINOLOGY AND MATHEMATICAL RELATIONS :-

Overall efficiency of the turbine = (output Power)/(input Power) ie: $\eta_o = P/Pa$

Output power measured through the brake drum.

i.e, $P_1 = (2\Lambda NT)/60000$ KW

where T = braking moment $(W_1 - W_2)Rg$.

W_1 = Pan load i.e wt of a scale + load Put on it,

W_2 = Spring load, R = moment area of the tangential load to break drum = Radius of the brake drum + Radius of the rope.

and available power, $Pa = f.Q\,Ha$

where, f = specific weight or weight density.

Ha = Available working head = Pressure gauge reading (in Kg/cm^2) $\times$ 10m of water.

Q = Discharge measured through venturimeter.

$$= \frac{C_d \times a_1 \times a_2 \times \sqrt{2gh}}{\sqrt{a_1^2 - a_2^2}} \ m^3/s.$$

where $h = (P_1 - P_2) \times 10$ m of water and P_1 and P_2 are the pressure gauge reading (in kg/cm^2) at inlet and throat respectively.

- Aparatus & INSTRUMENTS:

Pelton wheel laberotory on test bed with brake drum. Centrifugal pump motor, driving set, flow measuring venturimeter and Tachometer.

- SPECIFICATION OF THE FOLLOWING:

1) Rated supply head : 40 m
2) Discharge : 400 l.p.m.
3) Normal speed : 1000 r.p.m
4) output power : 2 HP
5) Jet Diameter : 22 mm max
6) Pitch circle Diameter : 260 mm
7) Jet ratio : 12 approx
8) No. of buckets : 18 NOS.
9) Brake drum Diameter : 200 mm
10) Rope diameter : 200 mm

EXPT. NO.

PAGE NO. 4

- DRIVING MOTORS AND CENTRIFUGAL PUMP SET

1) Rated Head : 39m
2) Discharge : 570 l.p.m
3) Normal speed : 2880 r.p.m
4) Power required : 7.5 H.P.
5) Size : 65X50 mm
6) Type suction volute : High speed, centrifugal, single
7) Model : CRI : 7.5H3

- FLOW MEASURING UNITS

1) Size of venturimeter : 50 mm
2) Diameter ratio : 16
3) Area ratio : 0.35
4) Throat diameter : 38.454 mm
5) Inlet cone angle of venturimeter : 20°
6) Diverging cone angle of venturimeter : 10°
7) Pressure gauge : 0.7 Kg/cm²
8) K value : 3.183 X10

- OBSERVATION:

Radius of brake drum = R_1 = Radius of ropes = r
= Weight of scale pan = 1Kg.

Co-efficient of discharge of the venturimeter - C_d = 0.98
Inlet cross section of venturimeter = a_1 = 0.003318 m^2
Throat cross-section of venturimeter = a_2 = 0.00116 m^2

EXPT. NO.

PAGE NO. 5

OBSERVATION TABLE

Nozzle Opening = 25 %

SL NO.	Pressure gauge reading (m)	Pan load (Kg)	Spring Load W_2 (Kg)	Tacho-meter reading N(RPM)	Venturimeter Pressure gauge reading at inlet, P_1 = Kg/cm²	Venturimeter pressure gauge reading at throat P_2 = kg/cm²
1.	4X10	1+0	0.1	1502	4.2X10	4X10
2.	4X10	1+1	0.1	1461	4.2X10	4X10
3.	4X10	1+2	0.1	1410	4.2X10	4X10
4.	4X10	1+3	0.15	1358	4.2X10	4X10
5.	4X10	1+4	0.20	1296	4.2X10	4X10
6.	4X10	1+5	0.20	1235	4.2X10	4X10
7.	4X10	1+7	0.30	1164	4.2X10	4X10
8.	4X10	1+8	0.30	1104	4.2X10	4X10
9.	4X10	1+15	0.70	748	4.2X10	4X10

Ha	N	Nu	Q	Qu	T_1	Tu	P_t	Pu	Pa	no%
40	1502	237.487	0.0075	0.0011	0.948	0.023	0.149	0.0005	2.94	5.06
40	1461	231.004	0.0075	0.0011	2.001	0.050	0.305	0.0012	2.94	10.37
40	1410	222.940	0.0075	0.0011	3.045	0.076	0.419	0.0017	2.94	18.03
40	1358	214.758	0.0075	0.0011	4.042	0.101	0.574	0.0020	2.94	19.52
40	1296	204.915	0.0075	0.0011	5.04	0.126	0.683	0.0026	2.94	23.23
40	1235	195.27	0.0075	0.0011	6.09	0.152	0.787	0.0031	2.94	26.76
40	1164	184.044	0.0075	0.0011	8.08	0.202	0.984	0.0038	2.94	33.46
40	1104	174.557	0.0075	0.0011	9.135	0.228	1.055	0.0041	2.94	35.88

EXPT. NO.

