

C-18 - Curriculum

Diploma in Mechanical Engineering



**State Board of Technical Education & Training
Telangana, Hyderabad**

IV Semester

Sl. No	Course Code	Course Name	Teaching Scheme					Examination Scheme						
			Instruction periods per week			Total Periods per semester	Credits	Continuous internal Evaluation (CIE)			Semester End Examination (SEE)			
			L	T	P			Mid Sem 1	Mid Sem 2	Internal Evaluation	Max marks	Min marks	Total Marks	Min marks for passing including CIE
1	18M-401F	Advanced Mathematics	3	1	0	60	3	20	20	20	40	14	100	35
2	18M-402C	Heat Power Engg.	3	1	0	60	3	20	20	20	40	14	100	35
3	18M-403C	Electrical Technology.	3	1	0	60	3	20	20	20	40	14	100	35
4	18M-404C	Fluid Mechanics and Hydraulic Machinery	3	1	0	60	3	20	20	20	40	14	100	35
5	18M-405C	Advanced Manufacturing Engineering	3	1	0	60	3	20	20	20	40	14	100	35
6	18M-406P	Production Drawing	1	0	2	45	1.5	20	20	20	40	20	100	50
7	18M-407P	Thermal Engineering. Lab	1	0	2	45	1.5	20	20	20	40	20	100	50
8	18M-408P	Electrical Technology. Lab	1	0	2	45	1.5	20	20	20	40	20	100	50
9	18M-409P	A. Material Testing Lab B. Fluid Mechanics and Hydraulics Machinery lab	1	0	2	45	1.5	20	20	20 (10+10)	40	20	100	50
10	18M-410P	Advanced Communication lab	1	0	2	45	1.5	20	20	20	40	20	100	50
11		Skill Upgradation	0	0	7	105	2.5	0	0	Rubrics			--	-
		TOTAL	20	5	17	630	25	200	200	200	400	170	1000	425
Activities: student performance is to be assessed through Rubrics														

Note: Pass criteria: The minimum marks required for passing in any of courses are given below

1. Cumulative 35% of marks (35 marks) in Mid Sem -1 + Mid Sem -2+ Internal Evaluation +SEE
2. Minimum marks in SEE is 35% (i.e.14marks).
3. If the cumulative of CIE is less than 35% (i.e.21 marks out of 60) then more than 35% of SEE is required to get overall 35%.

ADVANCED ENGINEERING MATHEMATICS

Course Title	: Advanced Engineering Mathematics	Course Code	: 18FW-401F
Semester	: IV	Course Group	: Foundation
Teaching Scheme in periods (L : T :P)	: 45 : 15 : 0	Credits	: 3
Methodology	: Lecture + Tutorial	Total Contact Periods	: 60
CIE	: 60 Marks	SEE	: 40 Marks

Pre requisites

This course requires the knowledge of Engg. Mathematics at Diploma first year level and Applied Engg. Mathematics at Diploma 3rd Semester level.

Course Outcomes :

At the end of the course, the student will have the ability to:

CO 1	Solve simple Homogeneous Linear Differential Equations
CO 2	Solve simple Non-Homogeneous Linear Differential Equations
CO 3	Express f(x) as a Fourier series in the given interval
CO 4	Express f(x) as a Fourier Half-Range Cosine series and Sine series
CO 5	Find Laplace transforms of simple functions
CO 6	Find Inverse Laplace transforms of simple functions and solve Linear Differential Equations using Laplace Transformations.

Blue Print of Marks for SEE

Unit No	Unit Name	Periods	Questions to be set for SEE			
			R		U	A
1	Homogeneous Linear Differential equations with constant coefficients	05	Q4	Q1	Q9(a)	Q13(a)
2	Non-Homogeneous Linear Differential equations with constant coefficients	15				
3	Fourier series	10		Q2	Q10(a)	Q14(a)
4	Fourier Half-range series	05				
5	Laplace Transforms	10		Q3	Q9(b), Q11(a), Q11(b)	Q13(b), Q15(a), Q15(b)
6	Inverse Laplace transforms	15			Q7,Q8	Q10(b), Q12(a), Q12(b)
Total		60	8		8	8

Course Contents:

Unit – I

Duration: 05 Periods (L:3.0 – T:2.0)

Homogeneous Linear Differential equations with constant coefficients

Homogenous linear differential equations with constant coefficients of order two and higher with emphasis on second order.

Unit – II

Duration: 15 Periods (L:12.0 – T:3.0)

Non-Homogeneous Linear Differential equations with constant coefficients

Non-homogenous linear differential equations with constant coefficients of the form $f(D)y = X$, where X is in the form k (a constant), e^{ax} , $\sin ax$, $\cos ax$, x^n , ($n = 1, 2, 3$) Complimentary Function (CF), Particular Integral (PI) and General Solution (GS).

Unit-III

Duration: 10 Periods (L: 8.0 – T: 2.0)

Fourier series

Orthogonality of trigonometric functions, Representation of a function in Fourier series over the interval $(c, c + 2\pi)$, Euler's formulae, sufficient conditions for existence of Fourier series for a function. Even, Odd functions and Fourier series over the Interval $(0, 2\pi)$ and $(-\pi, \pi)$

Unit – IV

Duration: 05 Periods (L: 3.0 – T: 2.0)

Fourier Half-range series

Representation of a function as Fourier Half-range Sine series and Cosine series over the interval $(0, \pi)$

Unit – V

Duration: 10 Periods (L: 7.0 – T:3.0)

Laplace Transformations:

Definition, sufficient conditions for existence of Laplace Transform, Laplace Transform of elementary functions, linearity property, Change of scale property, First shifting theorem, multiplication by t^n , division by t , Laplace Transform of derivatives and integrals, unit step function, Laplace Transform of second shifting theorem

Unit – VI

Duration: 15 Periods (L: 12.0 – T: 3.0)

Inverse Laplace transforms:

Inverse Laplace transforms- shifting theorems and change of scale property, multiplication by s^n and division by s –Inverse Laplace Transform using partial fractions

- convolution theorem (no proof) – application of Laplace Transformations to solve ordinary differential equations of second order with initial conditions.

Recommended Books:

1. Higher Engineering Mathematics, B.S.Grewal .
2. Laplace Transforms - Murray R. Spiegel .
3. Ordinary Differential Equations – R. S. Aggarwal.
4. Fourier Series – A.R. Vasishtha and Gupta.

Suggested E-Learning references:

1. www.freebookcentre.net/mathematics/introductory-mathematics-books.html
2. E-books: www.mathebook.net

Suggested Learning Outcomes

Unit-I

1.0 Solve Homogeneous linear differential equations with constant coefficients in engineering situations

- 1.1 Solve Differential equations of the type $(aD^2 + bD + c)y = 0$ when the roots of the auxiliary equation are real and different, real and repeated, complex.
- 1.2 Solve the higher order homogeneous Linear differential equations with constant coefficients.

Unit-II

2.0 Solve Non Homogeneous linear differential equations with constant coefficients in engineering situations

- 2.1 Explain the concept of complementary function, particular Integral and general solution of a differential equation.
- 2.2 Solve n^{th} order differential equation of the type $f(D)y = X$ where $f(D)$ is a polynomial of second order and X is a function of the form $k, e^{ax}, \sin ax, \cos ax, x^n$.
- 2.3 Solve simple problems on the above types of 2.2

Unit-III

3.0 Understand the Fourier series expansion of functions

- 3.1 Define the orthogonality of functions in an interval.
- 3.2 Define Fourier series of a function on the interval $(C, C+2\pi)$ and write the Euler's formulae for determining the Fourier coefficients.
- 3.3 Write sufficient conditions for the existence of Fourier series for a function.
- 3.4 Write Fourier series of simple functions in the range $(0, 2\pi)$ and $(-\pi, \pi)$.
- 3.5 Write Fourier series for even and odd functions in the interval $(-\pi, \pi)$
- 3.6 Solve simple problems on even and odd functions in the interval. $(0, 2\pi)$ and $(-\pi, \pi)$

Unit- I

4.0 Understand the Half – Range Fourier series expansion of functions

- 4.1 Write Half – Range Cosine series of a function in the range $(0, \pi)$.
- 4.2 Write Half – Range Sine series of a function in the range $(0, \pi)$.
- 4.3 Solve simple problems on Half – Range Cosine and Sine series over the interval $(0, \pi)$

Unit-V

5.0 Understand Laplace transforms

- 5.1 Write the definition of Laplace Transform and Laplace transform of standard functions.
- 5.2 Explain the sufficient conditions of existence of Laplace Transform.
- 5.3 Write the properties of Laplace Transform – Linearity property, First shifting theorem, Change of Scale property.
- 5.4 Solve simple problems using the above properties.
- 5.5 Write formulae for Laplace transform of $t^n f(t)$, $\frac{f(t)}{t}$, $f^n(t)$, $\int_0^t f(u) du$ in terms of Laplace transform of $f(t)$
- 5.6 Solve simple problems using the above formulae.
- 5.7 Define unit step function and write the Laplace Transform of unit step function.
- 5.8 Write Second shifting theorem.

Unit-VI

6.0 Use Laplace transforms and Inverse Laplace transforms to solve differential equation in engineering problems

- 6.1 Define inverse Laplace Transform and write inverse Laplace Transforms of standard functions.
- 6.2 Solve simple problems on Inverse Laplace Transforms.
- 6.2 Write Shifting theorems and Change of scale property of inverse Laplace Transform.
- 6.3 Solve simple problems on 6.2
- 6.4 Write inverse Laplace Transforms corresponding to Laplace Transform of the functions $t^n f(t)$, $\frac{f(t)}{t}$, $f^n(t)$, $\int_0^t f(u) du$
- 6.5 Solve simple problems on 6.4
- 6.6 Define convolution of two functions and state convolution theorem.
- 6.7 Solve simple problems on Convolution theorem.
- 6.8 Use Laplace and inverse Laplace Transforms to solve simple differential equations of Second order.

Suggested Student Activities:

- 1. Student visits Library to refer Standard Books on Mathematics and collect related material.

2. Quiz
3. Group discussion
4. Surprise tests
5. Seminars
6. Home Assignments.

CO-PO Mapping Matrix

	Basic knowledge	Discipline Knowledge	Experiments and practice	Engineering Tools	Engineer and society	Environment & sustainability	Ethics	Individual and Team work	Communication	Lifelong learning	Linked PO
CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	
CO1	3	2	2	1			1			3	1,2,3,4,7,10
CO2	3	2	2	1			1			3	1,2,3,4,7,10
CO3	3	2	2	1			1			3	1,2,3,4,7,10
CO4	3	2	2	1			1			3	1,2,3,4,7,10
CO5	3	2	2	1			1			3	1,2,3,4,7,10
CO6	3	2	2	1			1			3	1,2,3,4,7,10

Internal Evaluation

Test	Units	Marks
Mid Sem 1	1 and 2	20
Mid Sem 2	3 and 4	20
Slip Test 1	1 and 2	5
Slip Test 2	3 and 4	5
Assignments	-	5
Seminars	-	5
	Total	60

QUESTION PAPER PATTERN FOR MID SEMESTER EXAMS

Sl.No	Description	Level	No of Questions	Marks for each question	Choice	Total Marks
01	Part-A	Remembering(R)	4	1	Nil	4 Marks
02	Part-B	Understanding(U)	4	3	2	6 Marks
03	Part-C	Application(A)	4	5	2	10 Marks
Total Marks						20 Marks

MID SEM-I EXAM

S.No	Unit No	R	U	A	Remarks
1	Unit-I	1,2	5(a)	7(a)	
			5(b)	7(b)	
2	Unit-II	3,4	6(a)	8(a)	
			6(b)	8(b)	
Total Questions		4	4	4	

MID SEM-II EXAM

S.No	Unit No	R	U	A	Remarks
1	Unit-III	1,2	5(a)	7(a)	
			5(b)	7(b)	
2	Unit-IV	3,4	6(a)	8(a)	
			6(b)	8(b)	
Total Questions		4	4	4	

The length of answer for each question framed in respect of Part-A, B&C shall not exceed $\frac{1}{4}$ of a page, 1page and 2 pages respectively

