DR. B.C.ROY ENGINEERING COLLEGE, DURGAPUR

REVISED ACADEMIC CALENDAR - EVEN SEMESTER [JANUARY 2020 TO JUNE 2020] AS PER MAKAUT ACADEMIC CALENDAR 2020

MONTH	MON	TUE	WED	THU	FRI	SAT	SUN	REMARKS
JANUARY			1	2	3	4	5	21-01-2020 - COMMENCEMENT OF CLASSES
	6	7	8	9	10	11	12	01.01.2020:NPTEL COURSE ENROLLMENT STARTING(UNDER MOOCs)
	13	14	15	16	17	18	19	23.01.2020 - NETAJI'S BIRTH DAY
	20	21	22	23	24	25	26	29.01.2020 -SARASWATI PUJA/ 31.01.2020 - ANNUAL SPORTS DAY
	27	28	29	30	31			CONTINUOUS EVALUATION (PHASE I) : 31.01.2020
FEBRUARY								
						1	2	03.02.2020 - NPTEL SET - I ENROLMENT CLOSING
	3	4	5	6	7	8	9	12.02.2020 - DULAL MITRA REMEMBRANCE CEREMONY
	10	11	12	13	14	15	16	13.02.2020 - CULTURAL FUNCTION
	17	18	19	20	21	22	23	14.02.2020-15.02.2020 - TECH FEST/21.02.2020 - SHIVARATRI
	24	25	26	27	28	29	30	24.02.2020-NPTEL SET II ENROLLMENT CLOSING(UNDER MOOCs)
MARCH							1	CONTINUOUS EVALUATION (PHASE II) : 28.02.2020
	2	3	4	5	6	7	8	
	9	10	11	12	13	14	15	10.03.2020 - HOLI
	16	17	18	19	20	21	22	24.03.2020--28.03.2020 - FIRST ASSIGNMENT/24.03.2020-31.03.2020-FIRST TEST SLOT FOR SPOKEN TUTORIAL(UNDER MOOCs)
	23	24	25	26	27	28	29	29.03.2020 - NPTEL FIRST EXAMINATION (UNDER MOOCs)
	30	31						CONTINUOUS EVALUATION (PHASE III) : 31.03.2020/MENTORING REPORT SUBMISSION (PHASE I) : 31.03.2020
APRIL			1	2	3	4	5	
	6	7	8	9	10	11	12	10.04.2020 - GOOD FRIDAY
	13	14	15	16	17	18	19	14.04.2020: DR. AMBEDKAR'S BIRTH DAY/BENGALI NEW YEAR
	20	21	22	23	24	25	26	25.04.2020 & 26.04.2020 - NPTEL SECOND & THIRD EXAMINATION (UNDER MOOCs)
	27	28	29	30				CONTINUOUS EVALUATION (PHASE IV) : 30.04.2020
MAY					1	2	3	
	4	5	6	7	8	9	10	01.05.2020:MAY DAY/07.05.2020:RABINDRA JAYANTI/08.05.2020:BUDDHA PURNIMA
	11	12	13	14	15	16	17	11.05.2020-16.05.2020 UNIVERSITY PRACTICAL EXAMINATION & VIVA-VOCE
	18	19	20	21	22	23	24	22.05.2020-09.06.2020 - UNIVERSITY THEORY EXAMINATION
	25	26	27	28	29	30	31	26.05.2020 - ID-UL-FITR
JUNE	1	2	3	4	5	6	7	26.05.2020-29.05.2020-SECOND TEST SLOT FOR SPOKEN TUTORIAL(UNDER MOOCs)
	8	9	10	11	12	13	14	
	15	16	17	18	19	20	21	MENTORING REPORT SUBMISSION (PHASE II) : 30.06.2020
	22	23	24	25	26	27	28	10.06.2020-14.07.2020 - INTER-SEMESTER BREAK
	29	30	31					

LEGEND	
	GENERAL HOLIDAYS
	WEEKLY HOLIDAYS

* College hours: 10 a.m. to 5:30 p.m./ LABS WILL BE OPENED FROM 9:50 a.m./Absence from the scheduled classes/tests is punishable

**Any other Holiday that will intimated by the appropriate Authourity to be notified later on.

DATES OF CONTINUOUS EVALUATION/UNIVERSITY PRACTICAL & THEORY EXAMINATION MAY CHANGE IN CASE MAKAUT REVISE ANY DATES.

Pijush Pal Roy
DIRECTOR
Dr. B. C. Roy Engineering College
DURGAPUR.

Dr. B.C. ROY ENGINEERING COLLEGE, DURGAPUR

REVISED ACADEMIC CALENDAR - ODD SEMESTER [JULY TO DECEMBER 2019] AS PER MAKAUT CALENDAR

MONTH	MON	TUE	WED	THU	FRI	SAT	SUN	WEEK	REMARKS
ODD SEMESTER ACADEMIC ACTIVITIES WILL START FROM 9TH JULY, 2019 AND FOR THE STUDENTS FROM 16TH JULY, 2019 [EXCEPT FIRST SEMESTER]									
JULY	1	2	3	4	5	6	7	1	
	8	9	10	11	12	13	14	2	
	15	16	17	18	19	20	21	3	STUDENTS RETURN FROM VACATION 16TH JULY 2019
	22	23	24	25	26	27	28	4	21.07.2019: NSS ACTIVITIES - INTERNATIONAL YOGA DAY
	29	30	31					5	
AUG				1	2	3	4	6	
	5	6	7	8	9	10	11	7	02.08.2019 : ORIENTATION PROGRAMME
	12	13	14	15	16	17	18	8	03.08.19 TO 14.08.19 : INDUCTION PROGRAMME FOR FIRST YEAR/ 15.08.19 : INDEPENDENCE DAY
	19	20	21	22	23	24	25	9	13.08.19 TO 17.08.19 : SUBMISSION OF FIRST ASSIGNMENT/ 23.08.19 : JANMASTAMI
	26	27	28	29	30	31		10	31.08.19 : FRESHERS' WELCOME
SEPT							1		1ST ROUND OF TEST ON SPOKEN TUTORIAL PROJECT-IIT(BOMBAY) DURING 1ST WEEK (UNDER MOOCS)
	2	3	4	5	6	7	8	11	30.08.19 - 07.09.19: MAKAUT PHASE - I EVALUATION (OFF LINE CLASS TEST-I)
	9	10	11	12	13	14	15	12	10.9.19:MUHARRUM/11.09.19 TO 14.09.19: SUBMISSION OF MENTORING REPORT(PHASE-I) TO SPOC/ SUBMISSION OF SECOND ASSIGNMENT
	16	17	18	19	20	21	22	13	17.09.19: VISWAKARMA PUJA/18.09.19 - 21.09.19 MAKAUT PHASE-II EVALUATION(ON-LINE CLASS TEST-II)
	23	24	25	26	27	28	29	14	27.09.19 :NSS ACTIVITIES INCLUDING 1ST YEAR / 28.09.19: MAHALAYA
	30								29.09.19 : FIRST SLOT OF NPTEL EXAMINATION (UNDER MOOCS)
OCT		1	2	3	4	5	6	15	2.10.19: MAHATMA GANDHI'S BIRTHDAY
	7	8	9	10	11	12	13	16	03.10.19 TO 12.10.19 : DURGA PUJA AND LAKSHMI PUJA
	14	15	16	17	18	19	20	17	17.10.19-24.10.19 MAKAUT PHASE-III EVALUATION(OFF-LINE CLASS TEST-III FOR WEAK STUDENTS)
	21	22	23	24	25	26	27	18	
	28	29	30	31				19	31.10.19 TO 03.11.19:2ND ROUND OF TEST ON SPOKEN TUTORIAL PROJECT-IIT(B) (UNDER MOOCS)
NOV									29.10.19 TO 30.10.19 : BHATRIDWITIYA
					1	2	3		02.11.19 : CHHAT PUJA
	4	5	6	7	8	9	10	20	
	11	12	13	14	15	16	17	21	12.11.19: GURU NANAK'S BIRTHDAY/ 13.11.19 - 19.11.2019 : MAKAUT PHASE-IV (OFF-LINE CLASS TEST-IV)
	18	19	20	21	22	23	24	22	16.11.19 TO 17.11.19 : SECOND SLOT OF NPTEL EXAMINATION (UNDER MOOCS) / 19.11.19-23.11.19:SUBMISSION OF MENTORING REPORT-PHASE-II
	25	26	27	28	29	30		23	22.11.19 TO 30.11.19 - MAKAUT PRACTICAL EXAMINATIONS
DEC							1		
	2	3	4	5	6	7	8	24	04.12.19 TO 21.12.19 : MAKAUT THEORY EXAMINATIONS (UG & PG)
	9	10	11	12	13	14	15	25	
	16	17	18	19	20	21	22	26	25.12.19 : CHRISTMAS DAY
	23	24	25	26	27	28	29	27	22.12.19 TO 12.01.20: INTER SEMESTER BREAK
	30	31	LEGEND :	WEEKLY HOLIDAYS					COLLEGE WILL RE-OPEN ON 14TH JANUARY 2020

17/7/2019

DR. B.C.ROY ENGINEERING COLLEGE, DURGAPUR

ACADEMIC CALENDAR - EVEN SEMESTER [JANUARY 2019 TO JUNE 2019]

MONTH	MON	TUE	WED	THU	FRI	SAT	SUN	REMARKS
JANUARY		1	2	3	4	5	6	10-01-19 - COMMENCEMENT OF CLASSES
	7	8	9	10	11	12	13	01.01.2019:NPTEL COURSE ENROLLMENT STARTING(UNDER MOOCs)
	14	15	16	17	18	19	20	12.01.19 - SWAMI VIVEKANANDA'S BIRTHDAY
	21	22	23	24	25	26	27	23.01.19 - NETAJI'S BIRTH DAY/26.01.19 - REPUBLIC DAY
	28	29	30	31				31.01.2019:SPOKEN TUTORIAL ENROLMENT CLOSING(UNDER MOOCs)
FEBRUARY								
					1	2	3	02.02.19 - ANNUAL SPORTS DAY
	4	5	6	7	8	9	10	04.02.19 - NPTEL SET - I ENROLMENT CLOSING/ 10.02.2019 - SARASWATI PUJA
	11	12	13	14	15	16	17	12.02.19-16.02.19 - FIRST ASSIGNMENT
	18	19	20	21	22	23	24	04.02.19-05.02.19 - TECH FEST/06.02.19 - CULTURAL FEST
	25	26	27	28				25.02.19-NPTEL SET II COURSE STARTING & ENROLLMENT CLOSING(UNDER MOOCs)
MARCH					1	2	3	04.03.19 - SHIVARATRI
	4	5	6	7	8	9	10	05.03.2019-09.03.2019 - FIRST TEST SLOT (INCLUDING BACKLOG STUDENTS)-TENTATIVE
	11	12	13	14	15	16	17	21.03.19 - DOLJATRA/22.03.19-HOLI
	18	19	20	21	22	23	24	26.03.19-30.03.19 - SECOND ASSIGNMENT/26.03.19-31.03.19-FIRST TEST SLOT FOR SPOKEN TUTORIAL(UNDER MOOCs)
	25	26	27	28	29	30	31	31.03.19 - NPTEL FIRST EXAMINATION (UNDER MOOCs)
APRIL	1	2	3	4	5	6	7	02.04.19 -06.04.19-SECOND TEST SLOT(INCLUDING BACKLOG STUDENTS)-TENTATIVE
	8	9	10	11	12	13	14	14.04.19: Dr. AMBEDKAR'S BIRTH DAY/15.04.19:BENGALI NEW YEAR
	15	16	17	18	19	20	21	17.04.19- MAHAVIR JAYANTI/ 19.04.19 - GOOD FRIDAY/21.04.19-SAB-E-BARAT
	22	23	24	25	26	27	28	27.04.19 & 28.04.19 - NPTEL SECOND & THIRD EXAMINATION (UNDER MOOCs)
	29	30						
MAY			1	2	3	4	5	01.05.19 : MAY DAY/02.05.19-08.05.19-SECOND TEST SLOT FOR SPOKEN TUTORIAL(UNDER MOOCs)
	6	7	8	9	10	11	12	02.05.18-08.05.18-THIRD TEST SLOT(INCLUDING BACKLOG STUDENTS)-TENTATIVE
	13	14	15	16	17	18	19	09.05.19 - RABINDRA JAYANTI/18.05.19 : BUDDHA PURNIMA
	20	21	22	23	24	25	26	10.05.19-17.05.19 UNIVERSITY PRACTICAL EXAMINATION & VIVA-VOCE (TENTATIVE)
	27	28	29	30	31			22.05.19-08.06.19 - UNIVERSITY THEORY EXAMINATION (TENTATIVE)
JUNE						1	2	
	3	4	5	6	7	8	9	
	10	11	12	13	14	15	16	05.06.19 - ID-UL-FITR
	17	18	19	20	21	22	23	
	24	25	26	27	28	29	30	11.06.19-29.06.19 - INTER-SEMESTER BREAK (TENTATIVE)
		COLLEGE WILL RE-OPEN ON 10TH JANUARY 2019 AFTER WINTER RECESS						

LEGEND

	GENERAL HOLIDAYS
	WEEKLY HOLIDAYS

* College hours: 10 a.m. to 5:30 p.m./ LABS WILL BE OPENED FROM 9:50 a.m.