PAGE NO. 6

Nozzle opening - 50%.

Pressure gauge Reading (m)	Pan Load W_1 (kg)	Spring Load W_2 (kg)	Tachometer reading N (rpm)	Venturimeter pressure gauge reading at inlet P_1 (kg/cm²)	Venturimeter pressure gauge reading at throat P_2 (kg/cm²)
1·9 X10	1+0	0·1	1100		
1·9X10	1+1	0·1	1050	4·1X10	3·8X10
1·9X10	1+2	0·05	1010	4·1X10	3·8X10
1·9X10	1+3	0·1	971	4·1X10	3·8X10
1·9X10	1+5	0·1	875	4·1X10	3·8X10
1·9X10	1+7	0·15	798	4·1X10	3·8X10
1·9X10	1+8	0·2	755	4·1X10	3·8X10

Result sheet

Ha	N	Nu	Q	Qu	T_2	Tu	P_{t_2}	Pu	Pa_2	η%
19	1100	252·357	0·0093	0·0021	0·948	0·049	0·109	0·0013	1·7316	6·296
19	1050	240·886	0·0093	0·0021	1·995	0·105	0·219	0·0026	1·7316	12·65
19	1010	231·709	0·0093	0·0021	3·097	0·205	0·327	0·0039	1·7316	18·890
19	971	222·762	0·0093	0·0021	4·095	0·215	0·416	0·005	1·7316	24·032
19	875	200·738	0·0093	0·0021	6·195	0·326	0·567	0·0068	1·7316	32·755
19	798	183·073	0·0093	0·0021	8·242	0·433	0·688	0·0080	1·7316	39·755
19	755	173·208	0·0093	0·0021	9·24	0·486	0·730	0·0088	1·7316	42·172

EXPT. NO.

PAGE NO. 7

Nozzle opening - 75%

Pressure gauge reading (m)	Pan load W_1 (kg)	Spring load W_2 (kg)	Tachometer reading N (rpm)	Venturimeter pressure gauge reading at inlet P_1 (kg/cm²)	Venturimeter pressure gauge reading P_2 (kg/cm²)
1·9×10	1+0	0	1100	4·1×10	3·7×10
1·9×10	1+1	0	1059	4·1×10	3·7×10
1·9×10	1+2	0·05	1023	4·1×10	3·7×10
1·9×10	1+3	0·05	981	4·1×10	3·7×10
1·9×10	1+4	0·1	946	4·1×10	3·7×10
1·9×10	1+5	0·1	901	4·1×10	3·7×10
1·9×10	1+8	0·2	773	4·1×10	3·7×10

• Result sheet.

Ha	N_3	N_u	Q_3	Q_u	T_3	T_u	Pt_3	P_u	P_{a3}	η_o %
19	1100	252·357	0·0107	0·0024	1·053	0·0554	0·1212	0·0014	1·992	6·08
19	1059	242·951	0·0107	0·0024	2·107	0·1108	0·2335	0·0028	1·992	11·72
19	1023	234·692	0·0107	0·0024	3·107	0·1635	0·3326	0·004	1·992	16·69
19	981	225·056	0·0107	0·0024	4·161	0·2190	0·4272	0·0051	1·992	21·43
19	946	217·027	0·0107	0·0024	5·162	0·2716	0·5111	0·0061	1·992	25·65
19	901	206·703	0·0107	0·0024	6·215	0·3271	0·5861	0·0070	1·992	29·41
19	773	177·388	0·017	0·0024	9·270	0·4879	0·75	0·009	1·992	37·65

EXPT. NO.