QUESTION PAPER PATTERN FOR SEMESTER END EXAM

Sl.No	Description	Level	No of Questions	Marks for each question	Choice	Total Marks
01	Part-A	Remembering(R)	8	1	Nil	8 Marks
02	Part-B	Understanding(U)	8	3	4	12 Marks
03	Part-C	Application(A)	8	5	4	20 Marks
Total Marks						40 Marks

Unit No	Questions to be set for SEE				
	R		U		A
I	Q4	Q1		Q9(a)	Q13(a)
II					
III		Q2		Q10(a)	Q14(a)
IV					
V		Q3	Q5,Q6	Q9(b), Q11(a), Q11(b)	Q13(b), Q15(a), Q15(b)
VI			Q7,Q8	Q10(b), Q12(a), Q12(b)	Q14(b), Q16(a), Q16(b)
Total Questions	8		8		8

STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TELANGANA
BOARD DIPLOMA EXAMINATIONS
MID SEM –I, MODEL PAPER, IV SEMESTER
ADVANCED ENGINEERING MATHEMATICS

TIME: 1: 00 Hours

Max. Marks: 20

PART-A

Instructions:

1. Answer **ALL** questions

04 X 01 = 04

2 Each question carries **ONE** mark

1. Write the General solution of $(aD^2+bD+c)y = 0$, whose roots of auxiliary equation are real and distinct.
2. Find the roots of auxiliary equation of the differential equation $(D^2 + 2D + 1)y = 0$
3. Find the Particular Integral of $(D^2 - 4D + 1)y = e^{3x}$
4. Find the P.I of $(D^2 - 16)y = \sin 4x$

PART-B

Instructions:

1. Answer any **TWO** questions

02 X 03 = 06

2. Each question carries **THREE** marks

5 a) Solve: $(D^2 + 3D - 54)y = 0$

Or

5 b) Solve : $(D^2 + 16)y = 0$

6 a) Solve : $(D^2 + 4D + 4)y = e^{2x}$

Or

6 b) Find P.I of $(D^3 + D)y = \sin 2x$

PART C

Instructions:

1. Answer **ALL** questions

02 X 05 = 10

2. Each question carries **FIVE** marks

7 a) Solve : $(D^3 - 2D^2 - 4D + 8)y = 0$

Or

7 b) Solve : $(D^3 - D^2 - D + 1)y = 0$

8 a) Solve : $(D^2 + 36)y = \sin^2 x$

Or

8 b). Solve : $(D^2 + 3D + 2)y = x^2$

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Code: 18FW-401F

STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TELANGANA
BOARD DIPLOMA EXAMINATIONS
MID SEM –II, MODEL PAPER, IV SEMESTER
ADVANCED ENGINEERING MATHEMATICS

TIME: 1: 00 Hours

Max. Marks: 20

PART-A

Instructions:

1. Answer **ALL** questions

04 X 01 = 04

2 Each question carries **ONE** mark

1. Define periodic function and give one example
2. Define Fourier series of the function $f(x)$ in the interval $(0, 2\pi)$
3. Write Half-range sine series of $f(x)$ in the interval $(0, \pi)$
4. Find a_0 for $f(x) = e^x$ in $0 < x < \pi$

PART-B

Instructions:

1. Answer any **TWO** questions

02 X 03 = 06

2. Each question carries **THREE** marks

5 a). If $f(x) = x^2$ in $(0, 2\pi)$, then find the value of a_n in Fourier series of $f(x)$

Or

5 b) If $f(x) = |x|$ in $(-\pi, \pi)$, then find the value of a_1 in Fourier series of $f(x)$

6 a). Find the value of a_n in half-range Cosine series for the function $f(x) = e^x$ in $(0, \pi)$

Or

6 b). Obtain the Fourier Half – Range Sine series for $f(x) = (\pi - x)$ in the interval $(0, \pi)$

PART C

Instructions:

1. Answer any **TWO** questions

02 X 05 = 10

2. Each question carries **FIVE** marks

7 a). Obtain the Fourier series for $f(x) = x$ in the interval $0 < x < 2\pi$

Or

7 b). Find the Fourier series for $f(x) = (x - x^2)$ in the interval $(-\pi, \pi)$. Hence show that

$$\frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + \dots + \frac{\pi^2}{12}$$

8 a) Express $f(x) = \pi x - x^2$ as a half-range Sine series in $(0, \pi)$

Or

8 b). Find the half –range cosine series for the function $f(x) = x^2$ in the interval $(0, \pi)$

BOARD DIPLOMA EXAMINATION, (C-18)
SEMESTER END EXAM MODEL PAPER
IV SEMESTER EXAMINATION
ADVANCED ENGINEERING MATHEMATICS

Time: 2 hours

[Total Marks: 40]

PART-A

Instructions:

1. Answer **ALL** questions

08 X 01 = 08

2 Each question carries **ONE** mark

1. Find the roots of auxiliary equation of the differential equation $(D^2 + 4D)y = 0$.
2. Define Fourier Series for the function $f(x)$ in the interval $(c, c+2\pi)$
3. Find the Particular Integral of $(D^2 - 4D + 1)y = e^x$
4. Find $L(e^{2t} + \cos 3t)$
5. Find $L(t + 5\cos ht)$
6. State the First Shifting theorem of Laplace Transforms.
7. Find $L^{-1}\left(\frac{1}{s-3} + \frac{s}{s^2+4}\right)$
8. Find $L^{-1}\left(\frac{1}{2s+5}\right)$

PART-B

Instructions:

1. Answer any **FOUR** questions

04 X 03 = 12

2. Each question carries **THREE** marks

9. a) Solve: $(D^2 + D + 1)y = 4e^{3x}$

Or

- 9 b) Find $L(t\cos 3t)$

- 10 a) Find Half Range Sine Series of $f(x) = x$ in $(0, \pi)$

Or

- 10 b) Find $L^{-1}\left(\frac{s+1}{s^2+6s-7}\right)$

- 11 a) If $L\{f(t)\} = \frac{20-4s}{s^2-4s+20}$, find $L\{f(3t)\}$

Or

- 11 b) Find $\int_0^\infty t \cdot e^{-2t} \sin 3t dt$ using Laplace Transform Technique

- 12 a) Show that $L^{-1}\left(\frac{1}{s(s^2+a^2)}\right) = \frac{1-\cos at}{a^2}$

12 b) Find $L^{-1}\left(\frac{s}{(s+2)^2+4}\right)$

PART C

- Instructions:
1. Answer any **FOUR** questions
 2. Each question carries **FIVE** marks

04 X 05 = 20

13. a) Solve : Solve: $(D^2 + D - 2) y = x + \sin x$

Or

13 b) Find $L[te^t \sin 3t]$

14 a) Expand $f(x) = x^2$ as a Fourier series in the interval $(-\pi, \pi)$

Or

14 b) Find $L^{-1}\left(\frac{s}{(s+1)^2(s^2+1)}\right)$

15 a) Find $L\left(\frac{\sin 3t \cdot \cos t}{t}\right)$

Or

15 b) Evaluate $L\left\{\int_0^t \frac{\sin t}{t} dt\right\}$

16 a) Find $L^{-1}\left(\frac{1}{(s+1)(s+2)}\right)$ using Convolution theorem .

Or

16 b). Solve the differential equation $y'' - 2y' - 8y = \sin t$, when $y(0) = 3$, $y'(0) = 6$ by

Laplace Transform method.

HEAT POWER ENGINEERING

Course Title :	Heat Power Engineering	Course Code	18M402C
Semester	IV	Course Group	:Core
Teaching Scheme in periods (L:T:P)	36:24:0	Credits	: 3
Methodology	Lecture + Assignments	Total Contact Periods :	:60
CIE	60 Marks	SEE	40 Marks

Prerequisites

This course requires the basic knowledge of Basic Thermodynamics and Mathematics.

Course outcomes

At the end of course student should be able to

CO1 :	Comprehend the construction and working of air compressor and gas turbine. Compare the gas turbine with IC engine and steam turbine Illustrate the application of jet propulsion.
CO2 :	Illustrate the generation of steam and its property analysis
CO3 :	To understand the working and application of various elements of steam power plant, Explain the construction and working of boiler , its mountings and accessories.
CO4 :	Identify the need of nozzle , its working and design nozzle to given conditions
CO5 :	Illustrate the working of a turbine and interpret blade parameters using velocity triangles
CO6 :	To understand the construction and working of condenser and its necessity in protecting environment

Course Content and Blue Print of Marks for SEE

Unit no	Unit name	Questions to be set for SEE (Q No)				Remarks
		R		U	A	
1	Air Compressors, Gas Turbines & Jet Propulsion	4	1	9(a)	13(a)	
2	Properties of Steam					
3	Steam Boilers		2	10(a)	14(a)	
4	Steam Nozzles					
5	Steam Turbines	3	5,6	9(b)	13(b)	
				11(a)	15(a)	
			7,8	11(b)	15(b)	
				10(b)	14(b)	
6	Steam Condensers			12(a)	16(a)	
				12(b)	16(b)	
Total questions		8		8	8	

Legend: R; Remembering, U: Understanding A: Applying

COURSE CONTENT

UNIT-1

Duration: Periods 10 (L: 06 – T: 04)

Air compressors, Gas Turbines & Jet Propulsion

Functions of air compressor – uses of compressed air – types of air compressors - Single stage reciprocating air compressor its construction and working (with line diagram) using P.V. diagram. Formulae for work done and power required- simple problems on calculation of work done and power required. Multi stage compressors – advantages over single stage compressors. Use of inter cooler – conditions for minimum work in two stage compressor (without proof) Formulae for work done and power required in two stage compressors – simple problems. Gas turbines – Classification – open cycle gas turbines and closed cycle gas turbines – comparison of gas turbine with reciprocating I.C. engines and steam turbines. Applications, advantages and limitations of gas turbines - working of Open cycle constant pressure gas turbine – Closed cycle gas turbine – general lay-out. P.V. and T.S diagram. Principle of jet propulsion. Operation and applications of Ram – jet engine, turbojet engines and rocket engines – fuels used in jet propulsion.

UNIT-2

Duration: Periods 10 (L: 06 – T: 04)

Properties of steam

Formation of steam under constant pressure- dryness fraction and degree of superheat - Determination of enthalpy, entropy and specific volume of wet, dry and superheated steam at a given pressure using steam tables and Mollier chart.

Vapour processes – isochoric, isobaric, isothermal, adiabatic and polytropic - simple problems on enthalpy, entropy and specific volume- internal energy, internal latent heat, of wet, dry and superheated steam using tables.

UNIT-3

Duration: Periods 10 (L: 06 – T: 04)

Steam Boilers

Layout of steam power plant. Function and use of steam boilers – construction - Classification of steam boiler- Comparison of water tube and fire tube boilers - Cochran and Babcock Wilcox Boilers - modern high pressure boilers Lamont and Benson boilers - Boiler mountings - Boiler accessories - Actual evaporation - equivalent evaporation - factor of evaporation - boiler horse power - boiler efficiency - Formula for the above terms without proof - Simple direct problems on the above - draught systems

UNIT-4

Duration: Periods 10 (L: 06 – T: 04)

Steam Nozzles

Function – types- Flow of steam through nozzle - Velocity of steam at the exit of nozzle. Discharge of steam through nozzles - Critical pressure ratio - calculation of cross sectional areas at throat and discharge - Effect of friction in nozzles.

UNIT-5

Duration: Periods 10(L: 06 – T: 04)

Steam Turbines

Steam turbines - Classification - impulse & reaction turbines - working of a simple De-lavel turbine - Velocity diagrams of impulse turbines - Expression for work done, axial thrust, tangential force, blade and diagram efficiency, stage efficiency, nozzle efficiency –Compounding of turbines- velocity, pressure and combined pressure and velocity - Simple problems on single stage impulse turbines- analytical and graphical methods.

Working of Parson's Reaction turbine -Bleeding, re-heating - regeneration and re-heating factor(Problems omitted) - Governing of steam turbines and methods.