** All sessionals are to be submitted by the students in time and to report to the concerned HOD/***Absence from the scheduled classes/tests is punishable

****Any other Holiday that will intimated by the appropriate Authourity to be notified later on.

DATES OF CLASS TESTS/UNIVERSITY PRACTICAL & THEORY EXAMINATION WILL CHANGE AS PER MAKAUT ACADEMIC CALENDAR OF 2019

Pijush Pal Roy 12/12/2018
DIRECTOR
Dr. B. C. Roy Engineering College
DURGAPUR

DR. B.C.ROY ENGINEERING COLLEGE, DURGAPUR

ACTIVITY CALENDAR - PART OF MAR REQUIREMENT OF MAKAUT

EVEN SEMESTER [JANUARY 2019 TO JUNE 2019]

MONTH	MON	TUE	WED	THU	FRI	SAT	SUN	REMARKS
JAN		1	2	3	4	5	6	
	7	8	9	10	11	12	13	19-01-19-VOLUNTARY ORGAN DONATION WORKSHOP AND HEALTH CAMP
	14	15	16	17	18	19	20	25-01-19- BLOOD DONATION CAMP
	21	22	23	24	25	26	27	29-01-19 - WORKSHOP ON PHOTOGRAPHY (4:30 PM)
	28	29	30	31				30-01-19 TO 01-02-19- CRICKET AND OTHER TOURNAMENTS
FEB					1	2	3	02-02-19 - ANNUAL SPORTS DAY
	4	5	6	7	8	9	10	04-02-19 TO 05-02-19- TECH FEST; 06-02-19-CULTURAL FUNCTION
	11	12	13	14	15	16	17	09-02-2019 - PHOTOGRAPHY COMPETITION
	18	19	20	21	22	23	24	10-02-19 TO 12-02-19 -CRICKET AND OTHER TOURNAMENTS
	25	26	27	28				
MAR					1	2	3	
	4	5	6	7	8	9	10	
	11	12	13	14	15	16	17	16-03-19-GROUP DISCUSSION /DEBATE(FOR FINAL YEAR STUDENTS) BY DEPARTMENT
	18	19	20	21	22	23	24	30-03-19-ENTREPRENEURSHIP PROGRAMME
	25	26	27	28	29	30	31	23-03-19 - GROUP DISCUSSION /DEBATE(FOR THIRD YEAR STUDENTS) BY DEPARTMENT
APR	1	2	3	4	5	6	7	
	8	9	10	11	12	13	14	
	15	16	17	18	19	20	21	
	22	23	24	25	26	27	28	
	29	30						
MAY			1	2	3	4	5	
	6	7	8	9	10	11	12	
	13	14	15	16	17	18	19	
	20	21	22	23	24	25	26	
	27	28	29	30	31			
JUNE						1	2	
	3	4	5	6	7	8	9	
	10	11	12	13	14	15	16	
	17	18	19	20	21	22	23	
	24	25	26	27	28	29	30	

Pijush Pal Roy 27/12/2018
DIRECTOR
Dr. B. C. Roy Engineering College
DURGAPUR

Dr. B.C. ROY ENGINEERING COLLEGE, DURGAPUR

ACADEMIC CALENDAR - ODD SEMESTER [JULY TO DECEMBER 2018]

MONTH	MON	TUE	WED	THU	FRI	SAT	SUN	WEEK	REMARKS
									ODD SEMESTER ACADEMIC ACTIVITIES WILL START FROM 3RD JULY, 2018 AND FOR THE STUDENTS FROM 10TH JULY, 2018 [EXCEPT FIRST SEMESTER]
JULY							1	1	
	2	3	4	5	6	7	8	2	
	9	10	11	12	13	14	15	3	STUDENTS RETURN FROM VACATION 10TH JULY 2018
	16	17	18	19	20	21	22	4	
	23	24	25	26	27	28	29	5	25.07.2018: NSS ACTIVITIES - SWACCHH BHARAT ABHIYAN PROGRAMME
	30	31						6	
AUG									
			1	2	3	4	5	7	15.08.18 : INDEPENDENCE DAY/
	6	7	8	9	10	11	12	8	08.08.2018 (TENTATIVE) : FRESHERS' JOINING
	13	14	15	16	17	18	19	9	14.08.2018 TO 18.08.2018 : SUBMISSION OF FIRST ASSIGNMENT
	20	21	22	23	24	25	26	10	18.08.2018: E-CELL ACTIVITIES/ 22.08.2018 : ID-UZ-ZOHA
	27	28	29	30	31			11	25.08.2018 (TENTATIVE) : FRESHERS' WELCOME
SEPT						1	2	12	
	3	4	5	6	7	8	9	13	1ST ROUND OF TEST ON SPOKEN TUTORIAL PROJECT-IIT BOMBAY DURING 1ST WEEK
	10	11	12	13	14	15	16	14	04.09.2018 TO 08.09.2018: SUBMISSION OF SECOND ASSIGNMENT
	17	18	19	20	21	22	23	15	14.09.2018 - 20.09.2018: MAKAUT FIRST CLASS TEST SLOT
	24	25	26	27	28	29	30	16	21.09.18: MUHARRAM/ 27.09.2018 TO 28.09.2018:NSS ACTIVITIES INCLUDING 1ST YEAR
OCT	1	2	3	4	5	6	7	17	2.10.18: MAHATMA GANDHI'S BIRTHDAY
	8	9	10	11	12	13	14	18	07.10.2018 : FIRST SLOT OF NPTEL EXAMINATION
	15	16	17	18	19	20	21	19	16.10.2018 TO 25.10.2018: DURGA PUJA, MUHARRAM AND LAKSHMI PUJA
	22	23	24	25	26	27	28	20	28.10.2018: SECOND SLOT OF NPTEL EXAMINATION
	29	30	31					21	30.10.2018 TO 03.11.2018:2ND ROUND OF TEST ON SPOKEN TUTORIAL PROJECT-IIT(B)
NOV									
				1	2	3	4	22	
	5	6	7	8	9	10	11	23	06.11.2018 TO 09.11.2018: KALI PUJA , DIWALI & BHATRIDWITIYA.
	12	13	14	15	16	17	18	24	13.11.2018 : CHHAT PUJA
	19	20	21	22	23	24	25	25	14.11.2018 TO 20.11.2018 : MAKAUT SECOND CLASS TEST SLOT
	26	27	28	29	30			26	23.11.2018: GURU NANAK'S BIRTHDAY
DEC						1	2	27	
	3	4	5	6	7	8	9	28	04.12.2018 TO 21.12.2018 : MAKAUT THEORY EXAMINATIONS (UG & PG)
	10	11	12	13	14	15	16	29	19.12.2018 : FATEH-DWAZ DUHAM
	17	18	19	20	21	22	23	30	25.12.2018 : CHRISTMAS DAY
	24	25	26	27	28	29	30	31	24.12.2018 TO 12.01.2019: INTER SEMESTER BREAK
	31								
LEGEND :									COLLEGE WILL RE-OPEN ON 15TH JANUARY 2019
		WEEKLY HOLIDAYS							ABSENCE FROM THE CLASSES WILL ASK FOR PUNITIVE ACTION AS PER RULES OF THE COLLEGE

* College hours: 10 a.m. to 5:30 p.m./ LABS WILL BE OPEN FROM 9:50 a.m.

** All sessionals are to be submitted by the students in time and to report to the concerned mentors.

***** REVISION/MAKE-UP CLASSES/PENDING LABS/PENDING THEORIES/DOUBT CLEARING CLASSES MAY BE ADJUSTED AS PER CONVENIENCE

DR. B.C.ROY ENGINEERING COLLEGE, DURGAPUR

ACADEMIC CALENDAR - EVEN SEMESTER [JANUARY 2018 TO JUNE 2018]

MONTH	MON	TUE	WED	THU	FRI	SAT	SUN	REMARKS
JANUARY	1	2	3	4	5	6	7	10-01-18 - COMMENCEMENT OF CLASSES
	8	9	10	11	12	13	14	12-01-2018 - SWAMI VIVEKANANDA'S BIRTHDAY
	15	16	17	18	19	20	21	23-01-18 - NETAJI'S BIRTH DAY
	22	23	24	25	26	27	28	26-01-18 - REPUBLIC DAY
	29	30	31					
FEBRUARY								
				1	2	3	4	03.02.18 - ANNUAL SPORTS DAY
	5	6	7	8	9	10	11	10.02.18 - NSS ACTIVITIES
	12	13	14	15	16	17	18	13.02.18-17.02.18 - FIRST ASSIGNMENT
	19	20	21	22	23	24	25	23.02.18-24.02.18 - TECH FEST
	26	27	28					
MARCH				1	2	3	4	01.03.18 - DOLJATRA
	5	6	7	8	9	10	11	02.03.18 - HOLI
	12	13	14	15	16	17	18	07.03.2018-14.03.2018 - FIRST TEST SLOT (INCLUDING BACKLOG STUDENTS)
	19	20	21	22	23	24	25	
	26	27	28	29	30	31		29.03.18 - MAHAVIR JAYANTI/ 30.03.18 - GOOD FRIDAY
							1	
APRIL	2	3	4	5	6	7	8	
	9	10	11	12	13	14	15	14.04.18: Dr. AMBEDKAR'S BIRTH DAY
	16	17	18	19	20	21	22	17.04.18-21.04.18 - SECOND ASSIGNMENT
	23	24	25	26	27	28	29	30.04.18 :BUDDHA PURNIMA
	30							
MAY		1	2	3	4	5	6	01.05.18 : MAY DAY/02.05.18-08.05.18-SECOND TEST SLOT(INCLUDING BACKLOG STUDENTS)
	7	8	9	10	11	12	13	09.05.18 : RABINDRA JAYANTI
	14	15	16	17	18	19	20	10.05.18-16.05.18 UNIVERSITY PRACTICAL EXAMINATION & VIVA-VOCE
	21	22	23	24	25	26	27	22.05.18-09.06.18 - UNIVERSITY THEORY EXAMINATION
	28	29	30	31				
JUNE					1	2	3	
	4	5	6	7	8	9	10	
	11	12	13	14	15	16	17	16.06.18 - ID-UL-FITR
	18	19	20	21	22	23	24	
	25	26	27	28	29	30		12.06.18-30.06.18 - INTER-SEMESTER BREAK
		COLLEGE WILL RE-OPEN ON 3RD JULY 2018 AFTER SUMMER RECESS EXCEPT FOR 1ST SEMESTER						

LEGEND		
	GENERAL HOLIDAYS	
	WEEKLY HOLIDAYS	

* College hours: 10 a.m. to 5:30 p.m./ LABS WILL BE OPENED FROM 9:50 a.m.
** All sessionals are to be submitted by the students in time and to report to the concerned HOD.
*** Absence from the scheduled classes/ tests is punishable
****Any other Holiday that will intimated by the appropriate Authourity to be notified later on.
DATES OF CLASS TESTS/UNIVERSITY PRACTICAL & THEORY EXAMINATION MAY CHANGE IN CASE MAKAUT REVISE ANY DATES.

23/12/2017
Pijush Pal Roy
DIRECTOR
Dr. B. C. Roy Engineering College
DURGAPUR

DR. B. C. ROY ENGINEERING COLLEGE, DURGAPUR

ACADEMIC CALENDAR - UG and PG courses for the ODD SEMESTER [JULY 2017 TO DECEMBER 2017]

MONTH	MON	TUE	WED	THU	FRI	SAT	SUN	REMARKS
JULY						1	2	
	3	4	5	6	7	8	9	
	10	11	12	13	14	15	16	COMMENCEMENT OF ACADEMIC PROGRAMME FOR STAFF MEMBERS : JULY 11, 2017
	17	18	19	20	21	22	23	COMMENCEMENT OF ACADEMIC PROGRAMME FOR STUDENTS : JULY 18, 2017
	24	25	26	27	28	29	30	
	31							
AUGUST								
		1	2	3	4	5	6	
	7	8	9	10	11	12	13	JANMASHTAMI AUGUST 14, 2017
	14	15	16	17	18	19	20	INDEPENDENCE DAY CELEBRATION AUGUST 15, 2017
	21	22	23	24	25	26	27	
	28	29	30	31				
SEPTEMBER					1	2	3	ID-UZ-ZOHA SEPTEMBER 2, 2017
	4	5	6	7	8	9	10	
	11	12	13	14	15	16	17	VISWAKARMA PUJA SEPTEMBER 17, 2017
	18	19	20	21	22	23	24	MAHALAYA SEPTEMBER 19, 2017; FIRST TEST SLOT (SEPTEMBER 20 TO 23, 2017),
	25	26	27	28	29	30		DURGA PUJA, MUHARRAM, GANDHI BIRTHDAY AND LAKSHMI PUJA SEPTEMBER 26 TO OCTOBER 9, 2017,
OCTOBER							1	
	2	3	4	5	6	7	8	
	9	10	11	12	13	14	15	COLLEGE RE-OPEN ON OCTOBER 10, 2017;NSS ACTIVITIES DAY OCTOBER 14, 2017
	16	17	18	19	20	21	22	KALI PUJA AND BHATRIDWITIYA OCTOBER 19 - 21, 2017
	23	24	25	26	27	28	29	CHHAT PUJA OCTOBER 26, 2017
	30	31						
NOVEMBER								
			1	2	3	4	5	GURU NANAK BIRTHDAY NOVEMBER 4, 2017
	6	7	8	9	10	11	12	PRE FINAL LAB EXAMINATIONS NOVEMBER 7 - 11, 2017
	13	14	15	16	17	18	19	SECOND TEST SLOT NOVEMBER 14 - 18, 2017
	20	21	22	23	24	25	26	PRACTICAL EXAMINATIONS & VIVA-VOCE ((NOVEMBER 21 - 30, 2017)
	27	28	29	30				
DECEMBER								
					1	2	3	FATEHA DOAZ DAHAM DECEMBER 2, 2017
	4	5	6	7	8	9	10	THEORY EXAMINATIONS (DECEMBER 5 TO 23, 2017)
	11	12	13	14	15	16	17	
	18	19	20	21	22	23	24	
	25	26	27	28	29	30	31	INTER SEMESTER BREAK (DECEMBER 26, 2017 TO JANUARY 11,2018)
								BIRTHDAY OF SWAMI VIVEKANANDA JANUARY 12, 2018

COLLEGE WILL RE-OPEN ON 13TH JANUARY, 2018

Results will be announced in the University Website in FEBRUARY, 2018

LEGEND	SUSPENSION OF CLASSES
	WEEKLY HOLIDAYS

Any other Holiday that will intimated by the appropriate Authourity to be notified later on.