PAGE NO. 8

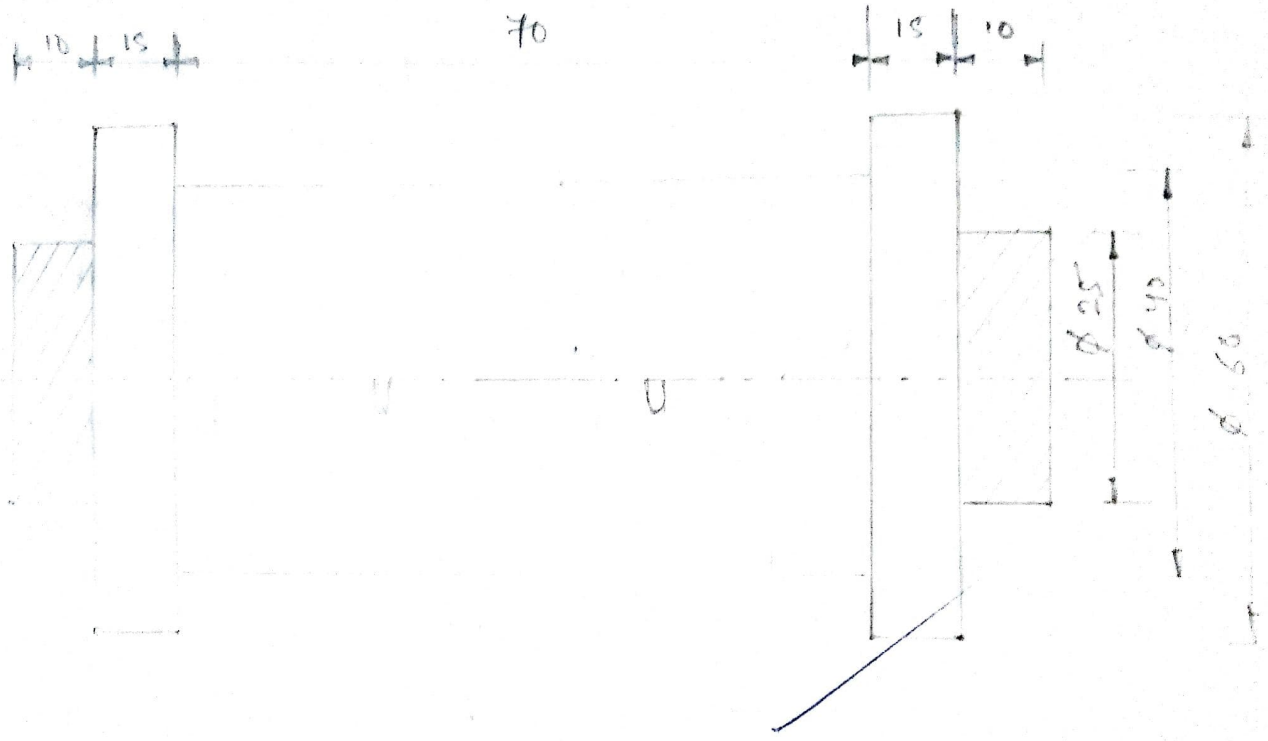
Nozzle opening - 100%

Pressure gauge reading (m)	Pan Load W_1 (kg)	Spring Load W_2 (kg)	Tachometer reading N (rpm)	Venturimeter Pressure gauge reading at inlet P_1 (kg/cm²)	Venturimeter Pressure gauge reading at throat P_2 (kg/cm²)
3·8×10	1+0	0	1540	3·8×10	3×10
3·8×10	1+1	0	1510	3·8×10	3×10
3·8×10	1+2	0·05	1486	3·8×10	3×10
3·8×10	1+3	0·05	1451	3·8×10	3×10
3·8×10	1+4	0·1	1415	3·8×10	3×10
3·8×10	1+6	0·15	13·59	3·8×10	3×10

graphs
Sketch of test rig
conclusion

Result sheet

Ha	N_4	N_u	Q_4	Q_u	T_4	T_u	Pt_4	P_u	P_{a4}	η_o %
38	1540	249·82	0·015	0·0024	1·0535	0·0277	0·1698	0·0072	5·586	3
38	1510	244·954	0·015	0·0024	2·107	0·0554	0·333	0·0014	5·586	5·96
38	1486	241·061	0·015	0·0024	3·107	0·0817	0·483	0·002	5·586	8·64
38	1451	235·383	0·015	0·0024	4·161	0·1095	0·631	0·0026	5·586	11·29
38	1415	229·543	0·015	0·0024	5·162	0·1358	0·764	0·0032	5·586	13·67
38	1359	220·458	0·015	0·0024	7·216	0·1898	1026	0·0043	5·586	18·36



Cross Pattern

Scale - 1:1

All dimensions are in mm

Page No. 41
Date.

NAME of THE JOB : Split Pattern

RAW MATERIAL : Any Common wood.

OBJECT : To make a Split Pattern as per figure from a wooden Rack size of 200mm x 70mm x 35mm.

REQUIREMENT of TOOLS AND MECHANISM :

i) Steel Rule ii) Try square iii) marking gauge iv) Carpentry vice v) Tenon saw vi) claw hammer vii) wood turning lathe.