UNIT-6

Duration: Periods 10 (L: 06– T: 04)

Steam Condensers

Steam condenser-its functions - Classifications – surface and jet condensers- Low level - High level Jet condenser and Ejector condenser - Shell and Tube Surface condenser - down flow - Central flow Surface - Evaporative condenser -Advantages and Disadvantages - Formulae for calculation cooling water required, Condenser efficiency - corrected vacuum, Absolute pressure and Vacuum efficiency - Simple problems on Steam condensers - Air Extraction, Types of Air Extraction systems, Dry-air Extraction and Wet-air Extraction systems, Air pump and Steam –Jet Air Ejector

REFERENCE BOOKS

1. Thermodynamic by Ballaney
2. Thermal Engineering by Arora& S. Domkundwar
3. Thermal Engineering by Roy & Sarao
4. Thermal Engineering by Vasandani& Kumar
5. Thermal Engineering by R.S.Khurmi

Suggested student activity

1. Students are advised to visit a nearby industry involving use of boiler and students are advised to conduct energy auditing.

2. Analyze the data by using excel and identify the areas of wastage of energy and suggest suitable methods for improvement of performance.
3. Velocity triangles of turbine may be solved using CAD software.
4. Visit nearest thermal power station and prepare a report consisting of layout – construction and working of various elements.

SUGGESTED LEARNING OUTCOMES

Up on completion of the course the student shall be able to

Comprehend the construction and working of air compressor

- State the functions of air compressors.
- Enumerate the uses of compressed air.
- Name the different types of compressors.
- Explain with line diagram the working of a single reciprocating air compressor.
- Write the formula for work done and power required by a single stage compressor.
- State the advantages of multi- stage compressors over single stage compressor.
- Explain the use of inter cooler.
- State the conditions for minimum work done in two stage compression.
- Solve simple problems on single acting reciprocating air compressors only.
- Write the formula for work done and power required in two stage compressor.
- Solve simple problems in two stage air compressor.

Understand the working and applications of gas turbines & Jet Propulsion

- Classify gas turbines.
- Compare Gas turbines with Steam turbines.
- Compare gas turbines with reciprocating I.C. engines.
- Mention the applications with limitations of gas turbine.
- Explain with line diagrams the working of an open cycle constant pressure type gas turbine.
- Explain with line diagram the working of a closed cycle type gas turbine.
- Represent cycle of operation for the above type on P-V and T-s diagrams.
- Explain with line diagram the principles of operation of Ramjet engine and turbo- jet and rocket engines.
- Identify the fuels used in jet propulsion.

Understand the Properties of Steam

- Define the various properties and types of steam
- Practice the use of steam tables and interpret the data for given pressure

- Compute the enthalpy, specific volume and entropy at given pressure for wet, dry and superheated steam using steam tables.
- Identify the various thermodynamic vapour processes isochoric, isobaric, isothermal, adiabatic and polytropic.
- Compute the work done, internal energy, enthalpy, specific volume and entropy in each of the above processes under wet, dry and superheated steam condition.
- Represent the above process on T-S and H-S diagrams

Understand the Working of Steam Boilers.

- State the function and construction of boiler
- List all the uses of boilers.
- Classify steam boilers
- Distinguish between water tube and fire-tube boilers
- Explain the working of Cochran Boiler with a legible sketch
- Explain the working of Babcock Wilcox Boiler with a legible sketch
- Recognise the need of high-pressure modern boilers
- Explain the working principle of Lamont and Benson Boilers with a legible sketch
- List all the boiler mountings
- Explain the function of all the mountings with a legible sketch such as pressure gauge, water level indicator, safety valve and fusible plug.
- List all the boiler accessories.
- Illustrate the function of all the accessories with a legible sketch such as economiser, Super Heater, Steam traps & Separators.
- Explain the terms actual/equivalent evaporation and factor of evaporation.
- Define the boiler Power
- Define the boiler efficiency
- Write the formula for the above
- Compute the equivalent and actual evaporation from given data.
- Solve problems on Boiler Power & efficiency
- Explain draught systems (without problems)

Understand the Working of Steam Nozzles

- Explain the Flow of steam through nozzle
- Derive the expression for Velocity of steam at the exit of nozzle in terms of heat drop.

- Calculate Velocity of steam at the exit of nozzle by using steam tables or Mollier chart
- Write the expression for Discharge of steam through nozzles
- Write the formula for Critical pressure ratio (without proof)
- Explain the Effect of friction in nozzles
- Solve problems of nozzles to calculate cross section area and discharge

Understand the Working of Steam Turbines

- Explain the working principle and construction of a turbine
- Classify the Turbines with examples
- Differentiate the impulse turbines from reaction turbine
- Explain the Principle of working of simple De-Laval turbine with a line diagram
- Draw velocity triangles for impulse turbine
- List various blade angles
- Write formula for tangential force, work done, axial thrust, power and efficiencies.
- State the necessity of compounding a turbine
- Describe the methods of reducing rotor speeds by velocity, pressure and pressure-velocity compounding with the help of pressure, velocity variation chart
- Explain the working principle of Parson's Reaction Turbine with a line diagram
- Simple problems on Single Stage Impulse turbines (Velocity triangles and problems on reaction turbine omitted)
- Define the terms bleeding & reheating
- State the necessity of governing a turbine
- Explain the methods of turbine governing

Understand the Working of Steam Condensers

- Define the Steam condenser
- State the functions of steam condenser
- Classify the condensers
- Explain the working principle of Low level counter – Flow and Parallel flow jet Condensers with legible sketch
- Explain the working principle of High level Jet condenser with legible sketch
- List the Advantages and Disadvantages of High- Level Jet condenser
- Explain the working principle of Ejector condenser with legible sketch
- Explain the working principle of Shell and Tube Surface condenser with sketch
- Distinguish between down flow and central flow surface condenser
- Explain the working principle of Evaporative condenser with legible sketch

- List Advantages and Disadvantages of Surface condenser
- Distinguish between Jet Condenser and Surface Condenser
- Write the Formulae for cooling water required, Condenser efficiency, corrected Vacuum, absolute pressure and Vacuum efficiency
- Solve Simple problems on Steam condensers to Estimate the Cooling water required, Condenser efficiency and Vacuum efficiency
- Define Air Extraction
- List the types of Air Extraction systems
- Distinguish between Dry-air Extraction and Wet-air Extraction systems
- Explain the working principle of Air pump and Steam –Jet Air Ejector with legible sketch

CO-PO Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	Mapping Pos
18M402C.1	3	2	2	2	1	-	-	-	1	-	1,2,3,4,5,9
18M402C.2	3	3	3	2	-	1	-	-	1	-	1,2,3,4,6,9
18M402C.3	2	3	3	2	-	1	-	-	1	1	1,2,3,4,6,9,10
18M402C.4	3	3	2	2	-	-	-	-	1	-	1,2,3,4,9
18M402C.5	3	3	3	2	-	1	-	2	1	1	1,2,3,4,6,8,9,10
18M402C.6	3	3	2	3	-	1	-	1	1	-	1,2,3,4,6,8,9

Question Paper Blue Print for CIE (MID I)

Unit no	Unit name	Questions to be set for MID-I			Remarks
		R	U	A	
1	Air Compressors, Gas Turbines & Jet Propulsion	1,2	5(a) 5(b)	7(a) 7(b)	
2	Properties of Steam	3,4	6(a) 6(b)	8(a) 8(b)	
Total questions		4	4	4	

Question Paper Blue Print for CIE (MID II)

Unit no	Unit name	Questions to be set for MID-II			Remarks
		R	U	A	
3	Steam Boilers	1,2	5(a)	7(a)	
			5(b)	7(b)	
4	Steam Nozzles	3,4	6(a)	8(a)	
			6(b)	8(b)	
Total questions		4	4	4	

State Board of Technical Education, Telangana State

Model Paper

18M402C-HEAT POWER ENGINEERING

Mid Sem-I (CIE)

Time : 1 Hour

Total Marks : 20 M

PART – A

Marks: 4 X 1M = 4M

NOTE: 1) Answer **ALL** questions and each question carries **One** mark.

2) Answers should be brief and straight to the point and shall not exceed **three** simple sentences

1. Define air compressor.
2. Write the classification of gas turbines.
3. Define dryness fraction of steam.
4. Write the formula to find the enthalpy of wet steam.

PART – B

Marks : 2 X 3M = 6 M

NOTE: 1) Answer **ALL** questions and each question carries **Three** marks

2) The answers should be comprehensive and the criteria for valuation is the content but not the length of the answer.

5.(a) Explain why volumetric efficiency decreases with increase in delivery pressure .

(OR)

5.(b) differentiate between open cycle and closed cycle gas turbines.

6.(a) Calculate enthalpy, entropy of a steam at 2bar and 130°C temperature.

(OR)

6.(b) represent a constant entropy process on mollier diagram.

PART – C

Marks : 2 X 5M = 10 M

NOTE :

1) Answer **ALL** questions and each question carries **Five** marks.

2) The answers should be comprehensive and the criteria for valuation is the content but not the length of the answer

7.(a) explain the working of a two stage air compressor with the help of P-V diagram.

(OR)

7.(b) explain the working of Ramjet with the help of a neat sketch.

8.(a) explain in detail the formation of steam under constant pressure.

(OR)

8.(b) calculate the change in enthalpy of one kg of steam at 200⁰ C and 3 bar pressure expanded to 0.3 bar pressure isentropically.

**State Board of Technical Education, Telangana State
Model Paper**

18M402C-HEAT POWER ENGINEERING

Mid Sem-II (CIE)

Time : 1 Hour

Total Marks : 20 M

PART – A

Marks: 4 X 1M = 4M

*NOTE: 1) Answer **ALL** questions and each question carries **One** mark.*

*2) Answers should be brief and straight to the point and shall not exceed **three** simple sentences*

1. Mention any two boiler mountings.
2. Define equivalent evaporation.
3. Define nozzle.
4. List out different types of nozzles.

PART – B

Marks : 2 X 3M= 6 M

*NOTE: 1) Answer **ALL** questions and each question carries **Three** marks*

2) The answers should be comprehensive and the criteria for valuation is the content but not the length of the answer.

5. (a) Write any three differences between fire tube and water tube boilers.

(OR)

5. (b) Write any three uses of steam boiler.

6. (a) Compute the critical pressure ratio in a nozzle when the steam is initially dry & saturated.

(OR)

6. (b) Write down the effect of friction in nozzles.

PART – C

Marks : 2 X 5M = 10 M

NOTE :

1. Answer **ALL** questions and each question carries **Five** marks.

2. The answers should be comprehensive and the criteria for valuation is the content but not the length of the answer

7. (a) Explain the working of any water tube boiler with a neat sketch.

(OR)

7. (b) Define draught. Explain various methods of producing draught in steam boilers.
8. (a) Derive the equation for exit velocity of steam passing through a nozzle without friction.

(OR)

- 8 (b) Explain supersaturated flow of steam in nozzle.

State Board of Technical Education, Telangana State
SEE -Model Paper
18M402C-HEAT POWER ENGINEERING

Time : 2 Hour

Total Marks : 40 M

PART-A

08X01=08

- Instructions :**
1. Answer **ALL** questions.
 2. Each question carries **ONE** mark.

1. Mention different fuels used in jet propulsion.
2. List out the types of steam nozzles.
3. Define condenser.
4. Define dryness fraction of steam.
5. Write the expression for work done in an impulse turbine.
6. Define stage efficiency.
7. Write the classification of condensers.
8. Define vacuum efficiency w.r.t a condenser.

PART-B

04X03=12

- Instructions :**
1. Answer **ALL** questions.
 2. Each question carries **THREE** marks.

9. (a) Write down the advantages of multi stage compression over single stage.

(OR)

9. (b) Write the differences between impulse and reaction turbines.
10. (a) List out the classification of steam boilers.

(OR)

10. (b) Differentiate between surface and jet condensers.

11. (a) Define the terms bleeding & reheating

(OR)

11. (b) Explain the working of a simple De-Laval turbine with a neat sketch.

12. (a) Write a short note on shell and tube surface condensers.

(OR)

12. (b) List out the functions of a condenser.

PART-C

04X5=20

- Instructions :**
1. Answer **ALL** questions.
 2. Each question carries **FIVE** marks.

13. (a) Explain the working of an open cycle constant pressure type gas turbine with the help of a neat sketch.

(OR)

13. (b) Explain different types of governing of steam turbines.

14. (a) Explain the working of Cochran boiler with a neat sketch.

(OR)

14. (b) Distinguish between dry air extraction and wet air extraction.

15. (a) Explain pressure compounding with the help of a neat sketch.