Principal
Dr. B. C. Roy Engineering College
DURGAPUR

21.06.17.

DR. B. C. ROY ENGINEERING COLLEGE, DURGAPUR

ACADEMIC CALENDAR - UG and PG courses for the EVEN SEMESTER [JANUARY 2017 TO JUNE 2017]

MONTH	MON	TUE	WED	THU	FRI	SAT	SUN	REMARKS
ANUARY							1	01.01.17 - New Years Day
	2	3	4	5	6	7	8	Academic Programme Commences from 02.02.2017
	9	10	11	12	13	14	15	12-01-17 - Swami Vivekananda's Birthday
	16	17	18	19	20	21	22	
	23	24	25	26	27	28	29	23-01-17 - NETAJI'S Birth Day ;26-01-17 - Republic Day;
	30	31						
EBRUARY			1	2	3	4	5	01.02.2017 - Saraswati Puja; Annual Sports - 02.02.2017 - 03.02. 2017
	6	7	8	9	10	11	12	
	13	14	15	16	17	18	19	
	20	21	22	23	24	25	26	24.02.2017 - Shivaratri
	27	28						
MARCH								
			1	2	3	4	5	
	6	7	8	9	10	11	12	Tech Fest - 09.03.2017 - 11.03.2017; Doljatra - 12.03.2017
	13	14	15	16	17	18	19	Holi - 13.03.2017
	20	21	22	23	24	25	26	First Test Slot - March 20 to March 25, 2017
	27	28	29	30	31			
APRIL						1	2	
	3	4	5	6	7	8	9	
	10	11	12	13	14	15	16	14.04.17 - Birthday of Dr. B. R. Ambedkar & Good Friday ; 15.04.2017 - Bengali New Years Day.
	17	18	19	20	21	22	23	Pre-Final Lab Test - April 18 - April 22, 2017
	24	25	26	27	28	29	30	
MAY								
	1	2	3	4	5	6	7	1.05.17 : MAY DAY ;
	8	9	10	11	12	13	14	Birthday Of Rabtndranath Tagore - 09-05-17; Buddha Purnima - 10-05-17; Sab-e-Barat - 12-05-17;
	15	16	17	18	19	20	21	Second Test Slot - May 16 - May 20, 2017
	22	23	24	25	26	27	28	University Practical Examinations & Viva Voce - May 25 - June 2, 2017
	29	30	31					
JUNE				1	2	3	4	
	5	6	7	8	9	10	11	University Theory Examinations - June 7 to June 25, 2017
	12	13	14	15	16	17	18	
	19	20	21	22	23	24	25	
	26	27	28	29	30			26.06.2017 - Id-Ul-Fitter; Inter Semester Break - June 27, 2017 - July 24, 2017 ;

COLLEGE WILL RE-OPEN ON 18th JULY 2017 AFTER SUMMER RECESS FOR ALL THE STAFF MEMBERS

Results will be announced in the University Website in July' 2017

During Inter-Semester-Break, Practical Training (where applicable) may be conducted

LEGEND	
	SUSPENSION OF CLASSES
	WEEKLY HOLIDAYS

****Any other Holiday that will intimated by the appropriate Authourity to be notified later on.

Make up classes of each subjects are to be accommoted in the last fortnight of the academic session.

DR. B. C. ROY ENGINEERING COLLEGE, DURGAPUR

ACADEMIC CALENDAR - UG and PG courses for the ODD SEMESTER [JULY 2016 TO DECEMBER 2016]

MONTH	MON	TUE	WED	THU	FRI	SAT	SUN	REMARKS
JULY					1	2	3	
	4	5	6	7	8	9	10	06.07.16: ID-UL FITRE
	11	12	13	14	15	16	17	COMMENCEMENT OF ACADEMIC PROGRAMME : JULY 12, 2016
	18	19	20	21	22	23	24	
	25	26	27	28	29	30	31	
AUGUST								
	1	2	3	4	5	6	7	
	8	9	10	11	12	13	14	
	15	16	17	18	19	20	21	INDEPENDENCE DAY CELEBRATION AUGUST 15, 2016
	22	23	24	25	26	27	28	JANMASHTAMI AUGUST 25, 2016
	29	30	31					
SEPTEMBER								
				1	2	3	4	
	5	6	7	8	9	10	11	
	12	13	14	15	16	17	18	
	19	20	21	22	23	24	25	FIRST TEST SLOT (SEPTEMBER 20 TO 24, 2016), NSS DAY SEPTEMBER 24, 2016
	26	27	28	29	30			MAHALAYA SEPTEMBER 30, 2016
OCTOBER						1	2	
	3	4	5	6	7	8	9	DURGA PUJA, MUHARRAM AND LAKSHMI PUJA (OCTOBER 7 TO 17, 2016),
	10	11	12	13	14	15	16	COLLEGE RE-OPEN ON OCTOBER 18, 2016
	17	18	19	20	21	22	23	
	24	25	26	27	28	29	30	KALI PUJA OCTOBER 29, 2016 ,
	31							
NOVEMBER		1	2	3	4	5	6	BHATRIDWITIYA NOVEMBER 1, 2016
	7	8	9	10	11	12	13	
	14	15	16	17	18	19	20	SECOND TEST SLOT (NOVEMBER 15 TO 19, 2016)
	21	22	23	24	25	26	27	PRACTICAL EXAMINATIONS & VIVA-VOCE ((NOVEMBER 22TO 30, 2016)
	28	29	30					
DECEMBER				1	2	3	4	
	5	6	7	8	9	10	11	THEORY EXAMINATIONS (DECEMBER 6 TO 23, 2016)
	12	13	14	15	16	17	18	FATEHA DOAZ DAHAM DECEMBER 13, 2016
	19	20	21	22	23	24	25	INTER SEMESTER BREAK (DECEMBER 24, 2016 TO JANUARY 12,2017)
	26	27	28	29	30	31		

COLLEGE WILL RE-OPEN ON 13TH JANUARY, 2017

Results will be announced in the University Website in FEBRUARY, 2017

LEGEND	
	SUSPENSION OF CLASSES
	WEEKLY HOLIDAYS

Any other Holiday that will intimated by the appropriate Authourity to be notified later on.

Principal
Dr. B. C. Roy Engineering College
DURGAPUR

DR. B. C. ROY ENGINEERING COLLEGE, DURGAPUR

ACADEMIC CALENDAR - UG and PG courses for the EVEN SEMESTER [JANUARY 2016 TO JUNE 2016]

MONTH	MON	TUE	WED	THU	FRI	SAT	SUN	REMARKS
JANUARY					1	2	3	01.01.16 - New Years Day
	4	5	6	7	8	9	10	
	11	12	13	14	15	16	17	Academic Programme Commences from 12.01.2016
	18	19	20	21	22	23	24	23-01-16 - NETAJI'S Birth Day
	25	26	27	28	29	30	31	26-01-16 - Republic Day
FEBRUARY								
	1	2	3	4	5	6	7	
	8	9	10	11	12	13	14	13.02.16 - Saraswati Puja
	15	16	17	18	19	20	21	
	22	23	24	25	26	27	28	First Test Slot - February 23 to February 27, 2016
	29							
MARCH								
		1	2	3	4	5	6	Publication of Result of First Test - March 4 - 5, 2016
	7	8	9	10	11	12	13	
	14	15	16	17	18	19	20	
	21	22	23	24	25	26	27	23rd March to 25th March, 2016 - Doljatra, Holi and Good Friday
	28	29	30	31				
APRIL					1	2	3	
	4	5	6	7	8	9	10	
	11	12	13	14	15	16	17	14.04.16 - Birthday of Dr. B. R. Ambedkar & Bengali New Years Day
	18	19	20	21	22	23	24	Second Test Slot - April 19 to April 23, 2016
	25	26	27	28	29	30		Publication of Result of Second Test - April 29 - 30, 2016
MAY							1	1.05.16 : MAY DAY
	2	3	4	5	6	7	8	8.05.16 - Birthday of Rabindra Nath Tagore
	9	10	11	12	13	14	15	University Practical Examinations & Viva Voce - May 12 to May 20, 2016
	16	17	18	19	20	21	22	21.05.2016 - Buddha Purnima
	23	24	25	26	27	28	29	23.05.2016 - Sab-e-Barat , University Theory Examinations - May 24 to June 11, 2016
	30	31						
JUNE			1	2	3	4	5	
	6	7	8	9	10	11	12	
	13	14	15	16	17	18	19	Inter Semester Break (Summer) - June 14 to July 07, 2016
	20	21	22	23	24	25	26	
	27	28	29	30				

COLLEGE WILL RE-OPEN ON 8th JULY 2016 AFTER SUMMER RECESS
Results will be announced in the University Website in August 2016
During Inter-Semester-Break, Practical Training may be conducted
Commencement of academic programme for Odd semester 2016 (except first year) - July 14, 2016

LEGEND	
	SUSPENSION OF CLASSES
	WEEKLY HOLIDAYS

****Any other Holiday that will intimated by the appropriate Authourity to be notified later on.

Make up classes of each subjects are to be accommoted in the last fortnight of the academic session.

Dr. B.C. ROY ENGINEERING COLLEGE, DURGAPUR

ACADEMIC CALENDAR - ODD SEMESTER [JULY TO DECEMBER 2015]

MONTH	MON	TUE	WED	THU	FRI	SAT	SUN	WEEK	
JULY			1	2	3	4	5	1	ODD SEMESTER ACADEMIC ACTIVITIES START FROM 4TH JULY ' 2015 [EXCEPT FIRST SEMESTER]
	6	7	8	9	10	11	12	2	
	13	14	15	16	17	18	19	3	18.07.15: ID-UL FITRE
	20	21	22	23	24	25	26	4	FIRST ASSIGNMENT
	27	28	29	30	31			5	REPORT ON PERFORMANCE IN MOCK TESTS
AUG						1	2		ACADEMIC REVIEW I BASED ON ASSIGNMENT I
	3	4	5	6	7	8	9	6	ACTIVITIES IN DEALING WITH WEAK STUDENTS
	10	11	12	13	14	15	16	7	15.08.15 : INDEPENDENCE DAY/
	17	18	19	20	21	22	23	8	SECOND ASSIGNMENT /REPORT ON PERFORMANCE IN MOCK TESTS
	24	25	26	27	28	29	30	9	26TH TO 30TH AUGUST WBUT FIRST TEST SLOT
	31							10	
SEPT		1	2	3	4	5	6		5TH SEPTEMBER JANMASTAMI / ACADEMIC REVIEW-II BASED ON ASSIGNMENT 2
	7	8	9	10	11	12	13	11	ACTIVITIES IN DEALING WITH WEAK STUDENTS
	14	15	16	17	18	19	20	12	18.09.15 : VISWAKARMA PUJA/ REPORT ON PERFORMANCE IN MOCK TESTS
	21	22	23	24	25	26	27	13	25TH SEPTEMBER: ID-UZ-ZOHA
	28	29	30					14	ACTIVITIES IN DEALING WITH WEAK STUDENTS
OCTOBER				1	2	3	4		2.10.15: MAHATMA GANDHI'S BIRTHDAY
	5	6	7	8	9	10	11	15	
	12	13	14	15	16	17	18	16	12TH OCTOBER MAHALAYA / WBUT SECOND TEST SLOT
	19	20	21	22	23	24	25	17	19TH OCTOBER - 27TH OCTOBER : DURGA PUJA, MUHARRAM AND LAKSHMI PUJA
	26	27	28	29	30	31		18	
NOVEMBER							1		
	2	3	4	5	6	7	8	19	
	9	10	11	12	13	14	15	20	10.11.15 - KALI PUJA , 11.11.15: DIWALI, 13.11.15: BHATRIDWITIYA.
	16	17	18	19	20	21	22	21	17TH NOVEMBER - CHHAT PUJA,
	23	24	25	26	27	28	29	22	25.11.15: GURU NANAK'S BIRTHDAY
	30							23	
DECEMBER		1	2	3	4	5	6		
	7	8	9	10	11	12	13	24	WBUT THEORY EXAMINATIONS (UG & PG)
	14	15	16	17	18	19	20	25	
	21	22	23	24	25	26	27	26	24.12.15: FATEH-DWAZ-DUHAM, 25.12.15 : CHRISTMAS DAY
	28	29	30	31				27	26TH DECEMBER 2015 TO 9TH JANUARY 2016 - INTER SEMESTER BREAK

LEGEND :	SUSPENSION OF CLASSES	COLLEGE WILL RE-OPEN ON 12TH JANUARY 2016
	WEEKLY HOLIDAYS	ABSENCE FROM THE CLASSES WILL ASK FOR PUNITIVE ACTION TO THE EXTENT OF FINANCIAL FINES PER CLASS

* College hours: 10 a.m. to 5:30 p.m./ LABS WILL BE OPEN FROM 9:50 a.m.