WORKING PROCEDURE :

i) Cut two pieces in two equal parts.

ii) To plane one side of the two pieces with the help of planers, hold two piece in the vice

iii) marking one side and make two holes with the help of drill machine

iv) Hold the job b/w centers of wood turning lathe, remove the outer wood with the help of outside gauge chisel, skelling chisel, then finish the split pattern very accurate dimension and good surface finish

14/11/19

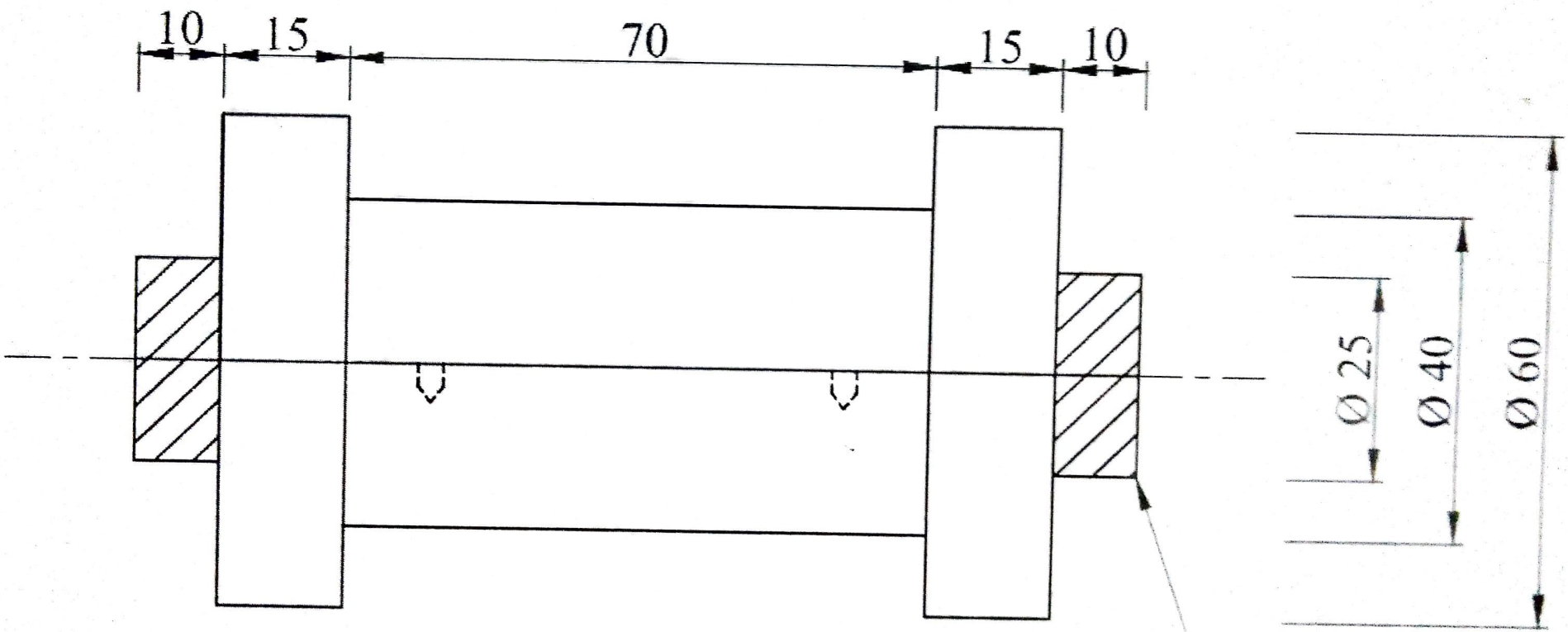
Teacher's Signature .....

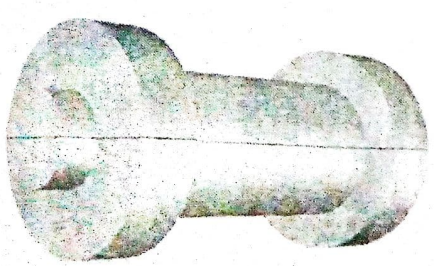
DR. B.C. ROY ENGINEERING COLLEGE
MECHANICAL ENGINEERING DEPARTMENT

PRACTICE OF MANUFACTURING PROCESSES (PC-ME-391)

::: JOB SKETCH :::

****





SPLIT PATTERN.

Scale -1:1

All dimensions are in mm.

Prepared By: S. Ghosh

Checked By:

DR. B.C. ROY ENGINEERING COLLEGE
MECHANICAL ENGINEERING DEPARTMENT
PRACTICE OF MANUFACTURING PROCESSES (PC-ME-391)
::: JOB REPORT :::

****

PATTERN SHOP

****

► Date of Commencement:
► Date of Completion:

► NAME OF THE JOB: Split Pattern.

► RAW MATERIAL: Any Commercial Wood.