(OR)

15. (b) Numerical example

16. (a) Numerical example

(OR)

16. (b) Explain the working of steam jet air ejector with the help of a neat sketch.

ELECTRICAL TECHNOLOGY

Course Title	: ELECTRICAL TECHNOLOGY	Course Code	: 18M403C
Semester	: IV	Course Group	: Core
Teaching Scheme in periods (L : T :)	: 45 : 15 : 0	Credits	: 3
Methodology	: Lecture + Tutorial	Total Contact Periods	: 60
CIE	: 60 Marks	SEE	: 40 Marks

Pre requisites

Enthusiasm to learn the course, the basic knowledge of Electrical Engineering

Course Outcomes

At the end of the course, the student will have the ability to:

CO 1	Describe the fundamentals of electricity, electrical and magnetic circuits.
CO 2	Describe the construction & working of D.C.Generators
CO 3	Summarize the performance of D.C. Motors.
CO 4	Explain the fundamentals of alternating current
CO 5	Describe the construction & working of A.C. Machines
CO 6	Practice the Electrical Safety & Protection procedures and Electrical Measuring instruments.

Blue Print of Marks for SEE

Unit No	Unit Name	Periods	Questions to be set for SEE				
			R		U	A	
1	Electrical engineering fundamentals	12	Q4	Q1		Q9(a)	Q13(a)
2	D.C.Generators	08		Q2		Q10(a)	Q14(a)
3	D.C.Motors	10					
4	A.C.Fundamentals	10		Q3	Q5,Q6	Q9(b), Q11(a), Q11(b)	Q13(b), Q15(a), Q15(b)
5	A.C.Machines	08					
6	Electrical measuring instruments & Safety procedures	12			Q7,Q8	Q10(b), Q12(a), Q12(b)	Q14(b), Q16(a), Q16(b)
Total		60	8		8	8	

Course Contents

UNIT-1 :Electrical engineering fundamentals Duration: 12 Periods (L: 9 - T: 3)

Definitions: Ohm's Law, Laws of resistance work, power, energy with units. Kirchoff's Laws, Definitions and units of magnetic field strength, flux, flux density, permeability, reluctance. Definitions and units electric field, field strength, permittivity, capacitance., Faraday's laws of Electro – magnetic induction. Dynamically and statically induced e.m.f., Lenz's Law, Fleming's right hand rule, Inductance – self and mutual – coefficient of coupling. Energy stored in a magnetic field.

UNIT-2 :D.C.Generators Duration: 08 Periods (L: 6 - T: 2)

Principle of operation - Parts of generator and materials used - Types of generators and schematic diagrams - E.M.F equation, voltage and current relations - Nomenclature used for determining armature, field and inter-pole windings - Power flow diagram - Welding Generator

UNIT-3: D.C.Motors Duration: 10 Periods (L: 7.5 - T: 2.5)

Principle of operation - Types of motors and schematic diagrams - Back e.m.f and speed equation - relation between voltages and currents - Starters and their necessity - Connection diagram of 3 point starter - Speed control methods – Field and Armature control - Applications of D.C motors- Batteries-types of batteries- AH Capacity-Efficiency .

UNIT-4: A.C.Fundamentals Duration: 10 Periods (L: 7.5 - T: 2.5)

Definition – alternating current, voltage amplitude, time period frequency, instantaneous value, Average value, r.m.s. value, form factor - Graphical representation of Alternating quantities - Phase difference - A.C. Circuits - Single phase series circuits – Definition of poly-phase and 3 Ø circuits - Phase difference in 3 Ø - Star and delta connections, definitions of phase values and line values.

UNIT-5: A.C.Machines Duration: 12 Periods (L: 9 - T: 3)

Alternators – principle of working. Constructional features of alternators. Relation between Speed and frequency.-Transformers working principle. Single phase transformers - Voltage ratio, Current ratio, Turns ratio - Welding transformer - 3-Phase Induction Motor - Working principle, Construction - Squirrel cage and Wound Rotor - Single phase Induction Motors - Types and applications of single phase induction motors.

UNIT-6: Electrical measuring instruments & Safety procedures

Duration: 08 Periods (L: 6- T: 2)

Construction and principle of operation of moving coil permanent magnet type ammeter and voltmeter and moving iron ammeter and voltmeter - Construction and working principle of Dynamometer type wattmeter - Single phase induction type Energy meter-Different types of wiring systems and accessories - Electrical safety Procedures - Effects of shock and burns - Remedial procedures to be adopted in case of electrical shocks - Plate earthing - Pipe earthing.

Recommended Books

1. Theraja B.L. - A Text Book of Electrical Engg. and Electronics.
2. Mehtha.V.K - Principles of Electronics
3. Gupta - Fundamentals of Elec. Engg.
4. Uppal - A Text Book of Elec.Engg& Electronics.

Suggested E-learning references

1. www.khanacademy.org
2. www.ocw.mit.edu/courses/electrical-engineering
3. www.nptel.ac.in

Suggested Learning Outcomes

After completion of the subject, the student shall be able to

- 1.1 Define Ohm's Law.
- 1.2 State the Laws of Resistance.
- 1.3 State and compare Work, Power and Energy from electrical and mechanical aspects and understand their units.
- 1.4 State and explain Kirchhoff's laws.
- 1.5 Define
 - a. Magnetic field strength
 - b. Flux
 - c. Permeability
 - d. Reluctance and state their units
- 1.6 Define
 - a. Electric field
 - b. Electric field intensity

- c. Permittivity and state their units
- 1.7 State capacitance and its units
- 1.8 State Faraday's laws of Electro Magnetic Induction.
- 1.9 Explain Dynamically and Statically induced E.M.F.
- 1.10 State Lenz's Law.
- 1.11 Explain Fleming's Right Hand rule.
- 1.12 Define
 - a. Self inductance
 - b. Mutual inductance
 - c. Co-efficient of coupling and state their units
- 1.13 Explain energy stored in a magnetic field.

- 2.1 Explain the working principle of D.C. Generators.
- 2.2 Describe the constructional features of D.C. Generators and materials used.
- 2.3 Classify D.C. Generators and draw their schematic diagrams.
- 2.4 State E.M.F equation of D.C. Generator
- 2.5 Solve the problems on EMF Equation.
- 2.6 Write the relation between currents and voltages in various D.C generators.
- 2.7 State the types of losses in D.C. Generator.
- 2.8 Label the terminals of D.C. Generators for armature, field and inter pole windings.
- 2.9 Draw power flow diagram of a D.C. Generator.
- 2.10 Sketch the connection of welding generator.

- 3.1 Explain the principle of operation of D.C. Motors.
- 3.2 Classify D.C. motors and draw their Schematic diagrams..
- 3.3 Explain the signification of back e.m.f in D.C. motors.
- 3.4 Write the relation between currents and voltages in various D.C. motors.
- 3.5 Write formula for speed of D.C. Motor in terms of supply voltage, current and flux.
- 3.6 Explain necessity of starters for D.C. motors.
- 3.7 Write the types of starters for D.C. motors
- 3.8 Describe with sketch the connection diagram of a D.C. 3 point starter.
- 3.9 Explain the speed control by Armature control method
- 3.10 Explain the speed control by Field control method

3.11 List the applications of D.C. motors

3.12 Working of Battery.

3.13 Main parts of Battery

3.14 Types of Batteries

3.15 State Capacity of battery

3.16 Define A-H and W-H efficiency

4.1 Define the following terms

- i) Alternating current
- ii) Amplitude (Peak Value)
- iii) Time Period
- iv) Frequency
- v) Instantaneous value
- vi) Average value
- vii) R.M.S Value
- viii) Form Factor

4.2 Define Phase and phase difference.

4.3 Explain the concept of 3-phase system.

4.4 Explain phase difference and Phase sequence in 3 phase system.

4.5 Draw the Star and Delta connections.

4.6 Write the relation between Line and Phase values in Star and Delta connection.

4.7 Solve simple conversion problems on line and phase values of star and delta connections.

5.1 State the working principle of alternators.

5.2 State the relations between frequency and speed in alternator.

5.3 State the working principle of transformers and their ratings.

5.4 Define Transformation, Turns, Voltage and Current ratios.

5.5 State the relation between Transformation, Turns, Voltage and Current ratios

5.6 Describe the operation of a welding Transformer with sketch.

5.7 Explain working Principle of 3-phase induction motors.

5.8 State the applications of 3-phase induction motors.

5.9 List out types of 1-phase induction Motors.

5.10 Applications of 1-phase induction Motors.

- 6.1 List the various meters for measure the different electrical quantity.
- 6.2 Classify the different types of measuring instruments on the bases of working principle.
- 6.3. Explain the construction and working principle of Moving Coil instruments.
- 6.4 Explain the construction and working principle of Moving Iron instruments.
- 6.5 Explain the construction and working principle of Dynamometer type Wattmeter.
- 6.6 Explain the construction and working principle of 1-phase induction type energy meters.
- 6.7 Name the different types of wiring systems
- 6.8 Write the different Accessories used in House wiring.
- 6.9 Explain Different types of wiring connections (one lamp controlled by one switch and Tube light connections)
- 6.10 State the precautions to be taken to avoid electric shock.
- 6.11 Explain effect of electrical shock and burn.
- 6.12 Explain the remedial procedures to be adopted in case of electric shocks.
- 6.13 State purpose of earthing of electrical equipment and machinery.
- 6.14 Describe the procedure of Pipe earthing
- 6.15 Describe the procedure of Plate earthing

Note : Where ever mentioned, simple formula substitution problems only be solved and no problems in the other specific objectives.

Suggested Student Activities

- 1. Student visits Library to refer to Manual of Electrical Safety.
- 2. Student inspects the available equipment in the Lab to identify the components
- 3. Quiz
- 4. Group discussions
- 5. Surprise test

CO-PO Mapping Matrix

	Basic knowledge	Discipline Knowledge	Experiments and practice	Engineering Tools	Engineer and society	Environment & sustainability	Ethics	Individual and Team work	Communication	Lifelong learning	Linked PO
CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	
CO1	3	3						2	2	3	1,2,8,9,10
CO2	3	3			2	2		2	2	2	1,2,5,6,8,9,10
CO3	3	2						2	2	2	1,2,8,9,10
CO4	3	2			2	2		3	2	3	1,2,5,6,8,9,10
CO5	3	2						2	3	2	1,2,8,9,10
CO6	3	2			2	2		3	2	2	1,2,5,6,8,9,10

Internal Evaluation

Test	Units	Marks
Mid Sem 1	1 and 2	20
Mid Sem 2	3 and 4	20
Slip Test 1	1 and 2	5
Slip Test 2	3 and 4	5
Assignment	1	5
Seminars	1	5
	Total	60

QUESTION PAPER PATTERN FOR MID SEMESTER EXAMS

Sl.No	Description	Level	No of Questions	Marks for each question	Choice	Total Marks
01	Part-A	Remembering(R)	4	1	Nil	4 Marks
02	Part-B	Understanding(U)	4	3	2	6 Marks
03	Part-C	Application(A)	4	5	2	10 Marks
Total Marks						20 Marks

MID SEM-I EXAM

S.No	Unit No	R	U	A	Remarks
1	Unit-I	1,2	5(a)	7(a)	

			5(b)	7(b)	
2	Unit-II	3,4	6(a)	8(a)	
			6(b)	8(b)	
Total Questions		4	4	4	

MID SEM-II EXAM

S.No	Unit No	R	U	A	Remarks
1	Unit-III	1,2	5(a)	7(a)	
			5(b)	7(b)	
2	Unit-IV	3,4	6(a)	8(a)	
			6(b)	8(b)	
Total Questions		4	4	4	

The length of answer for each question framed in respect of Part-A, B&C shall not exceed $\frac{1}{4}$ of a page, 1 page and 2 pages respectively

QUESTION PAPER PATTERN FOR SEMESTER END EXAM

Sl.No	Description	Level	No of Questions	Marks for each question	Choice	Total Marks
01	Part-A	Remembering(R)	8	1	Nil	8 Marks
02	Part-B	Understanding(U)	8	3	4	12 Marks
03	Part-C	Application(A)	8	5	4	20 Marks
Total Marks						40 Marks

Unit No	Questions to be set for SEE				
	R			U	A
I	4	1		9(a)	13(a)
II					
III		2		10(a)	14(a)
IV					
V		3	5, 6	9(b), 11(a), 11(b)	13(b), 15(a), 15(b)
VI			7, 8	10(b), 12(a), 12(b)	14(b), 16(a), 16(b)
Total Questions	8			8	8

BOARD DIPLOMA EXAMINATIONS
Model Question paper
DME IV semester Mid Semester-I Examination

Corse Code:18M403C
Course Name: Electrical Technology

Duration:1 hour
Max.Marks:20

PART – A

Marks: 4 X 1= 4

Instructions: (1) Answer all questions
(2) Each question carries **one** marks.