** All sessionals are to be submitted by the students in time and to report to the concerned mentors.

*** Absence from the scheduled classes/ tests is punishable

***** REVISION/MAKE-UP CLASSES/PENDING LABS/PENDING THEORIES/DOUBT CLEARING CLASSES MAY BE ADJUSTED AS PER CONVENIENCE

******ALL 7TH SEMESTER PROFESSIONAL CLASSSES WILL BE HELD FROM 14.10 HRS. TO 17.30 HRS REGULARLY FOR THE ABOVE MENTIONED PERIOD.

Make up classes of each subjects are to be accommoted in the last fortnight of the academic session.

Sinha.

Class Test Question Paper as per AICTE Exam Reform policy (Feb 2020) and IT NBA SAR

Course: **Computer Architecture (PCC-CS-402)** **CA2**

Maximum Marks: **15** Duration: **50 Min**

Q. No	Question (s)	Marks	GCO
1	Explain Flynn's Classification of Computer Architectures.	5	CO 1
2	Calculate Speedup, Efficiency and throughput to process 50 instructions in a 5 stages pipeline processor.	5	CO 2
3	Illustrate dynamic pipeline scheduling with the help of following reservation table, STD, Forbidden Latencies, Latency Cycles, greedy cycles and MAL with suitable examples.	5	CO 3

S1	X					X		X
S2		X		X				
S3			X		X		X	

Course B-Tech Semester Examination, 20 19 - 20 20

Class Test No. 02 Date 29/02/20

Name Sakshi Agarwal

University Roll No.: 12000218015 Branch I.T.

Paper Name Computer Architecture Paper Code PCC-CS-402

Signature of Invigilator

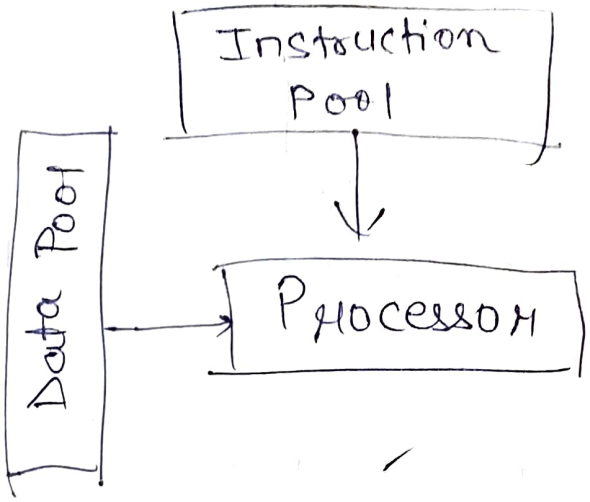
) Explain Flynn's classification of computer Architectures.

nswer → Flynn's classification :-

(i) Single - instruction, Single - data (SISD) System -

An SISD computing system is a uniprocessor machine which is capable of executing a single instruction, operating on a single data stream. In SISD, machine instructions are processed in a sequential manner and computers adopting this model are popularly called Sequential computers. Most Conventional computers have SISD architecture.

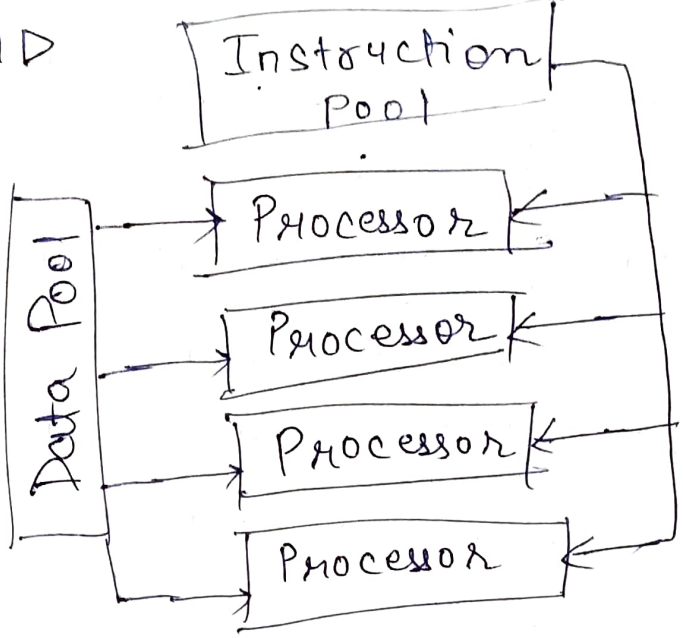
SISD



(ii) Single - Instruction, multiple - data (SIMD) Systems :-

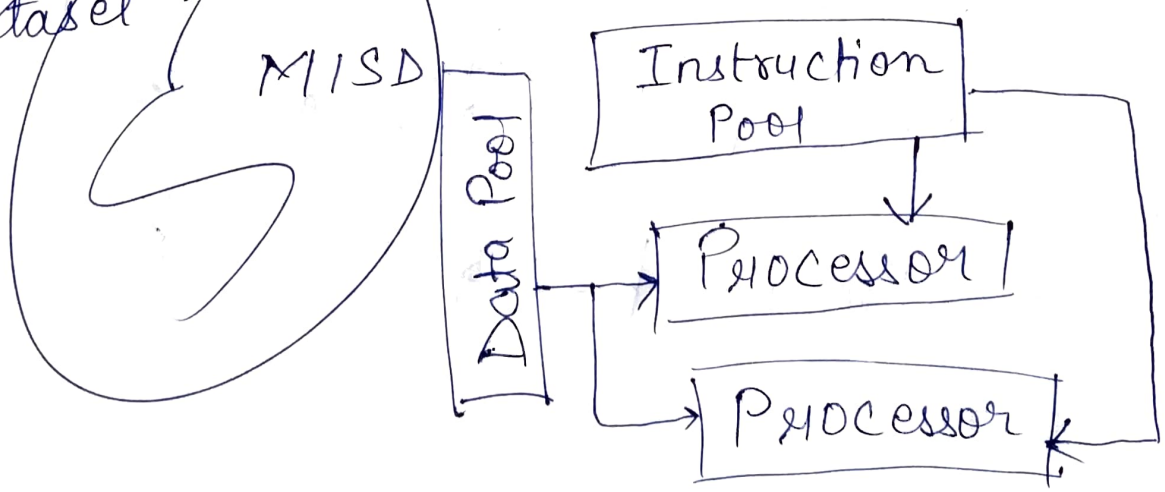
An SIMD system is a multiprocessor machine capable of executing the same instructions on all the CPUs but operating on different data streams. In this, the information can be passed to all the processing elements organized data elements of vectors can be divided into multiple sets (N sets for N PE Systems) and each PE can process one data set.

SIMD



(iii) Multiple instruction, Single - data (MISD) systems: -

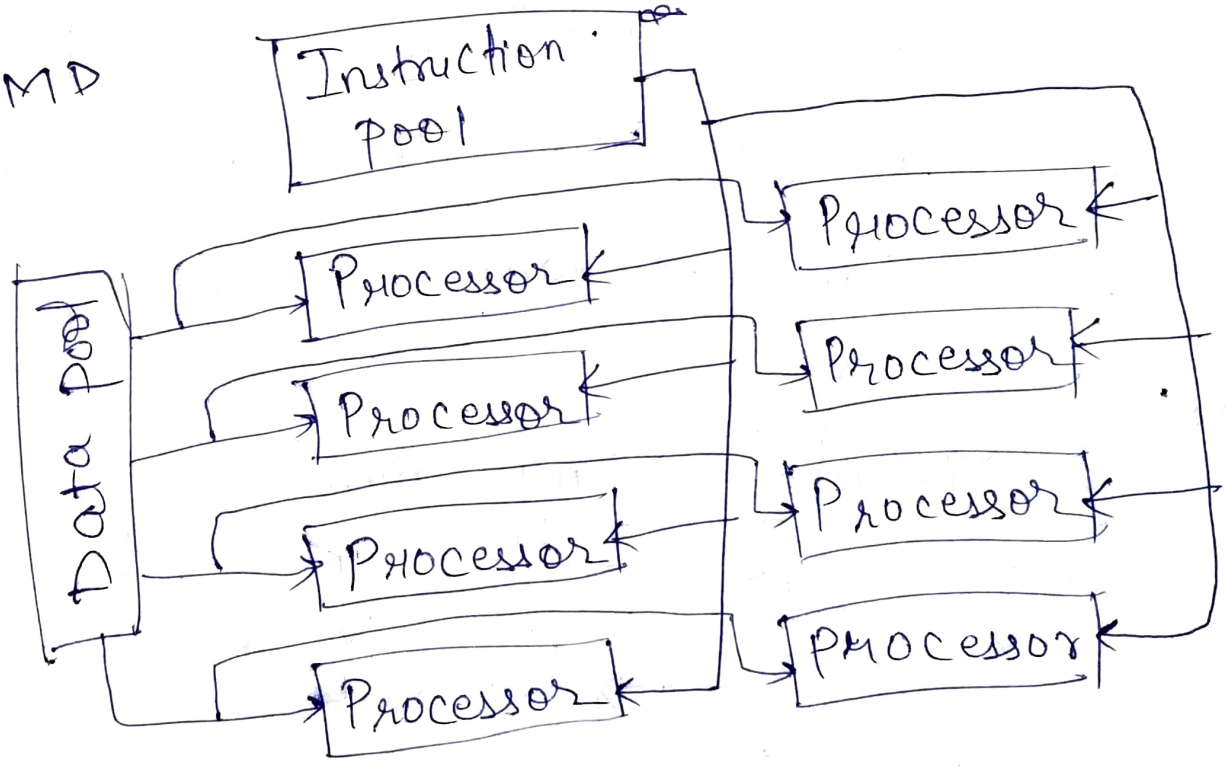
An MISD computing system is a multiprocessor machine capable of executing different instructions on different PEs but all of them ~~operation~~ operating on the same dataset.



(iv) Multiple instruction, multiple-data (MIMD) system :-

→ An MIMD system is a multiprocessor machine which is capable of executing multiple instructions on multiple data sets. Each PE ~~[illegible]~~ in the MIMD model has seperate instruction and data streams, therefore machines built using this model are capable to any kind of application.

MIMD



2) Calculate Speedup, Efficiency and throughput to process 50 instructions in a 5 stages pipeline processor.

→ No. of instruction = 50

No. of stages = 5

$$\text{Speedup} = \frac{\text{Non pipelined}}{\text{Pipelined}}$$

Pipelined = $k + (n-1)$

where k = stages

& n = no. of instruction.

$= 5 + (50-1)$

$= 54$

Non pipelined = $k \times n$

$= 50 \times 5$

$= 250$

$$\text{Speedup} = \frac{\text{Non pipelined}}{\text{Pipelined}}$$

$= \frac{250}{54}$

Speedup $= \frac{125}{27}$

Efficiency $=$ occupied no. of box / no. of stages x no. of instruction

$= \frac{}{8 \times 50}$

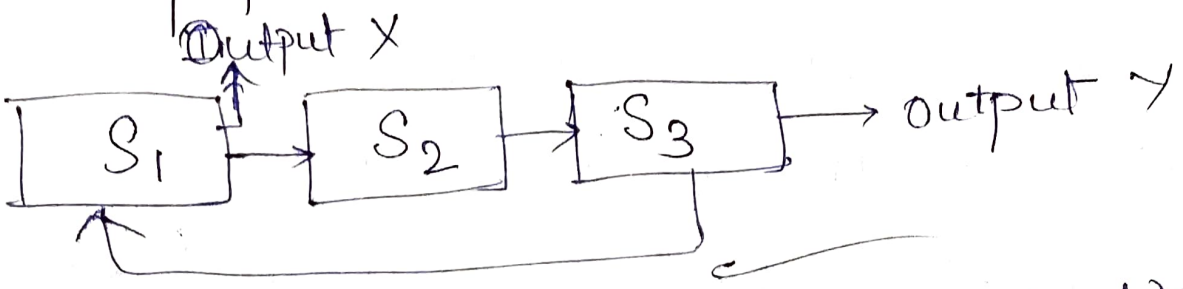
Efficiency $= \frac{nf}{k+(n-1)} = \frac{50 \times f}{5+(50-1)}$

$\therefore = \frac{50}{5} = 10$

$\Rightarrow \frac{50 \times f}{4+49} \Rightarrow \frac{50 \times f}{54 \times 10}$:

$= \frac{5}{54}$

3) Dynamic Pipeline is also known as non-linear pipeline.



In Dynamic pipelining, all linear forward and backward cycles occurs.

More than one output are obtained.