► OBJECT: To Make a Split Pattern as per Figure, from a Wooden Block, Sizes of 200mm X 70mm X 35mm.

► REQUIREMENT OF TOOLS & MACHINES :

(i) Steel rule, (ii) Try Square, (iii) Marking Gauge, (iv) Carpentry Vice, (v) Iron Jack planer, (vi) Tenon Saw, (vii) Claw Hammer, (viii) Wood Turning Lathe, (ix) Drill Machine etc.

► WORKING PROCEDURE : : (Explain following points...)

1) Cut two pieces in two equal parts.

2) To Plane one side of the two pieces with the help of Iron Jack Planer, hold two pieces in the Bench Vice then join the two pieces with help of nails.

3) Marking one side and make two holes with the help of drill Machine.

4) Hold the job in between centre in the Wood Turning Lathe, Remove the extra wood with the help of Outside Gauge Chisel, Shaping Chisel & Parting of Chisel, then finish the Split Pattern very accurate dimension and good surface finish. Cut extra wood with the help of Tenon Saw & finish again the whole surface accurately.

****

DR. B. C. ROY ENGINEERING COLLEGE, DURGAPUR
WEST BENGAL

Certificate

This is to certify that the project thesis entitled "Evaluation of Airfield Pavement Response using Warm Mix Asphalt" being submitted by **Subham Kumar (12001316032), Subham Chakraborty (12001316033), Srishti Deo (12001316034), Srishti Chourasia (12001316035), Soumyadip Mondal (12001316036), Somnath Rakshit (12001316037), Sibtin Raza (12001316038) and Shuvrapratim Bera (12001316039)** to Dr. B. C. Roy Engineering College, Durgapur (West Bengal) for the award of 8th Semester Project Work (CE 881), is a record of bonafide research work carried out by him under my supervision.

The results embodied in this thesis have not been submitted elsewhere to any other University or Institute for the award of any Degree.

Date: 24th June, 2020

Place: Durgapur

Sanjay Sengupta
H.O.D. / C.E.
Dr. B. C. Roy Engg. College, Durgapur

Arijit Kumar Banerji

Prof. Dr. Sanjay Sengupta	Prof. Arijit Kumar Banerji
Head of the Department	Assistant Professor
Department of Civil Engineering	Department of Civil Engineering
Dr. B. C. Roy Engineering College, Durgapur	Dr. B. C. Roy Engineering College, Durgapur

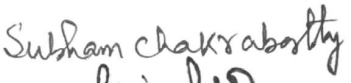
Acknowledgement

This study work would not have been possible without the valuable guidance of our supervisor Prof. Arijit Kumar Banerji of Civil Engineering Department, Dr. B. C. Roy Engineering College, Durgapur. We hereby take this opportunity to express our deep sense of thankfulness to him. His kind cooperation and the interactive environment ensured the successful completion of 8th Semester Project part I Work (CE-881).

We are grateful to faculty members of the Department of Civil Engineering, Dr. B. C. Roy Engineering College, Durgapur who have taught us during the earlier semester and made us understand the various facts related to this study.

We are also thankful to Dr. Sanjay Sengupta (H.O.D, Department of Civil Engineering, Dr. B. C. Roy Engineering College, Durgapur) for his constant support and providing great source of inspiration to our work.

Dated: 24th June, 2020

Student Name	**Roll No.**	**Signature**
SUBHAM KUMAR	(12001315132)	
SUBHAM CHAKRABORTTY	(12001315133)	
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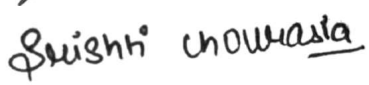
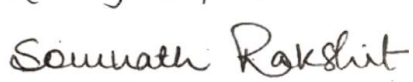
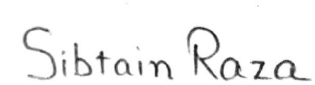
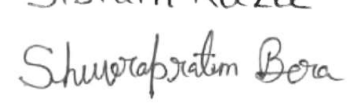
SRISHTI CHOURASIA	(12001315135)	
SOUMYADIP MONDAL	(12001315136)	
SOMNATH RAKSHIT	(12001315137)	
SIBTAIN RAZA	(12001315138)	
SHUVRAPRATIM BERA	(12001316039)	

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Dr. B. C. ROY ENGINEERING COLLEGE, DURGAPUR, WB

RECOMMENDATION

This is to recommend that the work undertaken in this report entitled, "**Offline Handwritten Digits Recognition Using Machine Learning**" has been carried out by **Biswaraj Chatterjee, Suratjyoti Dutta, Suraj Patel** and **Sunny Kumar Thakur** under my/our supervision and guidance during the academic year 2019-20. This may be accepted in partial fulfilment of the requirements for the award of the degree of Bachelor of Technology (Computer Science and Engineering).