1. Define Ohm's Law.
2. Define Magnetic field strength
3. Write the EMF equation of D.C. Generator
4. Write the classifications of D.C. Generators

PART - B

Marks: 2 x 3 = 6

Instructions: (1) Answer **all** questions.
(2) Each question carries **three** marks.

5.(a) State the Laws of Resistance.

OR

5.(b) State Kirchhoff's laws

6.(a) State the types of losses in D.C. Generator.

OR

6.(b) Draw the schematic diagram of D.C. Shunt Generator

PART - C

Marks: 2 x 5= 10

Instructions: (1) Answer **all** questions.
(2) Each question carries **five** marks.

7.(a) State Faraday's laws of Electro Magnetic Induction.

OR

7.(b) Explain energy stored in a magnetic field.

8.(a) Draw power flow diagram of a D.C. Generator

OR

8.(b) Sketch the connection of welding generator.

BOARD DIPLOMA EXAMINATIONS
Model Question paper
DME IV Semester Mid Semester-II Examination

Corse Code:18M403C
Course Name: Electrical Technology

Duration:1 hour
Max.Marks:20

PART – A

Marks: 4 X 1= 4

Instructions: (1) Answer all questions
(2) Each question carries **one** marks.

1. Write the types of starters for D.C. motors
2. Write the classifications of D.C. motors
3. Define Time Period
4. Define R.M.S Value

PART - B

Marks: 2 x 3 = 6

Instructions: (1) Answer **all** questions.
(2) Each question carries **three** marks.

- 5.(a). Draw the Schematic diagram of D.C. shunt motor.
OR
- 5.(b). Write the types of speed control of D.C. motors.
- 6.(a). Define Phase and phase difference
OR
- 6.(b). Draw the Star and Delta connections.

PART - C

Marks: 2 x 5= 10

Instructions: (1) Answer **all** questions.
(2) Each question carries **five** marks.

- 7.(a). List the applications of D.C. motors
OR
- 7.(b). Explain the speed control by Armature control method
- 8.(a). Write the relation between Line and Phase values in Star and Delta connection.
OR
- 8.(b). Explain phase difference and Phase sequence in 3 phase system.

BOARD DIPLOMA EXAMINATIONS
DIPLOMA IN MECHANICAL ENGINEERING.
SUB CODE: 18M403C
Electrical Technology
SEMESTER END EXAM MODEL PAPER

TIME: 2 HOURS**TOTAL MARKS: 40**

PART – A**Marks : 8 X 1= 8**

Instructions: (1) Answer all questions
(2) Each question carries **one** mark.

1. Define Flux
2. Define Form Factor
3. Define Transformation ratio
4. Define Amplitude
5. Define Turns ratio
6. Define Current ratio
7. What is the instrument used to measure Voltage.
8. What is the instrument used to measure Current.

PART - B**Marks: 4 × 3=****12**

Instructions: (1) Answer all questions.
(2) Each question carries **three** marks.

9.(a). State Faraday's laws of Electro Magnetic Induction.

OR

9.(b). List out types of 1-phase induction Motors.

10.(a). Write the relation between Line and Phase values in Star and Delta connection.

OR

10.(b). Write types of earthing systems.

11.(a). State frequency and speed relations in alternators.

OR

11.(b). State the working principle of transformers

12.(a). State the precautions to be taken to avoid electric shock.

OR

12.(b). Explain the effects of electrical shock

PART – C

Marks: $4 \times 5 = 20$

Instructions: (1) Answer all questions.
(2) Each question carries **five** marks.

13.(a). Draw power flow diagram of a D.C. Generator.

OR

13.(b). Explain working Principle of 3-phase induction motors.

14.(a). Write the relation between Line and Phase values in Star and Delta connection.

OR

14.(b). Explain the construction and working principle of Moving Coil instruments.

15.(a). Applications of 1-phase induction Motors.

OR

15.(b). State the applications of 3-phase induction motors.

16.(a). Explain the construction and working principle of Moving Iron instruments.

OR

16.(b). Explain the construction and working principle of 1-phase induction type energy meters.

Course Title: Fluid Mechanics and Hydraulic Machinery	Course Code: 18M404C
Semester: IV SEM	Course Group: Core
Teaching Scheme in Periods (L:T:P) : 36:24:0	Credits : 3
Methodology: lecture and tutorials	Total Contact periods : 60
CIE : 60 Marks	SEE : 40 Marks

Basic knowledge of Physics.

	At the end of the course the students will be able to :
CO1	Selection of suitable fluid for various applications based on fluid properties.
CO2	Applying concept of Bernoulli's equation for flow of liquids
CO3	Estimate frictional losses and design the pipe for flow of liquids through pipes
CO4	Analyse forces on plates or vanes due to impact of jets
CO5	Determine power developed by different water Turbines
CO6	Determine the power required to operate hydraulic pumps.

Unit No	Unit Name	Periods	Questions to be set for SEE(Q No)				Remarks	
			R		U	A		
1	Properties of Fluids	10	4	1		9(a)	13(a)	
2	Flow of Liquids	10						
3	Flow through pipes	10		2		10 (a)	14 (a)	
4	Impact of jets	10						
5	Water Turbines	10		3	5 , 6	9(b), 11(a), 11(b)	13(b), 15(a), 15(b)	
6	Pumps	10			7,8	10(b), 12(a), 12(b)	14(b), 16(a), 16(b)	

Legend: R; Remembering, U: Understanding A: Applying

COURSE CONTENTS

UNIT-1

Duration: Periods 10 (L: 06 – T: 04)

Properties of fluids

Definition of fluid, ideal and real fluids, compressible and incompressible fluids-Units used in fluid mechanics. Density, specific weight, specific gravity, viscosity and surface tension, compressibility and capillarity. Intensity of pressure, gauge and absolute pressures. Measurement of pressures by piezometer, U-Tube – manometer – simple problems – Bourdon tube pressure gauge.

UNIT-2

Duration: Periods 10 (L: 06 – T: 04)

Flow of Liquids

Types of Fluid flow- Laminar & Turbulent flow- Concept on Reynolds's Number – Continuity equation for compressible and incompressible fluids- Simple problems on continuity equation- Pressure, potential and kinetic energy of liquids - Total energy, Bernoulli's equation (no derivation) – assumptions made, Simple problems on Bernoulli's equation, Working principle of Venturimeter, Simple Problems on Venturimeter, Pitot tube – principle –applications.

UNIT-3

Duration: Periods 10 (L: 06 – T: 04)

Flow through pipes

Concept of loss of head in pipes due to friction, Darcy's & Chezy's formula (without proof), Simple problems on Darcy's and Chezy's formulae, Hydraulic gradient line and Total energy line-illustration, Calculation of discharge, velocity, diameter of pipe etc., for pipes connecting two reservoirs (considering frictional losses only), Siphon – principle of working (Numerical problems omitted), Expression for power transmitted through pipes. Expression for transmission efficiency, condition for maximum efficiency (without proof.), Simple problems on power transmission

UNIT-4

Duration: Periods 10 (L: 06 – T: 04)

Impact of jets

Derivation of formulae for the force of jet on Fixed vertical flat plate, Fixed inclined flat plate, Simple problems on the above, Derivation of formulae for the force of jet on moving vertical flat plate, Derivation of formulae for the force of jet on series of moving plates fixed on the rim of a wheel, Simple problems on the above, Force of jet striking at the centre of Fixed curved blade –velocity triangles, Force of jet striking at the top of a moving curved blade - velocity triangles, Work done, power and efficiency in the above cases, Simple problems on the above .

UNIT-5

Duration: Periods 10 (L: 06 – T: 04)

Water turbines

Introduction to water turbines- Hydro-electric power stations line sketch showing layout of hydro-electric power plant with head race, dam, sluice gate, pen stock turbine, generator and tail race, Classification of turbines-impulse and reaction turbines, Brief sub-classification as axial, radial and tangential flow type, Working principle of Pelton wheel-velocity triangles, Simple problems, Working principle of Francis turbine - velocity triangles, Simple problems, Working principle of Kaplan turbine - velocity triangles, Simple problems, Differences between Pelton wheel and Francis Turbines, Differences between Francis and Kaplan turbines, Governing of methods of Water turbines

UNIT-6

Duration: Periods 10 (L: 06 – T: 04)

Pumps

Pump-Function – Classification, Principle of operation of a reciprocating pump, Constructional details of single acting, double acting pumps. Expression for theoretical power required to drive the pump(without proof).Simple problems, Working principle of centrifugal pump, Installation of centrifugal pump, showing its mountings and other accessories, Priming of centrifugal pump – necessity -,Simple problems on work, power and efficiency of Centrifugal pumps

Suggested Student Activities

1. Visit nearby Hydro electric power station and observe dam, penstock, turbines, generators etc.
2. Visit nearby pumping station and identify the pumps used.
3. Quiz
4. Group discussion
5. Surprise test
6. Seminars

Suggested learning outcomes

On the completion of the study of the subject, the student should be able to

Understand the various properties of fluids

- Define a fluid
- Differentiate between ideal and real fluids
- Differentiate between compressible and incompressible fluids
- State the various units used in Hydraulics
- Define various properties of fluids and state their units
- Define intensity of pressure, differentiate between gauge pressure and absolute pressure.

- Pressure and state their units
- Explain the working principle of manometer

Understand the behavior of liquids in motion

- Distinguish between laminar flow and turbulent flow and concept on Reynold's number.
- State the various type of energies and the total energy.
- Know about the velocity of a flowing liquid
- Understand the equation of continuity.
- State Bernoulli's equation and its application in hydraulics
- Solve problems (simple) on law of continuity, Bernoulli's equation, Venturimeter and pitot tube
- Explain the working principle of Venturimeter, pitot tube.

Evaluate frictional losses during flow of liquids through pipes

- Mention the equation for loss of head due to friction in pipes
- State Darcy's and chezy's formulae
- Explain the hydraulic gradient and total energy line
- Calculate the velocity of flow, discharge and diameter of pipes connecting two reservoirs
- Explain the function of siphon and give reason for limiting the height of the pipes
- Explain how the power can be transmitted through pipes carrying liquid under pressure.
- Express the condition for maximum H.P. through pipes
- Solve simple problems on power transmission through pipes

Analyse forces during the impact of jets

- Derive expression for force of jet on fixed vertical, flat plate, fixed inclined flat plate, moving flat plate
- Derive expression for the force of jet on a series of plates fixed on the rim of a wheel
- Draw velocity triangles for fixed and moving curved blades
- Find the expressions for work done, power and efficiency in the above

Understand the working of water Turbines

- State the importance of water turbines
- Draw the layout of a hydroelectric power station
- Classify the water turbines and also sub-classify them based on the direction of flow of water
- Explain the working of Pelton wheel, Francis turbine and Kaplan turbine
- Describe the governing of water turbines
- Solve simple problems on water turbines

Know the working of pumps

- Explain the function of pump
- Classify the pumps
- Explain the principle of operation of a reciprocating pumps
- Mention the constructional details of single acting and double acting pumps

- Solve simple problems on power required to drive a pump
- Explain the principle of operation of centrifugal pumps
- Mention the constructional details of centrifugal pump
- Compare the centrifugal pump with a reciprocating pump
- Appreciate the importance of priming in centrifugal pump
- Identify the effects of leakages of air, its prevention
- Define the efficiency of a centrifugal pump
- Solve simple problems on centrifugal pumps
- Draw the layout of a centrifugal pump installation

REFERENCE BOOKS

Hydraulic Machines by S.AnanthaSwamy

Hydraulic Machines by R.C. Patel

Hydraulics ByMalhotra&Malhotra

Hydraulics & Hydraulic Machinery by Yeaple

Hydraulics and Pneumatics by Reya and Rao.