More than one reservation tables are made whereas in linear pipelining which is also known as static pipeline. Only one reservation table is made with only one output at the last stage.

S_1	X				X		X
S_2		X		X			
S_3			X		X	X	

Reservation table

From above reservation table, the Forbidden latencies are 5, 2

Latencies in S_2 are 2

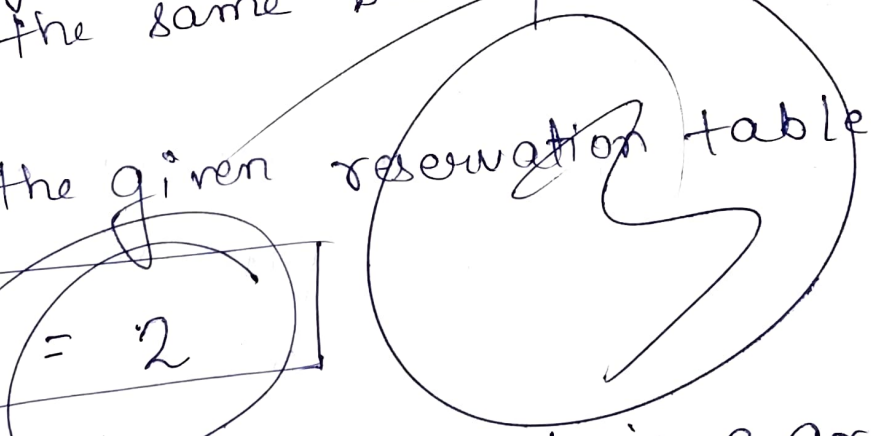
Latencies in S_3 are - 2,2.

So, the Forbidden Latencies are ~~(5,2)~~ (2,5)

Latency Cycle :-

A latency cycle is a latency sequence which repeats the same subsequences repeatly

So, from the given reservation table -



Latency cycle = 2

Greedy Cycle :- A Simple cycle is a greedy cycle. If each Latency contained minimum in the cycle. So, the Greedy cycle is executed.

So, the Greedy Cycle = 2

Because, Here is the minimum & latency which taken part in the reservation table.

MAL →

Course B.Tech Semester Examination, 20 19 - 20 20

Class Test No. 2nd Date 29/02/2020

Name Subhrajit Samanta

University Roll No.: 12000217007 Branch IT

Paper Name Software Engineering Paper Code CS 603

Signature of Invigilator

13

Answers

1.a) → iv) all of the above.

b) → ii) Integration and System Testing.

c) ~~SDLC~~ ~~Spiral~~ Spiral model in SDLC involve the Risk handling.

d) Spiral model is called meta model in SDLC.

e) Prototype model is used to rapidly develope prototype to show ~~all function~~ case functionalities of the software. It helps in accessment of risk and required resources.

3.b) *Advantages of Spiral Model :-

i) It has multiple round of prototyping and risk analysis. It therefore highly refine and functionality before the actual software is built.

ii) The multiple round of risk analysis helps in reading risk and providing an estimate of the resource required as time and money.

* Limitations of Spiral Model in Software Development :-

~~i)~~ i) Due to the prototype oriented nature of the model. It is time consuming and has a interval between the start of the project and the tim

where the actual project is built.

It is not suitable for small project where so much time for prototyping is not required.

4

2.) Effect of development for organic with KLOC = 20

= 2.4 (KLOC)$^{1.05}$ Pm

= 2.4 (20)$^{1.05}$ Pm.

= 2.4 × 23.25 Pm

= 55.752 Pm.

2.5 (Effect.

Organic Effect = 2.4 (KLOC)$^{1.05}$

Calculation:

KLOC = 20

Effect = 2.4(20)$^{1.05}$ pm

= 55.756 pm

T'dev = 2.5 (55.756)$^{0.38}$

= 11.52 months.

6

Dr. B.C.Roy Engineering College

Class Test, IT, 6th Semester,2020

Software Engineering (Subject Code: CS 603)

Time: 50 min. Full Marks: 15

Answer all Questions

1X5=5 (GCO1)

1.(a)DFD shows

i) the flow of data ii) the processes iii)the areas where they are stored iv)all of the above

(b)What is the next phase of classical waterfall model after 'coding & unit testing'

i) Integration Testing ii) Integration and System Testing iii) System Testing iv) none of the above

(c) Which model in SDLC involve the Risk handling.

(d) Which model is called meta model in SDLC.

(e) What is agile model?

2. Calculate the Effort and Time of development for Organic Project with KLOC 20 in Basic COCOMO Model. **5** (GCO2)

3. Write in brief the advantages and limitations of Spiral Model in software development. **5** (GCO3)

CO3-8
CO2-4
8+4=12

13

CO3-11
CO2-4

B-Tech _____ **Semester Examination, 2018 - 2021**

Class Test No. 1 Date 27-04-2019

Name UTTAM KUMAR

College Roll No. 12000718001 Branch MECHANICAL

Subject Primary manufacturing tech. Code ME-403

Signature of Invigilator

Q.1 Advantage & disadvantages of gas Welding.

Ans:- Advantage of gas welding.

i) The gas Welding process is versatile

ii) it Welding process the equipment is relative of low cost.

CO3 iii) gt process is self-sufficient. 3½

IN) Independent from the availability of external energy sources.

v) In this process the portable.

vi) Adapted too many different jobs.

Disadvantage of gas welding:-

i) Flux required for most materials other than low carbon steel.

ii) Welders skill required in manipulating the torch, the flame, and the filler rod.

iii) The process is slow joining rate.

Distortion :-

During the welding process one of the major problem found with Weldments is distortion. Distortion is caused mainly because of the shrinkage that take place in Weldments. The shrinkage taking take place in a Weldments depends upon the geometry and types of weld. There are three types of distortion possible in welding

a) Transverse shrinkage occuring perpendicular to the weld line.

CO3

b) Longitudinal shrinkage occuring ∥l to the weld line. Which is very small of the order of about 0.1 %. of the weld length and hence can be neglected.

2 1/2

c) Angular change as a rotation about the weld line.

Q8. different pattern allowances + explain any two.

Ans:- There are basically 5 types to account for the allowances.

3 1/2

i) shrinkage allowance
ii) Machining allowance
iii) Draft allowance
iv) Shake allowance
v) distortion Allowance.

CO2

i) ~~shrinkage~~ Machining Allowance :-

This is provided on the pattern to account for the material removal that takes place during machining of the cast produ to make it dimensionally accurate and to make it surface finish be

ii) Shrinkage allowance :-

This is provided on the pattern to account for the shrinkage in metal during solidification and cooling. The allowance required depends upon the metal that is to be cast and the metallurgical transformations taking place during solidification. This is given uniformly and linearly.

ns :- Q 2. Deposition :-

The rate at which the weld metal is deposited per unit time is the deposition rate and is normally expressed as kg/hr.

Penetration :-

It is the depth up to which the weld metal combines with the base metal, as measured from the top surface of the joint.

DR. B. C. ROY ENGINEERING COLLEGE

MECHANICAL ENGINEERING DEPARTMENT

CLASS TEST-1 (Module- 1, 2, 3)

2018–19

Course Details:

NAME OF THE PROGRAMME: **UG-Mechanical Engineering**

YEAR: **Second**

SEMESTER: **Second (ME-2)**

PAPER: **Primary manufacturing processes**

CODE: **ME 403**

Q	Description	Marks	COs
1	(a) Explain advantages & disadvantages of gas welding. (b) What do you mean by welding distortion, explain briefly? How these can be minimized?	4+3=7	CO3
2	Explain the effect of DC polarities on arc welded component with respect to deposition & penetration.	4	CO3
3	List out different pattern allowances & explain any two.	1+3=4	CO2

Dr. B. C. Roy Engineering College, Durgapur

Name: RITESH KUMAR

University Roll: 12001616064

Registration no: 161200110645 OF 2016-2017

College Roll: 1607058

Year: 4th Year (EE-1)

Semester: 7th Semester; Session: 2019-20 ODD; Batch: 2016-20

Concern Faculty members: Prof. Basudeb Mondal & Prof. Kingsuk Majumdar, AP, EE, BCREC

Assignment-1 BY

Prof. Basudeb Mondal & Prof. Kingsuk Majumdar, AP, EE, BCREC

NB: date of submission 27-09-2019

ASSIGNMENT-I: Power generation and economics (EE-704C)

DR. B. C. Roy Engineering College, Durgapur
Electrical Engineering
7th Sem, EE1 Session 2019-20

Power Generation and Economics

1. What is Spinning Reserve?
2. Need of unit commitment?
3. Short note Thermal unit constraints
4 Short note Different unit commitment problem solving method
5. Short note Hydro-Constraints
6. What do you mean "Must Run" unit.

7. A power system network with thermal power plants is operating by four generating unit. Determine the most economical unit to be committed to a load demand of 8 MW. Also, prepare the UC table for the load change in steps of 1 MW starting to Min. to Max. Generating capacities and cost curve parameter of the units are as follows

Unit no	Capacity (MW)		Cost Curve parameter		
	Min	Max	a	b	d
1	1.0	14.0	0.74	22.9	0
2	1.0	14.0	1.56	25.9	0
3	1.0	14.0	1.97	29.0	0
4	1.0	14.0	1.36	31.2	0

NB: **NB: Top page (i.e. the 1st page of this assignment) and the question page (i.e. the 2nd page of this assignment) must be attached with your assignment. And your full university roll number must be on each page. Use A4 white page for assignment.**

1Q) What is spinning reserve?

→ The spinning reserve is the extra generating capacity that is available by increasing the power output of generators that are area by connected to the power system. For most generators this increases in power output is achieved by increasing the torque applied to the turbine's rotor.

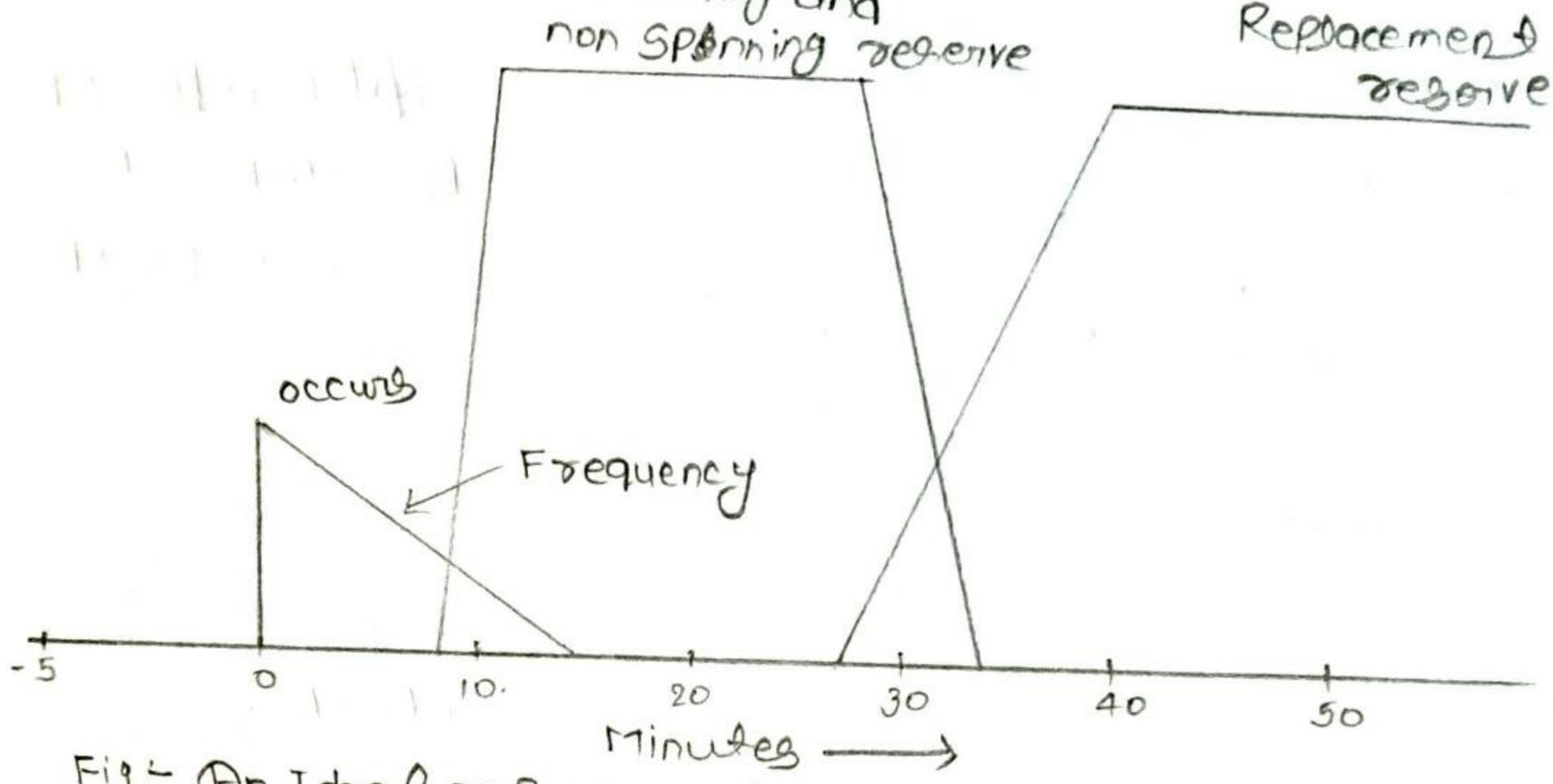


Fig:- An Ideal representation of 4 kinds of reserve Power and the time interval.