_____

Prof. Suvobrata Sarkar

Assistant Professor

Department of Computer Science & Engineering

Dr. B. C. Roy Engineering College, Durgapur

_____

Dr. Chandan Konar

Head of Department [HOD]

Department of Computer Science & Engineering

Dr. B. C. Roy Engineering College, Durgapur

RINL VIZAG STEEL Pride of Steel
A Navratna Company

राष्ट्रीय इस्पात निगम लिमिटेड Rashtriya Ispat Nigam Limited
विशाखपट्टणम इस्पात संयंत्र Visakhapatnam Steel Plant
तकनीकी प्रशिक्षण केन्द्र Technical Training Institute
विशाखपट्टणम Visakhapatnam-530031

No. 06982
0006982

प्रमाण पत्र CERTIFICATE

S1902TN01228-0154

प्रामाणित किया जाता है कि श्री/*This is to certify that*

Mr./Ms. MONALISHA KARMAKAR *a student of*

(वर्ष/पाठ्यक्रम/शाखा *Year/Course/Branch/* IV/B TECH/INFORMATION TECHNOLOGY

विध्यार्थी ने *from* DR B C ROY ENGINEERING COLLEGE,DURGAPUR से

has undergone INTERNSHIP प्रशिक्षण *training* विशाखपट्टणम इस्पात संयंत्र

के *at Visakhapatnam Steel Plant in* ENTERPRISE RESOURCE PLANNING

विभागों में *depts. from* दि 17/06/2019 से *to* 29/06/2019 तक प्राप्त किया।

परियोजना शीर्षक *The project title is* **********

है।

प्रशिक्षण अवधि में उनका आचरण *His/Her conduct during the period of training is*

GOOD है।

स्थल/Place : Visakhapatnam

दि/Date 29/06/2019

प्रक्षिण समन्वयक के हस्ताक्षर मोहर के साथ।
Signature of Training Co-Ordinator with Seal

जे. प्रभाकर राव-J. PRABHAKARA RAO
प्रबंधक (प्रशिक्षण)-Manager (Trg.)
तकनीकी प्रशिक्षण संस्थान
Technical Training Institute
आर आई एन एल,विशाखपट्टणम इस्पात संयंत्र
RINL,Visakhapatnam Steel Plant
विशाखपट्टणम-Visakhapatnam-530 031

Prashikshan - 2019

SHAVAK NANAVATI TECHNICAL INSTITUTE

An ISO 9001:2008 Organization

CERTIFICATE

This is to certify that Himanshu Shekhar (Reg. No. VT20192882), *student of* DR.B.C.ROY ENGINEERING COLLEGE, *has undergone Vacation Training Programme at* ***TATA STEEL LTD****., Jamshedpur from* 09-July ,2019 *to* 06-August ,2019*. The details of the programme are as under:*

Department Covered	CLIENT PARTNER
Project Title	DS COMPOUND OPTIMIZATION

He/She has successfully completed the Programme.

Place : Jamshedpur
Date : 14-08-2019
Ref No. : VT20192882

Coordinator
Vacation Training
TATA STEEL LTD.

SHAVAK NANAVATI TECHNICAL INSTITUTE, TATA STEEL Ltd, N-ROAD, BISTUPUR, JAMSHEDPUR -831001, INDIA
Telephone : 91-657-2320243, Fax : 91-657-2320243, E-mail-snti.office@tatasteel.com

इंडियन ऑयल कॉर्पोरेशन लिमिटेड
बरौनी रिफाइनरी, डाकघर : बरौनी ऑयल रिफाइनरी,
जिला : बेगूसराय, बिहार – 851 114
Indian Oil Corporation Limited
Barauni Refinery, P.O. : Barauni Oil Refinery,
Distt. : Begusarai, Bihar - 851 114
वेबसाइट : www.iocl.com
ई–मेल : baraunirefinery@indianoil.in
दूरभाष : 06243-240159 / 240110
फैक्स : 06243-240150 /240278

स्वच्छ भारत
एक कदम स्वच्छता की ओर

इंडियनऑयल

रिफाइनरीज़ प्रभाग
Refineries Division

ISO : 9001, 14001 & OHSAS : 18001 Certified Refinery

Ref: L&D/VT-CERT/19

Date: 15.07.2019

To whom it may concern

It is to certify that **Ms. PRIYANSHI KUMARI, Roll No. 12005516016** a student of **Electronics & Instrumentation Engineering** discipline from **Dr. B.C.ROY ENGINEERING COLLEGE, DURGAPUR, WEST BENGAL** has been undergone Industrial Training(VT) in **IOCL BARAUNI REFINERY** from **15.06.2019** to **15.07.2019** in the functional area of **Instrumentation Department.** A brief account of her learning is compiled and submitted as project work.