Pneumatics by SRIHARI RAO

Pneumatic controls by FESTO

Fluid Power Pneumatics by ALAN H. JOHN

Pneumatics by FLIPPO

Pneumatics by TTI

Fluid Power & Pneumatics by AUDEL

CO-PO Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	Mapping Pos
18M404C.1	3	1	1	-	1	-	-	-	-	-	1, 2,3,5
18M404C.2	3	2	2	-	-	-	-	1	-	-	1, 2, 3,8
18M404C.3	3	3	3	-	--	-	-	-	-	-	1, 2,3
18M404C.4	3	3	1	-	-	-	-	-	-	-	1, 2, 3
18M404C.5	3	3	3	-	2	1	-	-	-	-	1, 2,3,5,6
18M404C.6	3	3	2	-	-	1	-	-	-	-	1,2,3,6

QUESTION PAPER BLUE PRINT FOR CIE (MID I)

Unit No	Unit Name	Questions to be set for CIE(Q No)			Remarks
		R	U	A	
1	Properties of Fluids	1	5(a)	7(a)	
		2	5(b)	7(b)	
2	Flow of Liquids	3	6(a)	8(a)	
		4	6(b)	8(b)	

QUESTION PAPER BLUE PRINT FOR CIE (MID II)

Unit No	Unit Name	Questions to be set for CIE(Q No)			Remarks
		R	U	A	
3	Flow through pipes	1	5(a)	7(a)	
		2	5(b)	7(b)	
4	Impact of jets	3	6(a)	8(a)	
		4	6(b)	8(b)	

Board Diploma Examinations
C18-Semester End Examination (SEE)
Model Paper- 18M404C

FLUID MECHANICS AND HYDRAULIC MACHINERY

TIME : 2 Hours

Max. Marks: 40

PART – A

Marks: 8 X 1 M = 8M

*NOTE : 1) Answer **all** questions and each question carries **one** mark.*

*2) Answers should be brief and straight to the point and shall not exceeding **three** simple sentences*

1. Define ideal fluid.
2. Write the Chezy's formula.
3. State the pump use.
4. Define vapour pressure
5. State the function of breaking jet in pelton wheel.
6. Define hydraulic efficiency in hydraulic turbine.
7. Define slip for the reciprocating pump.
8. State the purpose of priming.

PART – B

*Answer **all** questions . Each question carries **three** marks*

4x 3 M = 12M

9(a) Draw a neat sketch of Bourdon pressure gauge and label its parts.

OR

9(b) Classify Turbines.

10(a) Write short notes on syphon system.

OR

10(b) What are the functions of the casing of a centrifugal pump?

11(a) Compare Francis and Kaplan turbine.

OR

11(b) Define Degree of reaction and Specific speed for a water turbine.

12(a) What are the advantages of centrifugal pump over reciprocating pump?

OR

12(b) Why can the suction height of a pump not exceed certain limit?

PART – C

Answer **all** questions . Each question carries **five** marks

4x 5 M = 20 M

13 (a) The space between two square flat parallel plates is filled with oil of specific gravity 0.95. Each side of plate is 720mm. The thickness of oil film is 15 mm. The upper plate which moves at 3 m/sec requires a force of 120 N to maintain the speed. Determine the Dynamic viscosity and kinematic viscosity if the density of water is 1000 kg/m^3 .

OR

13 (b) Explain governing of the reaction turbines with line diagram.

14 (a) A pipeline is connecting two reservoirs. Its diameter is reduced by 15% over a length of time due to the deposition of sediments. For a given head difference in the reservoirs, what is the percent reduction in discharge? Assume friction factor remains same.

OR

14 (b) Explain the working of double acting reciprocating pump with a sketch.

15 (a) What is the difference between impulse and reaction turbine.

OR

15 (b) Pelton wheel having semi circular buckets and working under a head of 140m is running at 600 rpm. The discharge through nozzle is 50 lit/sec and diameter of wheel is 60cm. Find power available at nozzle and hydraulic efficiency, if $C_v=0.98$.

16 (a) Compare the centrifugal pumps and reciprocating pumps.

OR

16 (b) Centrifugal pump is to discharge $0.118 \text{ m}^3/\text{s}$ at a speed of 1450 rpm against a head of 25m. The impeller diameter is 250mm its width at outlet is 50mm and manometric efficiency 75%. Determine the vane angle at the outer periphery of impeller.

Board Diploma Examinations
Model Paper- 18M404C
FLUID MECHANICS AND HYDRAULIC MACHINERY
Mid -I (CIE)

Time : 1 Hour

Total Marks : 20 M

PART – A

Marks: 4 X 1M = 4 M

NOTE: 1) Answer all questions and each question carries one mark.

2) Answers should be brief and straight to the point and shall not exceed three simple sentences

1. State the units of viscosity.
2. Write the formula for mass density.
3. Write the Bernoulli's equation .
4. What is the Reynolds number for laminar flow.

PART – B

Marks: 2 X 3M= 6 M

NOTE: 1) Answer all questions and each question carries three marks

2) The answers should be comprehensive and the criteria for valuation is the content but not the length of the answer.

5. (a) Define capillarity and explain briefly about the surface tension of the fluid .
OR
5. (b) Calculate the Density and specific weight of 1 litre of liquid with specific gravity of 0.6
6. (a) What is the difference between steady flow and unsteady flow.
OR
- 6 (b) what is venturimeter? State its use.

PART – C

Marks : 2 X 5 M = 10 M

NOTE :

- 1. Answer all questions and each question carries five marks.**
- 2. The answers should be comprehensive and the criteria for valuation is the content but not the length of the answer**

- 7 (a) Define Gauge pressure and Absolute pressure. Convert a vacuum of 100mm mercury into absolute pressure in meters of water.

OR

- 7 (b) Define viscosity and determine the dynamic viscosity of Benzene if its kinematic viscosity is 7.42×10^{-3} stokes and mass density is 860 kg/m^3 .

- 8 (a) Define continuity equation. A circular pipe of 250 mm diameter carries an oil of specific gravity of 0.8 at the rate of 120 lit/sec. and under a pressure of 2 KPa. Calculate the total energy in meters at a point which is 3m above datum line.

OR

- 8 (b) A horizontal Venturimeter has a main diameter of 300mm and a throat diameter of 200mm. If discharge is 10,000 liters of water/minute when the difference of pressure heads between the inlet and the throat is 1.5 m of water. Find the coefficient of discharge (C_d).

Board Diploma Examinations
Model Paper- 18M304C
FLUID MECHANICS AND HYDRAULIC MACHINERY

Mid –II (CIE)

Time : 1 hr

Total Marks : 20

PART – A

Marks: 4 X 1 M = 4 M

NOTE: 1) Answer all questions and each question carries one marks.

2) Answers should be brief and straight to the point and shall not exceed three simple sentences

1. Write the Darcy- Weisbach formula.
2. What is a pipe.
3. What is a jet?
4. Write the formula for force exerted by impact of jet on inclined fixed plate.

PART – B

Marks : 2 X 3 M= 6 M

NOTE: 1) Answer all questions and each question carries three marks

2) The answers should be comprehensive and the criteria for valuation is the content but not the length of the answer.

- 5 (a) Define Hydraulic mean depth and write its expression for a fully flowing pipe.

OR

- 5 (b) How does the energy loss take place, when the fluid is flowing through pipes.

- 6.(a) Derive the expression for the normal force due to impact of jet on a fixed flat vertical plate.

OR

- 6 (b) A jet of water moving with a velocity of 25 m/sec, strikes normally on a plate. The jet diameter is 60 mm. Determine the force on the plate, when the plate is moving in the direction of jet with a velocity of 5 m/sec.

PART – C

Marks : 2 X 05 M= 10 M

NOTE :

1)Answer all questions and each question carries five marks

2)The answers should be comprehensive and the criteria for valuation is the content but not the length of the answer.

7.(a) Find the maximum power transmitted through a pipe of 100mm diameter and 2 Km long. The supply head is 4.9 Kpa. Take $f = 0.01$.

OR

7 (b) Water flows through a pipe of 200mm diameter and 60 m long with velocity of 2.5m/sec. Find the head lost due to friction by using Chezy's Formula, $C=55$.

8 (a) A jet of water 20 mm in diameter, moving with a velocity of 10m/sec. Strikes on a series of vanes moving with a velocity of 3m/sec. Find

(i) Force exerted by the jet.

(ii) Work done/sec.

(iii) Efficiency of jet.

OR

8.(b) A jet of water 10cm diameter moving with a velocity of 30m/sec strikes a curved fixed symmetrical plate at centre. Find the force exerted by the jet of water in the direction of the jet, if the jet is deflected through an angle of 120° at the outlet of the curved plate

Advanced Manufacturing Technology

Course Title :	Advanced Manufacturing Technology	Course Code	18M405C
Semester	IV	Course Group	:Core
Teaching Scheme in Periods(L:T:P)	36 : 24 : 0	Credits	: 3
Methodology	Lecture + Assignments	Total Contact Hours :	:60Pds
CIE	60 Marks	SEE	40 Marks

Prerequisites:

Basic knowledge of Manufacturing Processes & Machines

COURSE OUTCOMES

	At the end of the course the students will have the ability to :
CO1	Illustrate the Working of Grinding Process and apply for engineering applications.
CO 2	Understand various super finishing processes and apply for various applications
CO 3	Explain Plastic Processing methods for different applications.
CO 4	Classify Press tools and apply it in various engineering applications
CO 5	Identify Special tools for Work holding and guiding for different machining processes
CO 6	Describe measuring tools and select a proper tool required in engineering applications

COURSE CONTENT AND BLUE PRINT OF MARKS FOR SEE

Unit No	Unit Name	Period s	Questions to be set for SEE(Q No.)				Rem arks	
			R		U	A		
1	Grinding	10	4	1		9(a)	13(a)	
2	Finishing processes	10						
3	Plastic processing	10		2		10 (a)	14 (a)	
4	Press Tools	10						
5	Jigsand Fixtures	10		3	5 & 6	9(b), 11(a), & 11(b)	13(b), 15(a), &15(b)	
6	Metrology	10			7 & 8	10(b), 12(a),& 12(b)	14(b), 16(a),& 16(b)	

Legend: R; Remembering, U: Understanding A: Applying

COURSE CONTENT

Unit – 1

Duration: 10 Periods (L: 6.0 – T: 4.0)

Grinding

Introduction – principles of Metal Removal by Grinding - need of grinding – construction of grinding wheel - types of abrasives, need of bonding materials – types - binding processes: Vitrified, silicate, shellac, rubber, Bakelite, Factors effecting the selection of grind wheels – size and shape of wheel – effect of grain size ,grit, grade and strength of bond – structure, spacing, Standard marking systems.

Grinding machines – classification, Cylindrical, Surface, Tool & Cutter grinding machines- construction details – relative merits, Principle of centreless grinding, Advantages & limitations of centreless grinding, Work-holding devices, Wheel maintenance – Balancing of wheels – Dressing and trimming of grinding wheels, Coolants used.

Unit – 2

Duration: 10 Periods (L: 6.0 – T: 4.0)

Surface Finishing processes

Introduction - Finishing by grinding - Honing, Lapping, Super finishing, Electroplating– Basic principles – applications, Hot dipping: Galvanizing, Tin coating, Parkerising, Anodizing. Metal spraying: wire process, powder process and applications. Organic coatings: Oil base Paint, Lacquer base, Enamels, Bituminous paints, rubber base coating.

Unit – 3

Duration: 10 Periods (L: 6.0 – T: 4.0)

Plastics Processing

Introduction - Processing of plastics - Injection moulding - Compression moulding - Transfer moulding – Extruding - Casting – Calendaring, machining and welding - fabrication methods. Applications of Plastics

Unit – 4

Duration: 10 Periods (L: 6.0 – T: 4.0)

Press Tools

Introduction - Types of Presses – hand, power, gap, inclinable, adjustable, horn, straightside, pillar presses. Constructional details of a power press -Press size. Press Tools – Punch and die - Die Accessories – Stops, Pilots, strippers, Knockouts, pressure pads. Shear action in die cutting operation – punch and die clearance and angular clearance, centre of pressure, cutting forces. Press working operations: blanking, piercing and forming, lancing, cutting-off and parting, notching, shaving, trimming, embossing, beading and curling, bulging, twisting, coining, swaging, hole flanging or extruding – line sketches and meaning of terms. Sheet metal bending: bending methods, spring back, bend allowance, bending pressure – sketches

and empirical formulae. Types of dies meaning of inverted, progressive, compound and combination dies. Material selection for punch and die.