2Q) What is the need of unit commitment?

→ unit commitment is an operational planning. The purpose of this planning is to determine a schedule called unit commitment schedule which tell us beforehand when and which units to start and shut down during the operation over a prescribed time, such that the total operation cost for that period becomes minimum.

unlike economic load dispatch the objective of planning is not to distribute the load in real time between the unit already running in such a manner that the every instant cost becomes minimum.

Q 3.) Short note Thermal unit constraints

Thermal units usually require a crew to operate them, especially when turned on and turned off. A thermal unit can undergo only gradual temperature changes and this translates into a time period of some hours required to bring the unit on line. As a result of such restrications in the operation of a thermal plant various arise such as.

Minimum up time:- once the unit is running, it should not be turned off immediately.

Minimum down time:- once the unit is decommitted, there is a minimum time before it can be recommitted.

Crew constraints:- if a plant consists of two or more units they cannot both be turned on at the same time since there are not enough crew members to attend both units while starting up.

Roll No. 12001616064

Signature .....

Q4) What are different unit commitment Problem Solving methods?

⇒ Techniques for the Solution of unit commitment Problem are:-

1) Priority list Schemes:-

- The Simple unit commitment ment Solution method consists of creating a priority list of unit
- A Simple Shut down rule or Priority list Schemes could be obtained after an exhaustive enumeration of all unit combination at each load level.
- The priority list could be obtained in a much simpler manner by noting the full load average Production costs ~~of~~ is simply the net heat rate at full load multiplied by the fuel cost.

2) Dynamic Programming (DP)

Dynamic Programing has many advantage over the enumeration Scheme, the chief advantage being a reduction in the dimensionality of the Problem.

Suppose, we have found units in a system and any combination of them could serve the (Single) load. There would be a maximum of $2^4-1 = 15$ combination to test.

However, if a strict Priority order is imposed, there are only four combination to try:

Roll No. 12001616064

Signature .....

Priority 1 unit
Priority 1 unit + Priority 2 unit
Priority 1 unit + Priority 2 unit + Priority 3 unit
Priority 1 unit + Priority 2 unit + Priority 3 unit + Priority 4 unit

3) Lag range relation (LR):-

The dynamic programming method of solution of the unit commitment problem has many disadvantage for large Power systems with many generating units.
This is because of the necessity of forcing the dynamic Programming solution to search over a small no of commitment states to reduce the no of combinations that must be tested in each time period.
In the Lagrange relation techniques there disad vantages disappear.
This the lagrange method is based on a dual optimization approach.
The Lagrange relaxation procedure solves the unit commitment problem by relaxing or temporarily ignoring the coupling constraints and solving the problem as if they did not exist. This is done through the dual optimization procedure.
The dual optimization procedure attempts to reach the constrained optimum by maximizing the lagrangian with respect to the Lagrange multipliers, while minimizing the Lagrangian with respect to the other variables in the problem that is

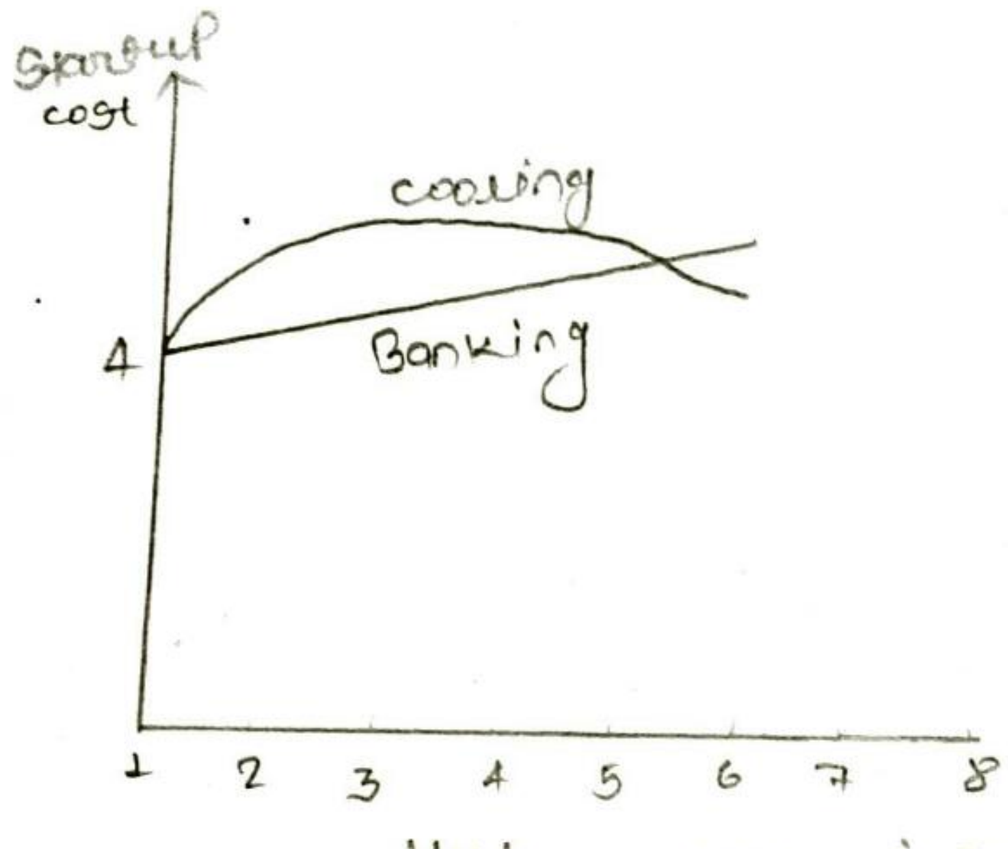
$$q^{*}(\lambda) = \max_{\lambda^t} q(\lambda)$$

Where $q(\lambda) = \min_{P_i^t, U_q^b} L(P, U, \lambda)$

Roll No. 12001616064 Signature .....

Q5.) Short note Hydro- constraints

Unit commitment cannot be completely seperated from the scheduling of hydro units. In this text we will assume that the hydro thermal scheduling (or coordination) problem can be seperated from the unit commitment problem we of curve cannot assert fully that our treatment in this fashion will always result in an optemal solution.



Hydro constraints

Q.6) What do you mean "Must Run" unit.

Must Run units

A specific generating unit that has been designated by the system operator to be on line or on the grid to insure the flow of electricity. This must run unit is outside of economic dispatch and mayor may not be a system's most efficient unit. A unit may be designated as must run for operating reasons that may include system reliability, voltage control, or system stability.

8.7) A Power system network with thermal Power Plants is operating by four generating unit. Determine the most economical unit to be committed to a load demand of 8 MW. Also, Prepare the UC table for the load change in steps of 1MW starting to Min. to max. Generating capacities and cost curve Parameter of the units are as follows:

unit no	capacity (MW)		cost curve Parameter		
	Min	Max	a	b	d
1.	1.0	14.0	0.74	22.9	0
2.	1.0	14.0	1.56	25.9	0
3.	1.0	14.0	1.97	29.0	0
4.	1.0	14.0	1.36	31.2	0

We know that

The cost function $F_i = \frac{1}{2} a_i P_{ai}^2 + b_i P_{ai} + d_i$

Incremental fuel cost, $= \frac{dc_i}{dP_{ai}} = a_i P_{ai} + b_i$

The total load = P_D = 8MW (given)

By comparing the cost-curve parameters, we come to know that the cost characteristics of the first unit are the lowest. If only one single unit is to be committed unit-1 is to be employed.

Now, find out the cost of generation of Power by the first unit from minimum to maximum generating capacity of the unit.

Let

$f_1(1)$ = the main cost in Rs/hr for the generation of 1MW by the first unit.

$f_1(2)$ = the main cost in Rs/hr for the generation of 2 MW by the first unit.

$f_1(3)$ = the main cost in Rs/hr for the generation of 3MW by the first unit.

$f_1(4)$ = the main cost in Rs/hr for the generation of 4MW by the first unit

Roll No. 12091616064

Signature .....

$f_i(8)$ = the main cost in Rs/hr for the generation of 8MW by the first unit.

$f_1(P_{ai}) = \frac{1}{2} a_i P_{ai}^2 + b_i P_{ai} + d_i$

$f_1(P_{a1}) = \frac{1}{2}(0.74) P_{ai}^2 + 22.9 P_{ai} = (0.37 P_{ai} + 22.9) P_{ai}$

$f_2(P_{a2}) = \frac{1}{2}(1.56) P_{a2}^2 + 22.9 P_{a2} = (0.78 P_{a2} + 25.9) P_{a2}$

Capacities and cost-curve parameters of the units

unit number	capacity (MW)		cost-curve parameters		
	Min.	Max.	a	b	d
1	1.0	14.0	0.74	22.9	0
2	1.0	14.0	1.56	25.9	0
3	1.0	14.0	1.97	29.0	0
4	1.0	14.0	1.36	31.2	0

$f_1(P_{a1}) = \frac{1}{2}(1.97) P_{a1}^2 + 29.0 P_{a1} = (0.985 P_{a1} + 29.0) P_{a1}$

$f_1(P_{a1}) = \frac{1}{2}(1.36) P_{ai}^2 + 31.2 P_{a1} = (0.68 P_{a1} + 31.2) P_{a1}$

For the commitment of unit-1 only:

When only one unit is to be committed to meet a particular load demand i.e. in this case due to its less cost parameters, then $F_1(x) = f_1(x)$

Where:

$F_1(x)$ is the minimum cost of generation of 'x' MW by only one unit

$f_1(x)$ is the minimum cost generation of 'x' MW by unit-1

$\therefore f_1(1) = f_1(1) = (0.37 \times 1 + 22.9)1 = 23.27$

$f_1(2) = f_1(2) = (0.37 \times 2 + 22.9)2 = 47.28$

$f_1(3) = f_1(3) = (0.37 \times 3 + 22.9)3 = 72.03$

Roll No. 12001616064

Signature .....

Similarly,

$F_1(4) = f_1(4) = 97.52$

$F_1(5) = f_1(5) = 123.75$

$F_1(6) = f_1(6) = 150.43$

$F_1(7) = f_1(7) = 178.43$

$F_1(8) = f_1(8) = 206.88$

When unit-1 is to be committed to meet a load demand of 8 MW, the cost of generation becomes 206.88 Rs/hr

For the second unit

$f_2(1)$: min cost in Rs/hr for the generation of 1 MW by the second unit only.

$= (0.78 P_{g_2} + 25.9) P_{g_2}$

$= (0.78 \times 1 + 25.9) 1 = 26.68$

Similarly,

$f_2(2) = 54.92$

$f_2(3) = 84.72$

$f_2(4) = 116.08$

$f_2(5) = 149.0$

$f_2(6) = 183.48$

$f_2(7) = 219.52$

$f_2(8) = 257.12$

By observing $f_2(8)$ and $f_1(8)$, it is concluded that $f_1(8) < f_2(8)$ i.e. the cost of generation of 8 MW by unit-1 is minimum than that by unit-2

For commitment of unit-1 and unit-2 combination

$F_2(8)$: minimum cost of generation of 8 MW by the simultaneous operation of two units

i.e, units-1 and 2.

Roll No. 12001616064

Signature .....

$$= \min \begin{bmatrix} f_2(0)+f_1(8), & f_2(1)+f_2(7), & f_2(2)+f_1(6) \\ f_2(3)+f_1(5), & f_2(4)+f_1(4), & f_2(5)+f_1(3) \\ f_2(6)+f_1(2), & f_2(7)+f_1(1), & f_2(8)+f_1(0) \end{bmatrix}$$

$$= \min \begin{bmatrix} 206.87, & 205.11, & 205.64, \\ 208.47, & 213.6, & 221.03, \\ 230.76, & 242.79, & 257.12, \end{bmatrix}$$

$\therefore F_2(8) = 205.11$ Rs/hr

in other words. the minimum cost of generation of 8 MW by the combination of unit. 1 and unit-2 is 205.11 Rs/hr and for this optimal cost unit-1 supplies 7 MW and unit-2 supplies 1 MW.

$$F_2(7) = \min \begin{bmatrix} f_2(0)+F_1(7), & f_2(1)+f_1(6), & F_2(2)+f_1(5) \\ f_2(3)+f_1(4), & f_2(4)+f_1(3), & f_2(5)+f_1(2) \\ f_2(6)+f_1(1), & f_2(7)+f_1(0), & \end{bmatrix}$$

$$= \min \begin{bmatrix} 178.43, & 177.4, & 178.67 \\ 182.24, & 188.11, & 196.28 \\ 206.75, & 219.52, & \end{bmatrix}$$

$\therefore F_2(7) = 177.4$ Rs/hr.

i.e, the minimum cost of generation of 7 MW with the combination of unit-1 (by 6-MW supply) and unit-2 (by 1-MW supply) is 177.4 Rs/hr.

$$F_2(6) = \min \begin{bmatrix} f_2(0)+f_1(6), & F_2(1)+f_1(5) & f_2(2)+f_1(4) \\ f_2(3)+f_1(3), & f_2(4)+f_1(2) & f_2(5)+f_1(1), \\ f_2(6)+f_1(0), & & \end{bmatrix}$$

$$= \min \begin{bmatrix} 150.92, & 150.43, & 159.44 \\ 156.95, & 163.36, & 178.97 \\ 183.48, & & \end{bmatrix}$$