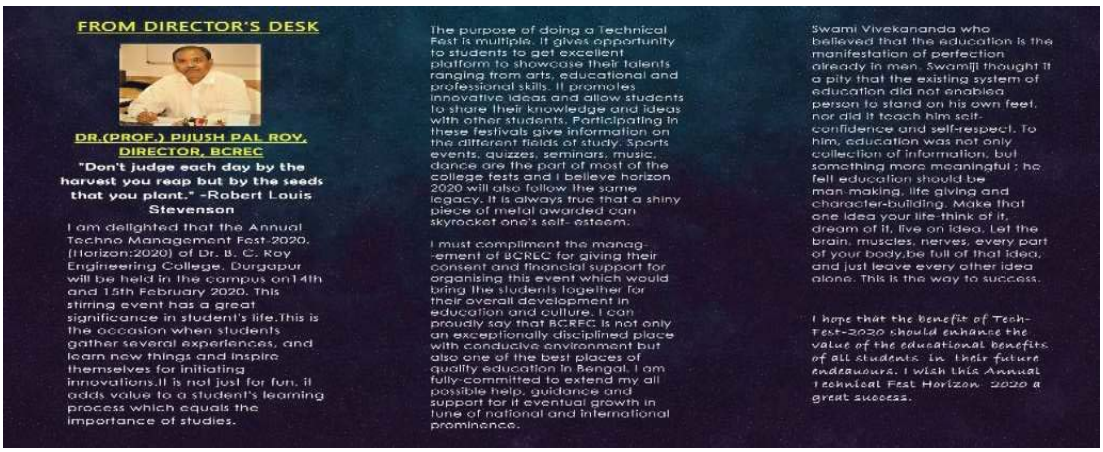
As a trainee she is found to be punctual; demonstrated keen interest in learning and acquiring skills. We wish her all the success in her career.

15/07/19

(Krishna Kumari)
Asst. Manager
Learning & Development

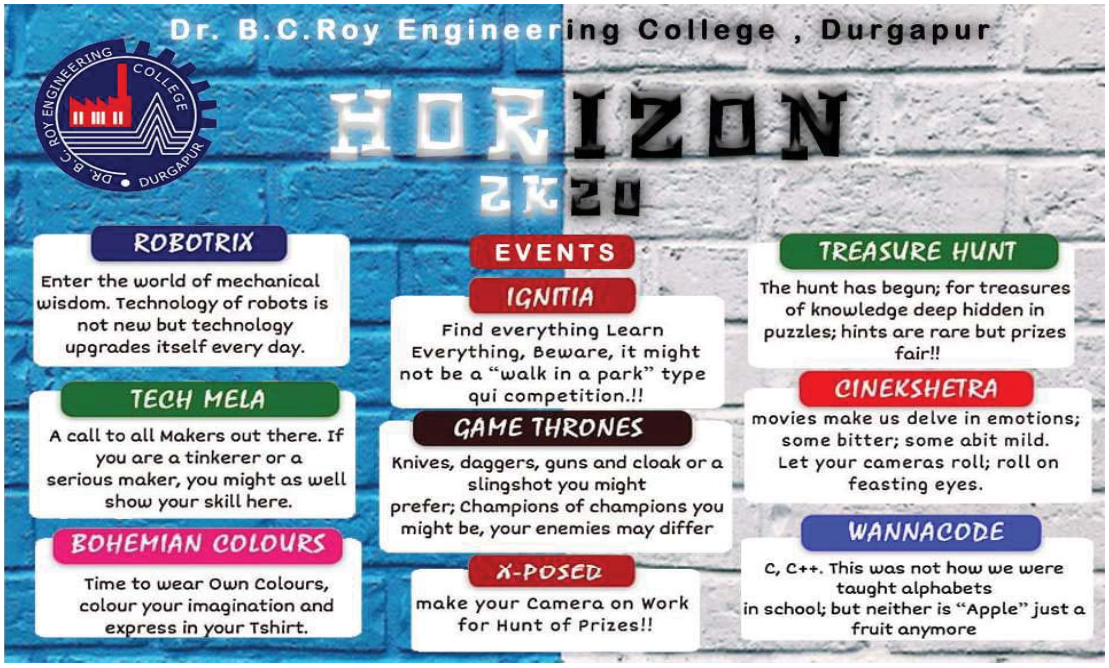
कृष्णा कुमारी
KRISHNA KUMARI
सहायक प्रबंधक (प्रशिक्षण एवं विकास)
ASSTT. MANAGER (T & D)
इंडियन ऑयल कॉर्पोरेशन लिमिटेड
INDIAN OIL CORPORATION LTD.
बरौनी रिफाइनरी, बेगूसराय–851 114 (बिहार)
Barauni Refinery, Begusarai-851 114 (Bihar)