Unit – 5

Duration: 10 Periods (L: 6.0 – T: 4.0)

Jigs and Fixtures

Definition of jig - Types of jigs - leaf jig, box and handle jig, template jig, plate jig, Indexing jig, Universal jig, vice jig. Explanation of constructional details of the above jigs. General consideration in the design of drill jigs.

Explanation of drill bush - Types of fixtures: vice fixtures, milling fixtures, boring fixtures, Grinding fixtures - Explain the constructional details of the above fixtures.

Basic principles of location - Explain the locating methods and devices. Explanation of basic principles of clamping - Types of clamps – strap clamps, cam clamps, screw clamps, toggle clamps, hydraulic and pneumatic clamps.

Unit – 6

Duration: 10 Periods (L: 6.0 – T: 4.0)

Metrology

Linear measurement: Slip gauges and dial indicators. Angle measurements: Bevel Protractor, Sine Bar, Angle Slip Gauges. Comparators: a) Mechanical b) Electrical c) Optical d) Pneumatic. Measurement of surface roughness: methods of measurements by comparison, tracer instruments and by interferometry - Collimators. Measuring Microscope, Interferometer.

REFERENCE BOOKS

- | | | | |
|----|---------------------------------|---|----------------------------|
| 1. | Manufacturing Technology | - | P. N. Rao (MGH Publishers) |
| 2. | Production Technology | - | R. C. Patel |
| 3. | Production Technology | - | Jain & Gupta |
| 4. | Gear Technology | - | Charrathi |
| 5. | A Text Book of Production Engg. | - | Dora |
| 6. | Tool Design | - | Donaldson |

SUGGESTED LEARNING OUTCOMES

Understand the concept of Grinding

- Explain the principle of metal removal by grinding.
- List the different abrasives.
- Explain the bonds and binding processes in grinding wheel manufacturing
- Identify the grinding wheel from the standard code (Marking system or Designation of wheel).
- State the factors for selecting the grinding wheels.
- State the methods of grinding.
- Classify the grinding machines.
- Illustrate the cylindrical, surface, tool and cutter grinders.
- List the different work holding devices.
- State the methods of wheel maintenance.

Understand the concept of Surface Finishing Processes

- State different finishing processes by grinding.(Honing, Lapping, Super finishing)
- Explain the principle of electro-plating with a legible sketch.
- Explain the principle of hot dipping processes namely galvanising, tin coating, Parkerizing and anodising.
- List the various organic coatings.
- Describe the processes of various organic coatings
- State the principles of metal spraying.
- State the features of wire process and powder process.
- Select the appropriate process for surface roughness of a given application

Understand the principle of manufacturing plastic products.

- Explain the methods of injection moulding, compression moulding, transfer moulding with legible sketches
- Explain the principle of extruding, casting and calendaring with legible sketches
- State the principle of machining and welding plastics
- Explain the different fabrication methods – Sheet forming, Blow moulding, Laminating and Reinforcing
- List Engineering applications of plastics

Understand the concept of Press Tools.

- Explain the Importance of Press Tools.
- Classify presses based on power and design of frame.
- Explain the constructional details of a power press with the help of a legible sketch.
- State the meaning of Press size.
- Explain Press Tools – Punch and die.
- Explain shear action in die cutting operation – Punch and die clearances, Angular clearance, centre of pressure, cutting forces.
- Explain various press working operations.
- Explain different types of dies.
- List various die operations.
- List punch and die materials.

Understand the concept of Jigs and Fixtures

- List types of jigs and explain their constructional details with the help of legible sketches.
- State general considerations in design of drill jigs.
- State the function of drill bush.
- List different types of fixtures and explain their constructional details with the help of legible sketches.
- Differentiate between jigs and fixtures.
- List the advantages of Jigs and Fixtures.
- Explain basic principle of location.
- Identify different locating methods and devices.
- Explain the basic principle of clamping.
- Identify different types of clamps and their constructional details with the help of legible sketches.

Understand the concept of Metrology

- Identify various linear and angular measuring instruments.
- Explain the principle of working of (at least 4 types) comparators with a legible sketch.
- List the surface roughness measuring instruments.
- State the use of collimator and microscope.

- State the principle of working of interferometer.

SUGGESTED E – RESOURCES / STUDENT ACTIVITIES

1. Grinding process
<https://www.youtube.com/watch?v=Vcfau3bJ8hE>
2. Centerless grinding
https://www.youtube.com/watch?v=LfbNFTyGW_c
3. Truing and dressing of a Grinding wheel
<https://www.youtube.com/watch?v=GOR35qroeew>
.Electroplating
https://www.youtube.com/watch?v=OxhCU_jBiOA
4. Metal spraying
<https://www.youtube.com/watch?v=NAeBpF84Q9M>
5. Injection moulding
<https://www.youtube.com/watch?v=b1U9W4iNDiQ>
6. Compression moulding
<https://www.youtube.com/watch?v=pOGpXZ-UMfo>
7. Transfer moulding
<https://www.youtube.com/watch?v=2DUB9Doloi8>
8. Blow moulding
<https://www.youtube.com/watch?v=8W6P5KU5ONQ>
9. Manual press
<https://www.youtube.com/watch?v=nTshp3STG9M>
10. Hydraulic press
<https://www.youtube.com/watch?v=JxJUPD-Ajnc>
11. Die and types
<https://www.youtube.com/watch?v=qTuPkrfZB00>
12. Jigs and fixtures
<https://www.youtube.com/watch?v=CA3GnflmGmw>

Suggested Student Activities

1. Student to inspect the available equipment in the lab to identify different machines, its functioning and application.
2. Quiz
3. Group discussion
4. Surprise test
5. Seminar

CO-PO Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	Mapping Pos
18M405C.1	2	3	-	-	2	-	-	-	1	-	1,2,5,9
18M405C.2	2	3	-	-	2	-	-	-	1	-	1,2,5,9
18M405C.3	2	3	-	-	2	-	-	-	1	-	1,2,5,9
18M405C.4	2	3	-	-	2	-	-	-	1	-	1,2,5,9
18M405C.5	2	3	-	-	2	-	-	-	1	-	1,2,5,9
18M405C.6	2	3	-	-	2	-	-	-	1	-	1,2,5,9

QUESTION PAPER BLUE PRINT FOR CIE (MID I)

Unit No	Unit Name	Questions to be set for CIE (Q No)			Remarks
		R	U	A	
1	Grinding	1& 2	5(a)& 5(b)	7(a)&7(b)	
2	Surface finishing processes	3& 4	6(a)& 6(b)	8(a)& 8(b)	

QUESTION PAPER BLUE PRINT FOR CIE (MID II)

Unit No	Unit Name	Questions to be set for CIE (Q No)			Remarks
		R	U	A	
3	Plastic processing	1& 2	5(a)& 5(b)	7(a)&7(b)	
4	Press Tools	3& 4	6(a)& 6(b)	8(a)& 8(b)	

BOARD DIPLOMA EXAMINATIONS
Model Paper
ADVANCED MANUFACTURING TECHNOLOGY

Mid Sem - I

Time: 1 Hours

Total Marks :20 M

PART – A

Marks: 4 X 1M = 4 M

*NOTE: 1) Answer **all** questions and each question carries **one** mark.*

*2) Answers should be brief and straight to the point and shall not exceed **three** simple sentences*

1. List Natural abrasives used for a grinding machine.
2. List the coolants used in grinding operation.
3. Define a) Galvanizing.
4. List different types of organic coatings.

PART – B

Marks: 2 X 3M = 6 M

*NOTE: 1) Answer **all** questions and each question carries **three** marks*

2) The answers should be comprehensive and the criteria for valuation is the content but not the length of the answer.

5(a) Write the advantages and limitations of centre less grinding

OR

5(b) Explain briefly truing and dressing of a grinding wheel.

6(a) Explain the basic principle of electroplating.

OR

6(b) Explain the basic principle of hot dipping

PART – C

Marks: 2 X 5 M = 10 M

*NOTE: 1. Answer **all** questions and each question carries **five** marks.*

2. The answers should be comprehensive and the criteria for valuation is the content but not the length of the answer

7(a) Explain standard marking system in Grinding.

OR

7(b) Explain briefly surface grinding.

8(a) Explain Powder process surface finishing operation and explain it.

OR

8(b) List and explain various organic coatings.

BOARD DIPLOMA EXANIMATIONS
Model Paper
ADVANCED MANUFACTURING TECHNOLOGY

Mid Sem-II

Time: 1 Hours

Total Marks: 20 M

PART – A

Marks: 4 X 1M = 4 M

*NOTE: 1) Answer **all** questions and each question carries **one** mark.*

2) Answers should be brief and straight to the point and shall not exceed **three** simple sentences

1. List various advantages, limitations and applications of plastics.
2. List various methods of molding used for plastic.
3. What is a press and how it is specified
4. List various press tool operations.

PART – B

Marks : 2 X 3M= 6 M

*NOTE: 1) Answer **all** questions and each question carries **three** marks*

2) The answers should be comprehensive and the criteria for valuation is the content but not the length of the answer.

5(a) Distinguish Thermo and Thermosetting plastics.

OR

5(b) Explain the process of Plastic bottle making briefly.

6(a) List and explain principle elements of a mechanical press..

OR

6(b) what is the importance of clearance angle in punch and die, briefly explain

PART – C

Marks : 2 X 5 M = 10 M

*NOTE : 1. Answer **all** questions and each question carries **five** marks.*

2. The answers should be comprehensive and the criteria for valuation is the content but not the length of the answer

7(a) Explain Injection molding with simple sketch.

OR

7(b) Explain how the water storage tanks are manufactured..

8(a) Explain any five press operations with simple sketch..

OR

8(b) explain progressive die operation with sketch..

BOARD DIPLOMA EXANIMATIONS

Model Paper-
ADVANCED MANUFACTURING TECHNOLOGY

TIME : 2 Hours

Max. Marks: 40

PART – A

Marks: 8 X 1 M = 8M

NOTE: 1) Answer **all** questions and each question carries **one** mark.

2) Answers should be brief and straight to the point and shall not exceeding **three** simple sentences

1. List various types of abrasives.
2. Write the specification of a press..
3. Define jig and fixture.
4. List various additives of a plastic.
5. Write various elements of a fixture.
6. List different types of clamping elements..
7. List various linear measuring instruments.
8. Classify comparators.

PART – B

Answer **all** questions . Each question carries **three** marks

4x 3 M = 12M

9(a) what is meant by grinding wheel balancing and mention the reasons for unbalancing.

OR

9(b) State the factors to be considered for efficient clamping of a work piece..

10(a) Explain briefly the extrusion molding of plastics?

OR

10(b) What is meant by wrapping of slip gauges and mention various steps.

11(a) Briefly explain the principles of location applicable for jigs and fixtures.

OR

11(b) Explain the working of screw clamp with simple sketch.

12(a) Explain the procedure to measure angle by using sinbar

OR

12(b) Explain the working of optical comparator.

PART – C

Answer **all** questions . Each question carries **five** marks

4x 5 M = 20 M

13 (a) Explain surface finish by honing with a sketch.

OR

13 (b) Explain indexing jig with a sketch.

14 (a) Explain Compound die with a sketch.

OR

14 (b) Explain the construction and working of autocollimator

15 (a) Explain Leaf jig with a sketch.

OR

15 (b) Explain a milling fixture with sketch.

16 (a) Explain the principle of working of interferometer

OR

16 (b) Explain optical comparator with a neat sketch.

18M406P -PRODUCTION DRAWING

Course Title	Production drawing	Course Code	18M406P
Semester	IV	Course Group	Practical
Teaching Scheme in Periods (L :T:P)	15:0:30	Credits	1.5
Methodology	Lecture + practice	Total Contact in Periods	45
CIE	60 Marks	SEE	40 Marks

Prerequisites:

Basic knowledge of Assembly Drawing.