$\therefore F_2(6) = 150.43$ Rs/ha

$$F_2(5) = \min \begin{bmatrix} f_2(0)+f_1(5), & f_2(1)+f_1(4), & f_2(2)+f_1(3) \\ f_2(3)+f_1(2), & f_2(4)+f_1(1), & f_2(5)+f_1(0) \end{bmatrix}$$

$$= \min \begin{bmatrix} 123.75, & 124.2, & 126.95 \\ 132.0, & 139.35, & 140.0 \end{bmatrix}$$

$\therefore F_2(5) = 123.75$ Rs/ha

$$F_2(4) = \min \begin{bmatrix} f_2(0)+f_1(4), & f_2(1)+f_1(3), & f_2(2)+f_1(2) \\ f_2(3)+f_1(1), & f_2(4)+f_1(0) & \end{bmatrix}$$

$$= \min \begin{bmatrix} 97.52, & 98.71, & 102.2, \\ 107.99 & 116.08, & \end{bmatrix}$$

$\therefore F_2(4) = 97.32$ Rs/ha

$$F_2(3) = \min \begin{bmatrix} f_2(0)+f_1(3), & f_2(1)+f_1(2) \\ f_2(2)+f_1(1), & f_2(3)+f_1(0) \end{bmatrix}$$

$$= \min \begin{bmatrix} 72.03, & 73.96 \\ 78.19, & 84.72 \end{bmatrix}$$

$\therefore F_1(3) = 72.03$ Rs/ha

$$F_1(2) = \min [f_2(0)+f_1(2), f_2(1)+f(1), f_2(2)+f_1(0)]$$

$$= \min [47.28, 49.95, 54.99]$$

$\therefore F_1(2) = 47.28$ Rs/ha

$$f_1(1) = \min [f_2(0)+f_1(1), f_2(1)+f_1(0)]$$

$$= \min [23.27, 26.68]$$

$\therefore F_1(1) = 23.27$ Rs/ha

Roll No. 12001616064

Signature .....

Now, the cost of generation by unit-3 only is

$$f_1(P_{a_1}) = \frac{1}{2} a_i P_{a_1}^2 + b_i P_{a_i} + d_i$$

$$= (0.985) P_{a_i} + 29.0 P_{a_i}$$

$f_3(0) = 0$
$f_3(1) = 29.985$
$f_3(2) = 61.94$
$f_3(3) = 95.865$
$f_3(4) = 131.76$
$f_3(5) = 169.625$
$f_3(6) = 209.46$
$f_3(7) = 251.265$
$f_3(8) = 295.04$

for commitment of unit-1 and unit-2 and unit-3 combination

$F_3(8)$: The minimum cost of generation of 8 MW by the three units i.e. unit-1, unit-2 and unit-3

$$= \min \begin{bmatrix} f_3(0)+f_2(8), & f_3(1)+f_2(7), & f_3(2)+f_2(6) \\ f_3(3)+f_2(5), & f_3(4)+f_2(4), & f_3(5)+f_2(3) \\ f_3(6)+f_2(2), & f_3(7)+f_2(1), & f_3(8)+f_2(0) \end{bmatrix}$$

$$= \min \begin{bmatrix} 205.11, & 207.385, & 212.37 \\ 219.615, & 229.28, & 241.655 \\ 256.74, & 298.545, & 295.04 \end{bmatrix}$$

$\therefore F_1(8) = 205.11$ RS/hr

i.e. for the generation of 8 MW by three units unit-1 and unit-2 will commit to meet the load of 8 MW with unit-1 supplying 7 MW, unit-2 supplying 1 MW, and unit-3 is in an off condition.

$$F_2(7) = \min \begin{bmatrix} F_3(0)+f_2(7), & f_3(1)+f_2(6), & F_3(2)+f_2(5), \\ f_3(3)+f_2(4), & f_3(4)+f_2(3), & f_3(5)+f_2(2), \\ f_3(6)+F_2(1), & f_3(7)+f_2(0), & \end{bmatrix}$$

$$= \min \begin{bmatrix} 177.4, & 180.415, & 185.69 \\ 193.385, & 203.79, & 216.905 \\ 232.73, & 251.265, & \end{bmatrix}$$

$\therefore F_3(7) = 177.4$ RS/hr

Signature .....

$$F_3(6) = \min\begin{bmatrix} f_3(0)+f_2(6), & f_3(1)+f_2(5), & f_3(2)+f_2(4) \\ f_3(3)+f_2(3), & f_3(4)+f_2(2), & f_3(5)+f_2(1) \\ f_3(6)+f_2(0), & & \end{bmatrix}$$

$$= \min\begin{bmatrix} 150.43, & 153.735, & 159.46 \\ 167.895, & 179.04, & 192.89 \\ 209.46, & & \end{bmatrix}$$

$\therefore F_3(6) = 150.43$ Rs/hr

$$F_3(5) = \min\begin{bmatrix} f_3(0)+f_2(5), & f_3(1)+f_2(4), & f_3(2)+f_2(3) \\ f_3(3)+f_2(2), & f_3(4)+f_2(1), & f_3(5)+f_2(0) \end{bmatrix}$$

$$= \min\begin{bmatrix} 125.75, & 127.505, & 133.97, \\ 143.145, & 155.03, & 169.625 \end{bmatrix}$$

$\therefore f_3(5) = 123.75$ Rs/hr

$$F_3(4) = \min\begin{bmatrix} f_3(0)+f_2(4), & f_3(1)+f_2(3), & f_3(2)+f_2(2) \\ f_3(3)+f_2(1), & f_3(4)+f_2(0) & \end{bmatrix}$$

$$= \min\begin{bmatrix} 97.52, & 102.015, & 109.22 \\ 119.135, & 131.76 & \end{bmatrix}$$

$\therefore F_3(4) = 97.52$ Rs/hr

$$F_3(3) = \min\begin{bmatrix} f_3(0)+f_2(3), & f_3(1)+f_2(2), & f_3(2)+f_2(1) \\ f_3(3)+f_2(0). & & \end{bmatrix}$$

$$= \min\begin{bmatrix} 72.03, & 77.265, & 85.21 \\ 95.865, & & \end{bmatrix}$$

$\therefore F_3(3) = 72.03$ Rs/hr

$F_3(2) = \min[f_3(0)+f_2(2), f_3(1)+f_2(1), f_3(2)+f_2(0)]$

$= \min[47.28, 53.255, 61.94]$

$\therefore F_3(2) = 47.28$ Rs/hr

Roll No. 12001610064

Signature .....

$F_3(1) = \min[F_3(0) + f_2(1), f_3(1) + f_2(0)]$

$= \min[23.27, 29.958]$

$\therefore f_3(1) = 23.27$ Rs/hr

cost of generation by the fourth unit

$f_1(Pa_1) = \frac{1}{2} a_1 Pa_1^2 + b_1 Pa_1 + d_1$

$= (0.68 Pa_1 + 31.2) Pa_1$

$f_4(0) = 0$

$f_4(1) = 31.88$ Rs/hr

$f_4(2) = 65.12$ Rs/hr

$f_4(3) = 99.72$ Rs/hr

$f_4(4) = 135.68$ Rs/hr

$f_4(5) = 173.0$ Rs/hr

$f_4(6) = 211.68$ Rs/hr

$f_4(7) = 251.72$ Rs/hr

$f_4(8) = 293.12$ Rs/hr

Minimum cost of generation by four units, i.e. unit-1, unit-2, unit-3 and unit-4

$F_4(8)$ = The minimum cost of generation of 8MW by four units

$= \min \begin{bmatrix} f_4(0)+f_3(8), & f_4(1)+f_3(7), & f_4(2)+f_3(6) \\ f_4(3)+f_3(5), & f_4(4)+f_3(4), & f_4(5)+f_3(3) \\ f_4(6)+f_3(2), & f_4(7)+f_3(1), & f_4(8)+f_3(0) \end{bmatrix}$

$= \min \begin{bmatrix} 205.11, & 209.28, & 215.55 \\ 223.47, & 233.2, & 245.03 \\ 258.96, & 274.99, & 293.12 \end{bmatrix}$

$\therefore F_4(8) = 205.11$ Rs/hr.

i.e. For the generation of 8MW by four units, unit-1, unit-2 will commit to meet the load of 8MW with unit-1 supplying 7MW.

Roll No. 12001616064

Signature .....

unit-2 supplying 1 MW and unit-3 as well as unit 4 are in an off state condition:

$$F_4(7) = \min\begin{bmatrix} f_4(0)+f_3(7), & f_4(1)+f_3(6), & f_4(2)+f_3(5) \\ f_4(3)+f_3(4), & f_4(4)+f_3(3), & f_4(5)+f_3(2) \\ f_4(6)+f_3(1), & f_4(7)+f_3(0), & \end{bmatrix}$$

$$= \min\begin{bmatrix} 177.4, & 182.31, & 188.87 \\ 197.24, & 207.71, & 220.28 \\ 234.97, & 251.72, & \end{bmatrix}$$

$\therefore F_4(7) = 177.4$ Rs/hr

$$F_4(6) = \min\begin{bmatrix} f_4(0)+f_3(6), & f_4(1)+f_3(5), & F_4(2)+f_3(4) \\ f_4(3)+f_3(43), & f_4(4)+f_3(2), & f_4(5)+f_3(1) \\ f_4(6)+f_3(0), & & \end{bmatrix}$$

$$= \min\begin{bmatrix} 150.43, & 155.63, & 162.64 \\ 171.75, & 182.96, & 196.27 \\ 211.68, & & \end{bmatrix}$$

$\therefore F_4(7) = 150.43$ Rs/hr

$$F_4(5) = \min\begin{bmatrix} F_4(0)+f_3(5), & f_4(1)+f_3(4), & F_4(2)+f_3(3) \\ F_4(3)+f_3(2), & F_4(4)+f_3(1), & f_4(5)+f_3(0) \end{bmatrix}$$

$$= \min\begin{bmatrix} 125.75, & 129.4, & 137.15 \\ 147.0, & 158.95, & 173.0 \end{bmatrix}$$

$\therefore F_4(5) = 123.75$ Rs/hr

$$F_4(4) = \min\begin{bmatrix} f_4(0)+f_3(4), & f_4(1)+f_3(3), & f_4(2)+f_3(2) \\ f_4(3)+f_2(21), & f_4(4)+f_3(0) & \end{bmatrix}$$

$$= \min\begin{bmatrix} 97.52, & 103.91, & 112.4 \\ 122.99, & 135.68, & \end{bmatrix}$$

$\therefore F_4(4) = 97.52$ Rs/hr

Signature

$$F_4(3) = \min\begin{bmatrix} f_4(0)+f_3(3), & f_4(1)+f_3(2), & f_4(2)+f_3(1), \\ f_4(3)+f_3(0) \end{bmatrix}$$

$$= \min\begin{bmatrix} 72.03, & 79.16, & 88.39 \\ 99.72, \end{bmatrix}$$

$\therefore F_4(3) = 72.03$ Rs/hr

$$F_4(2) = \min\begin{bmatrix} f_4(0)+f_3(2), & f_4(1)+f_3(1) \\ f_4(3)+f_3(0), \end{bmatrix}$$

$$= \min\begin{bmatrix} 47.28, & 55.154 \\ 65.12, \end{bmatrix}$$

$\therefore F_4(2) = 47.28$ Rs/hr

$F_4(1) = \min[f_4(0)+f_3(1), f_4(1)+f_3(0)]$

$= \min[23.27\ 31.88]$

$\therefore F_4(1) = 23.27$ Rs/hr

From the above criteria, it is observed that for the generation of 8 MW, the commitment of units is as follows.

$f_1(8) = F_1(8)$ = the minimum cost of generation of 8 MW in Rs/hr by unit-1 only = 206.88 Rs/hr.

$F_2(8)$ = the minimum cost of generation of 8 MW by two units with unit-1 supplying 7 MW and unit-2 supplying 1 MW

= 205.11 Rs/hr

$F_3(8)$ = the minimum cost of generation of 8 MW by three units with unit-1 supplying 7 MW, unit-2 supplying 1 MW, and unit-3 is in an off-state condition.

= 205.11 Rs/hr

$F_4(8)$ = minimum cost of generation of 8 MW by four units with unit-1 supplying 7 MW. unit-2 supplying 1 MW, and unit-3 and unit-4 are in an off-state condition

= 205.11 Rs/hr.

Roll No. 12001616064.

Signature .....

By examining the costs $F_1(P)$, $F_2(P)$, $F_3(P)$, and $F_4(P)$, we have calculated that for meeting the load demand of 8 MW, the optimal combination of units to be committed is unit-1 with 7 MW and unit-2 with 1 MW, respectively, and an operating cost of 205.11 Rs/hr for Preparing the UC tables, the ordering of units, that is independent of numbering units.

To get a higher accuracy, the step size of the load is to be reduced, which results in a considerable increase in time of computation and required storage capacity.

Status of any unit indicates unit running or unit committing and status 0 of any unit that the unit is not running.

The UC table is Prepared once and for all for a given set of units (Tables 4.6). As the load cycle on the station changes it would only mean changes in starting and stopping of axis without changing the basic UC tables.