BANNERS AND PHOTOGRAPHS OF THE EVENT



Game Throne Competition

CENTRAL EVENTS



To
The Director
Dr. B C Roy Engineering College, Durgapur
Jemua Road, Fuljhor

27/02/2020

Subject: Permission for site visit of 30 Civil Engineering Department students on 02nd March,2020

Respected Sir,

With due respect I would like to inform you that a prestigious organization "Unique Procon Pvt. Ltd." has granted permission for a site visit on 2nd March, 2020 from 9:30am to 12:30 pm, for 30 students of Civil Engineering Department of our college at their construction site located in Shankarpur, Durgapur. The copy of the approval is enclosed for your reference.

The students would be accompanied by three faculty members of the department.

This visit would help the students in better understanding of various concepts and gather practical knowledge. The visit may also enhance academic-Industry relationship.

I will be highly obliged if you grant permission for the same. The necessary arrangements of transportation will be arranged by the students themselves.

The list of 30 students and faculty coordinators are attached herewith.

Thanking You,

Yours Sincerely,

Sanjay Sengupta 27/02/2020

Sanjay Sengupta
HOD, CE

Fwd By:

Dean, Academic: 27/2/2020

Dean, Student Affairs 27/2/2020

Approved by:

Director: 27/2/2020

Dr. B. C. Roy Engineering College, Durgapur

Department of Civil Engineering

Date:26.02.2020

To
The Directors
Unique Procon Pvt. Ltd.
Shankarpur, Durgapur-713212

Sub: Request for site visit of 30 students of Civil Engineering Department of Dr.B.C.Roy Engg. College,Durgapur.

Dear Sir,

Greetings!

I am writing this letter with due respect in order to seek your permission for a site visit on 02nd March,2020 from 9.30 A.M. to 12.30 P.M. for 30 students of Civil Engineering Department of our college at your construction site located in Shankarpur, Durgapur. The students will be accompanied by two faculty members of the department.

It will be a great pleasure if you allow our students to visit your construction site to enrich their knowledge which will in-turn enhance the academic-industry relationship.

I shall be looking forward to your fullest co-operation.

With warm regards.

Thanking you,

Yours sincerely,

Sanjay Sengupta

Dr. Sanjay Sengupa 26/02/2020
HOD, Dept. of Civil Engg.
BCREC, Durgapur

Approved as mentioned above
26/02/2020
UNIQUE PROCON PVT. LTD.
Authorised Signatory

List of Students:

Sl No.	Roll No.	Name
1	12001317058	POOJA KUMARI
2	12001317050	RAKHI AGARWAL
3	12001317024	VIVEK KUMAR
4	12001317056	PRANIT KR BHARGAVA
5	12001317046	SAIF KHAN
6	12001317059	OM PRAKASH MAHATO
7	12001317054	PREM KUMAR PATEL
8	12001317052	RAHUL KUMAR SINGH
9	12001317047	RIYANKA MANNA
10	12001317042	SHIVAM
11	12001317030	SURYAKANT KUMAR
12	12001317043	SHASHANK KUMAR
13	12001317045	SANTANU BALA
14	12001317035	SUBHADIP DEY
15	12001318011	SUBHAJIT SINHA

Sl. No.	Roll No.	Name
16	12001318037	ABHISHEK GOSWAMI
17	12001318034	ARABINDA MAHATO
18	12001318027	DURLAV GORAIN
19	12001318020	RAJESH GORAIN
20	12001317102	AADIL NAWAZ MALLICK
21	12001317070	MD KAMRAN
22	12001317067	MD ANAS HASSAN
23	12001317079	KISALAY KUMAR
24	12001317068	MD SAHIL RAZA
25	12001317069	MD KHOWAZA RAHMAT RAZA
26	12001317083	FAIZAN CHISTY AHMAD
27	12001317077	KRISHNA CHANDRA MANDAL
28	12001317096	AMAN RAJ
29	12001317093	ANANYA KUMAR SAM
30	12001317065	MUKESH KUMAR

List of Faculty Members:

1. Dr. Sanjay Sengupta, HOD CE Dept. BCREC
2. Mr. Shovan Roy, Asst. Prof. CE Dept. BCREC
3. Mr. Anupam Kumar Biswas, CE Dept. BCREC

Sanjay Sengupta 27/02/2020


PROJECT SITE
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