The UC table is used in giving the information of which units are to be committed to supply a particular load demand.

The exact load sharing b/w the units committed is to be obtained by solving the co-ordination equation as below.

Total load $P_D = 8$ MW

$$C_1 = \frac{1}{2} a_1 P_{G1}^2 + b_1 P_{G1}$$

$$C_2 = \frac{1}{2} a_2 P_{G2}^2 + b_1 P_{G1}$$

$$\frac{dC_1}{dP_{G1}} = a_1 P_{G1} + b_1 = 0.74 P_{G1} + 22.9$$

$$\frac{dC_2}{dP_{G2}} = a_2 P_{G2} + b_2 = 1.56 P_{G2} + 25.9$$

$$P_{G1} + P_{G2} = 8 \text{ MW (given)}$$

$$\therefore P_{G2} = 8 - P_{G1}$$

Table 4.6 The UC table for the above-considered system

Load range	Units			
	1	2	3	4
1-5	1	0	0	0
6-13	1	1	0	0
14-18	1	1	1	0
19-56	1	1	1	1

For an optimal load sharing

$$\frac{dc_1}{dP_{G1}} = \lambda$$

i.e $$\frac{dc_1}{dP_{G1}} = \frac{dc_2}{dP_{G2}}$$

$$0.74P_{G1} + 22.9 = 1.56P_{G2} + 25.9$$

$$= 1.56(8 - P_{G1}) + 25.9$$

$$\Rightarrow 2.3P_{G1} = 15.48$$

$$P_{G1} = \frac{15.48}{2.3} = 6.73 \text{ MW}$$

i.e., load shared by the first unit $P_{G1} = 6.73$ MW

and $P_{G1} = 8 - P_{G1} = 8 - 6.73 = 1.27$ MW

i.e. load shared by the second unit $P_{G2} = 1.27$ MW

Lagrangian multiplier, $\lambda = 0.74P_{G1} + 22.9 = 1.56P_{G2} + 25.9$

$= 27.88$ Rs/MWh

$F_1(6.73)$: cost of generation of 6.73 MW by the first unit

$$= \frac{1}{2}a_1P_{G1}^2 + b_1P_{G1} + d_1$$

$$= \left|\frac{1}{2} \times 0.74 \times (6.73)^2\right| + (22.9)(6.73) + 0.0$$

$= 170.87$ Rs/hr

$F_2(1.27)$ = cost of generation of 1.27 MW by the second unit

$$= \frac{1}{2}a_2P_{G2}^2 + b_2P_{G2} + d_2$$

$$= \frac{1}{2} \times 1.56 \times (1.27)^2 + (25.9)(1.27)$$

$= 34.15$ Rs/hr

The total minimum operating cost with an optimal combination of unit-1 and unit-2 is $F_1 + F_2 = 205.11$ Rs/hr

Roll No. ...12001616064.

Signature .....

To prepare the uc table, the load is to vary in steps of 1 MW starting from a minimum generating capacity to a maximum generating capacity of a station in suitable steps.

Serial No. U 478304

Signature of the Invigilator

Complete this cover carefully and in your own interest, follow the instructions printed below.

Signature of the Officer-in-Charge

Candidate's Roll Number 12001316026

Registration Number with year 161200110561 Examination, Year 2019

Subject Environmental Engineering lab Paper CE-791 ~~First~~/Second Half

Twinkle sharma

Full Signature of Student

MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL

MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL

INSTRUCTIONS TO CANDIDATES

1. In no circumstances may you remove Answer Booklets, used or un-used, from the Examination Room.
2. Write on both sides of the paper.
3. Begin each answer on a fresh page.
4. Write the question number at the top of each page.
5. Do all rough work in the Answer Booklet and cross it through. No loose paper will be provided for scribbling and no paper is to be brought in for this purpose, any candidate possessing loose paper or found copying will be subject to Disciplinary Action under the relevant rules.
6. If you use any additional sheet or sheets, tie them with end of this booklet. Do not write answers on them until you have used all the pages in this booklet.

Do not write anything inside this box.

WRITTEN ASSESSED ANSWER SCRIPT FOR ALL UNIVERSITY EXAMINATIONS SHALL NOT BE PRESERVED BY THE UNIVERSITY BEYOND SIX MONTHS FROM THE RESPECTIVE DATES OF PUBLICATION OF RESULTS.

To be filled by the Candidates	For Examiner's Only
Serial No. of questions answered	Marks awarded
1. a	4
b	1
c	5
d	5
e	4
2 a	4
b	5
c	5
d	1
e	5
Total Marks	38

Signature of Head-Examiner/Co-Ordinator/Scrutineer

H.K

Signature of Examiner

Q. No.

1. To determine the pH of given sample of water

a) **Theory:** The pH can be defined as the log of reciprocal of H^+ ion present in the given sample of water i.e

$$pH = \log_{10}\left[\frac{1}{H^+}\right]$$

A pure water contains equal amount of both positively (+ve) charged ion i.e H^+ and negatively (-ve) charged ion i.e OH^-. The product of both in a pure or neutral water is found to be 10^{-14} moles/ℓ. The quantum of H^+ or OH^- both be equal to $\sqrt{10^{-14}} = 10^{-7}$ moles/ℓ.

So the pH of pure water is $\log_{10}\left[\frac{1}{10^{-7}}\right] = 7$

pH can be represented with a scale ranging from 0-14 where pH less than 7 indicates acidic nature and pH greater that 7 indicates alkaline nature and 7 being neutral. The maximum acidity can be 0 and the maximum alkalinity is 14.

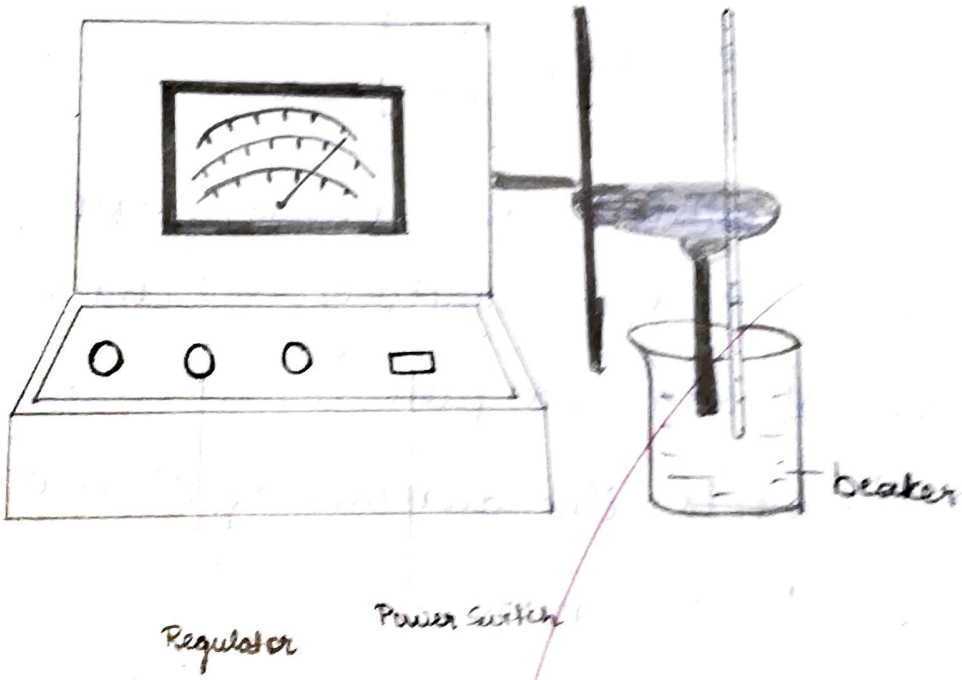
The standard permissible limit of pH in drinking water is 6.5 - 8.5.

Q. No.

b) **Apparatus:** pH meter, beaker, thermometer

No Reagents used.

c) **Diagram:**



pH-meter

c) **Procedure:**

1. Connect the pH meter to 230V AC mains
2. connect the electrodes to back panel.
3. Take the buffer solutions of pH 7 | pH 4 and dip the electrode into the solution and measure it through pH meter, if the reading does not come 7|4 then calibrate the meter with 'cal' knob to 7 & 4.

Q. No.

4. Now place the sample in the testing beaker.

5. clean and dry the electrode with distilled water and tissue paper.

6. dry and dip the electrode in the sample of water.

7. note the measurement i.e reading

8. Also measure the temperature of the water.

d) No observation table and No calculation
pH is directly found from the pH meter.

e) **Precautions:** i) pH meter should be checked by using the buffer solution of pH 7 / pH 4.

ii) calibrate the pH meter using 'cal' knob, if the value doesnot come as required for known samples.

iii) make sure you clean the electrode with distilled water

iv) make sure the beaker is clean and dry.

Q. No.

Environmental Significance: The pH is very necessary for both water and sewage treatment process. The pH ranging more than 6.5 - 8.5 is not used for domestic and drinking purpose. The water with known pH helps in treating various process like disinfection, coagulation, water softening.

The pH with low value causes corrosion, tuberculation etc. The pH with high value causes sediment deposit and difficulties in chlorination.

2. To determine the turbidity of given sample of water.

a) **Theory:** Turbidity is the measure of optical property of light which is scattered and absorbed instead of getting transmitted in straight lines. This is due to the presence of suspended solids in water which scatters the light. Suspended solids can be due to the presence of clay, silt, algae, organic matter etc. Higher the turbidity, higher will be scattering of light and higher will be the suspended

Q. No.

solids. But turbidity is not a direct measure of suspended solids. Turbidity is the quality of being opaque, cloudy with suspended particle.

Turbidity is measured in nephelometric turbidity unit (NTU). The permissible limit is 5NTU and acceptable is 1NTU for drinking water.

b) **Apparatus:** Nephelometer.

Reagents: i) Solution I: Dissolve 1.0 gm of hydrazine sulphate $[(NH_2)_2H_2SO_4]$ with distilled water and dilute it to 100 ml volumetric flask.

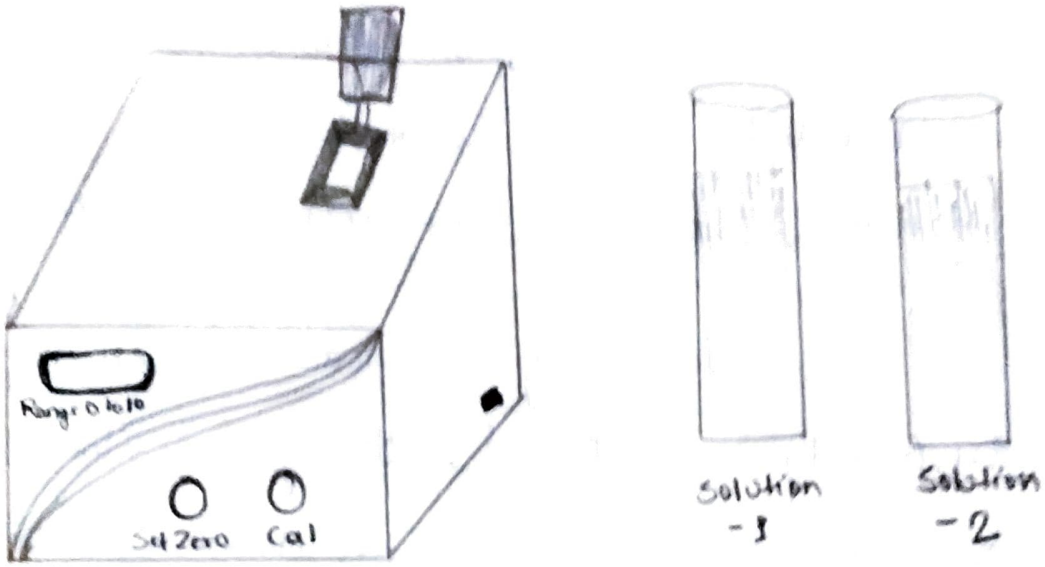
ii) Solution II: Dissolve 10gm of hexamethylene tetramine $[(CH_2)_6N_4]$ with distilled water and dilute it to 100 ml volumetric flask.

iii) Take 5ml of solution I and 5 ml of solution II in a beaker and keep it for 24 hr at 25°C and mix and measure. The value will be 400 NTU.

Q. No.

Diagram:

Nephlometer for measuring turbidity of the sample.



Nephlometer

c **Procedure:** 1. Switch on the instrument and let it warm up for 10 to 15 minutes.

2. Place the standard sample into the nephlometer, ~~the~~ calibrate it using calibrate to '000' and then note the reading which will be 400NTU.

3. Again place the sample into the nephlometer, note down the reading.

4. Compare it with the ~~stan~~ standard value enabled to know whether its drinkable or not.

Q. No.

d) **Observations:** Turbidity is directly found through nephlometer.

e) **Precautions:** 1. Instruments should be warmed before testing the sample for about 10-15 minutes.

2. A standard solutions should be checked first inorder to do calibration if the known value doesnot come.

3. Nepholometer should be connected to AC mains.

4. Test tube should be clean and dry.

Environmental Significance

Turbidity represents aesthetic and psycological nature of water. If the water is turbid, it contains suspended solids which effects the aquatic organism and algal growth as they prevent the penetration of sunlight into the water. Acceptable limit for drinking water is 1 NTV and punissable is 5NTV. Due to the turbidity, aquatic life is destroyed, another aquactic organism, long term impairment of ecosystem.