COURSE OUTCOMES

	At the end of the course the students will be able to :
CO1	Understand the difference between machine drawing and production drawing. Understand the need and calculation of limits and tolerances.
CO2	Understand the importance of surface roughness on life of component, indicate surface roughness symbols in drawings, understand standard component specification.
CO3	Illustrate production drawings of components, draw process sheet and apply suitable limits and fits.

Course Content and Blue Print of Marks for SEE

Unit No	Unit Name	Periods	Questions for SEE		
			R	U	A
PART-A					
1	Introduction to production drawing, Limits, fits and tolerances.	06		1	
2	Geometrical Tolerances, Surface finish and standard mechanical component specifications. Reprographic Techniques	09		3	
PART-B					
3	<u>PART DRAWING EXERCISE – I</u> Gib and Cotter joint, Knuckle joint, Muff couplings, flange coupling universal coupling, Eccentric, stuffing box etc.. Process sheet preparation.	15			1
PART-C					
4	<u>PART DRAWING EXERCISE - II</u> Bearings (Foot step Bearing, Plummer block), Cross head, connecting rod, lathe tail stock, Revolving centre, Non-return valve etc.	15			1
	Total	45			

Part B each question carries 28 marks and distributed for

- Component drawing views..... 20 marks
- limits fits and tolerances..... 2 marks
- Geometrical tolerances..... 1 mark
- Surface finish..... 2 marks
- Process sheet 3 marks

3. Standard components in part-B question need not be drawn.

COURSE CONTENTS

1.0 Understand the idea of production drawing, Limits, Fit and Tolerances and Process sheet preparation

1.1 Introduction to production Drawing

Need of preparing a production drawing, requirements for manufacturing a product like equipment, tools, measuring instruments depending upon processes, accuracy and finish data available in machine drawing – components of a production drawing, fits and tolerances, surface finish, specific processes, material of the component.

1.2 Limits, fits and tolerances

Concept of limits, fits and tolerances – need of limits – standard designation of Hole and Shaft dimensions. Calculation of limits, fits by using tolerance charts. Selecting dimensions from BIS standards to obtain clearance, transition and interference fits for a given set of mating parts – computation of fit and tolerance from BIS table. Exercises in computing tolerance.

1.3 Reprographic Techniques

Brief description. Steps to make Ammonia Prints, Advantages and Limitations of other reproduction process of drawing.

2.0 Geometrical tolerances to a component, Surface finish and Standard Mechanical component specification

2.1: Need of geometrical tolerances, Types of geometrical tolerances.

Tolerance of profile: profile of a line, profile of a surface.

Tolerance of orientation or attitude: angularity, perpendicularity, parallelism

Tolerance of location: position, concentricity, symmetry,

Composite tolerances: radial run-out, axial run-out

Symbols for geometrical tolerances, indication of geometrical tolerances on components.

Exercises on representation of geometrical tolerances on the drawings

2.2 Surface finish. Indicate Profile of a surface and important characteristics of a surface, Identify the surface texture symbols. Identify Lay direction, surface roughness achievable from different manufacturing processes, Equivalent surface roughness symbols; Indicate the roughness values or grade number and corresponding symbol as per BIS. Indicate surface roughness on drawings.

- **Exercises** on specifying the surface roughness (average values) for functional surfaces of the following machine tool parts.
- -Shaft rotating in bush bearing,
- -Tailstock sleeve in tailstock body,
- -Keys and keyways
- -Mounting surfaces for antifriction bearings
- -Shaft or bush press fitted into bodies
- -Beds of machine tools, guide-ways
- -Contact surfaces ,example :flanges of pipe fittings
- -Peripheral surfaces of pulleys and grooves for v-belts
- -Surfaces of control elements example: levers ,hand wheels
- -Bases of machines
- -Machine tool tables

2.3 Standard Mechanical component specification.

Standard components (parts) are to be designated as per BIS like - Bolts, Nuts, Locknuts ,Washers, Screws and, Studs – Circlips - Cylindrical and taper pins – Keys – Rivets – Splines - Oil seals-rings - Antifriction bearings:

2.4 Process sheets : sequence of processes of production for a particular product. Specifications of relevant equipment and tools to obtain the desired accuracy and surface finish. Selection of measuring instruments to check the accuracy.

3.0 Production drawing exercises-I

Prepare the relevant views of the part(s) of a given assembly drawing needed for the purpose of production.

Dimension the views obtained and indicate on it with relevant notes the specific processes.

Compute/ identify the type fit between mating parts from ISI tables as per the function of the component and indicate the limits at appropriate place on the drawing prepared.

Indicate the geometrical tolerances on the component drawing

Mark the surface finish symbols with indications added.

Prepare the process sheet indicating sequence of processes and equipment, tools, measuring instruments required.

Production drawing exercises-I

- Gib and Cotter joint,
- Knuckle joint,
- Muff couplings,
- flange coupling
- universal coupling,
- stuffing box
- Eccentric

4.0 Production drawing exercises-II

Prepare the relevant views of the part(s) of a given assembly drawing needed for the purpose of production.

Dimension the views obtained and indicate on it with relevant notes the specific processes.

Compute/ identify the type fit between mating parts from ISI tables as per the function of the component and indicate the limits at appropriate place on the drawing prepared.

Indicate the geometrical tolerances on the component drawing

Mark the surface finish symbols with indications added.

Prepare the process sheet indicating sequence of processes and equipment, tools, measuring instruments required.

Production drawing exercises-II

- Foot step Bearing
- Plummer block
- cross Head,
- connecting rod,
- lathe tail stock ,
- Lathe tool post
- Revolving centre ,
- Non-return valve etc...

Student Activity

Students/staff members advised to visit nearby local industry and collect actual production drawing, study and practise as exercise.

REFERENCE BOOKS

IS 696 – 1972-Code of Practice for General Engg. Drawing & B.I.S Code – SP . 46. IS 696 – 1988

Machine Design data hand book – Vol I & II – Dr. K. Lingaiah, (Suma Publishers, Bangalore).

IS Code on fits and tolerances.

Blur print reading for Mechanical Trades by B.R.Sachdeva.

Machine drawing by R.B. Gupta.

Machine Drawing by Siddeswar.

Production Drawing by K.Venkat Reddy

Machine Drawing by Nagpal

SUGGESTED STUDENT LEARNING OBJECTIVES.

On the completion of the course the student should be able to

1.0 Understand the need of production drawing.

- 1.1 Distinguish the machine drawing from a production drawing.
- 1.2 State the factors that govern the preparation of a production drawing.
- 1.3 Identify the components of a production drawing.
- 1.4 List the function of the component.
- 1.5 Prepare the relevant views of the part and dimension the part.
- 1.6 Indicate the details of specific processes like, heat treatment, welding, counter boring etc.

2.0 Interpret dimension to obtain Limits, fit and Tolerance as per BIS standards.

- 2.1 State the need of Limits, allowance and tolerance
- 2.2 Definition of fit, allowance and tolerance.
- 2.3 Identify tolerance zones and tolerance grades
- 2.4 Classify types of fits, Material conditions, System of limits, specification tolerances
- 2.5 Selection of suitable fit for a given mating part.
- 2.6 Compute the fit from tables.
- 2.7 Indicate fits on the drawings.
- 2.8 Need of geometrical tolerances, Types of geometrical tolerances
- 2.9 Guidelines for indication of feature controlled by geometrical tolerances

- 2.10 Guidelines for indication of datum features, datum planes in space, General principles for applying geometrical tolerances on a component
- 2.11 Identify the need of reprographic and methods like Xerox print etc.
- 2.12 Indicate Profile of a surface and important characteristics of a surface on drawings
- 2.13 Identify the surface texture symbols. Identify Lay direction, surface roughness achievable from different manufacturing processes, Equivalent surface roughness symbols.
- 2.14 Indicate the roughness values or grade number and corresponding symbol as per BIS.
- 2.15 Identify the need of reprographic and methods like Xerox print etc.
- 2.16 Indicate the sequence of process of production.

3.0 Illustrate the ability to draw the component views in exercise I

4.0 Illustrate the ability to draw the component views in exercise II

BOARD DIPLOMA EXANIMATIONS, (C-18)

CIE- MID-1Model Paper
18M406P -PRODUCTION DRAWING

Time: 1 Hours

Max. Marks: 20

PART – A

04 X 05 M = 20M

Instructions :

1. Answer any **FOUR** questions.
2. Each question carries **FIVE** marks.
3. Answer should be neat & clear with all the necessary Dimensions.
4. All Dimensions are in mm. Choose suitable Scale.
5. Use of tolerance tables permitted.

1. The dimensions of a shaft and a hole are given Hole: $\phi 40^{+0.039}_{+0.062}$ Shaft: $\phi 40^{+0.000}_{+0.041}$ find out
 - (a) Hole Tolerance
 - (b) Shaft Tolerance
 - (c) Min Allowance
 - (d) Max allowance
 - (e) Type of fit
2. Draw the symbols of the following geometrical tolerances:
 - a) Straightness.
 - b) Circularity
 - c) Angularity
 - d) Position.
 - e) Profile of a Line
3. Write the surface roughness values for the following :
 - (a) Hot rolling
 - (b) Cylindrical grinding
 - (c) Lapping
 - (d) Boring
 - (e) Extrusion
4. Indicate the roughness values for the following surface roughness grade numbers :
(a) N 10 (b) N 8 (c) N 6 (d) N 4 (e) N 1
5. Write the meaning of the following designations of mechanical components :
 - (a) Square bolt M12 $\times$ 70 N
 - (b) Ball bearing 308
 - (c) Taper key 12 X 8 X 50
 - (d) Fe 470 W
 - (e) Splines 6 X 23 X 26
6. Write about different reprographic techniques.

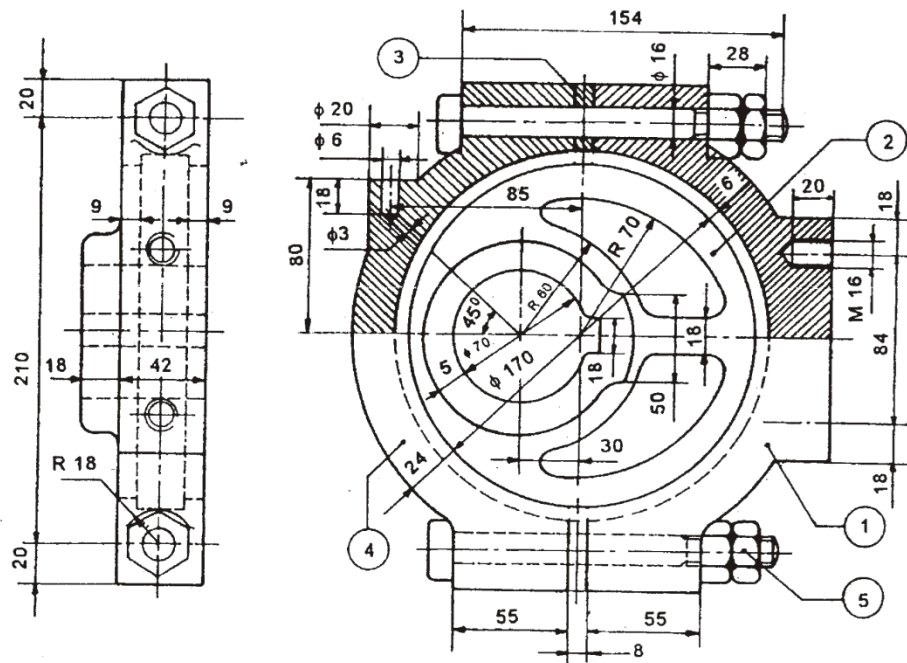
BOARD DIPLOMA EXANIMATIONS, (C-18)

**CIE- MID 2 Model Paper-
18M406P -PRODUCTION DRAWING**

Time: 1 Hours

Max. Marks: 20

- Instructions :**
1. Answer any **ONE** questions.
 2. Each question carries **twenty** marks.
 3. Answer should be neat & clear with all the necessary Dimensions.
 4. All Dimensions are in mm. Choose suitable Scale.
 5. Assume missing data proportionately if any
1. Study the given assembly drawing of the eccentric shown in Figure given below:
- (a) Draw the component drawings of all except part 5----14M
 - (b) Apply suitable geometric tolerances and fits.-----2M
 - (c) Show the surface roughness symbols. -----1M
 - (d) Draw the process sheet for bolt -----3M



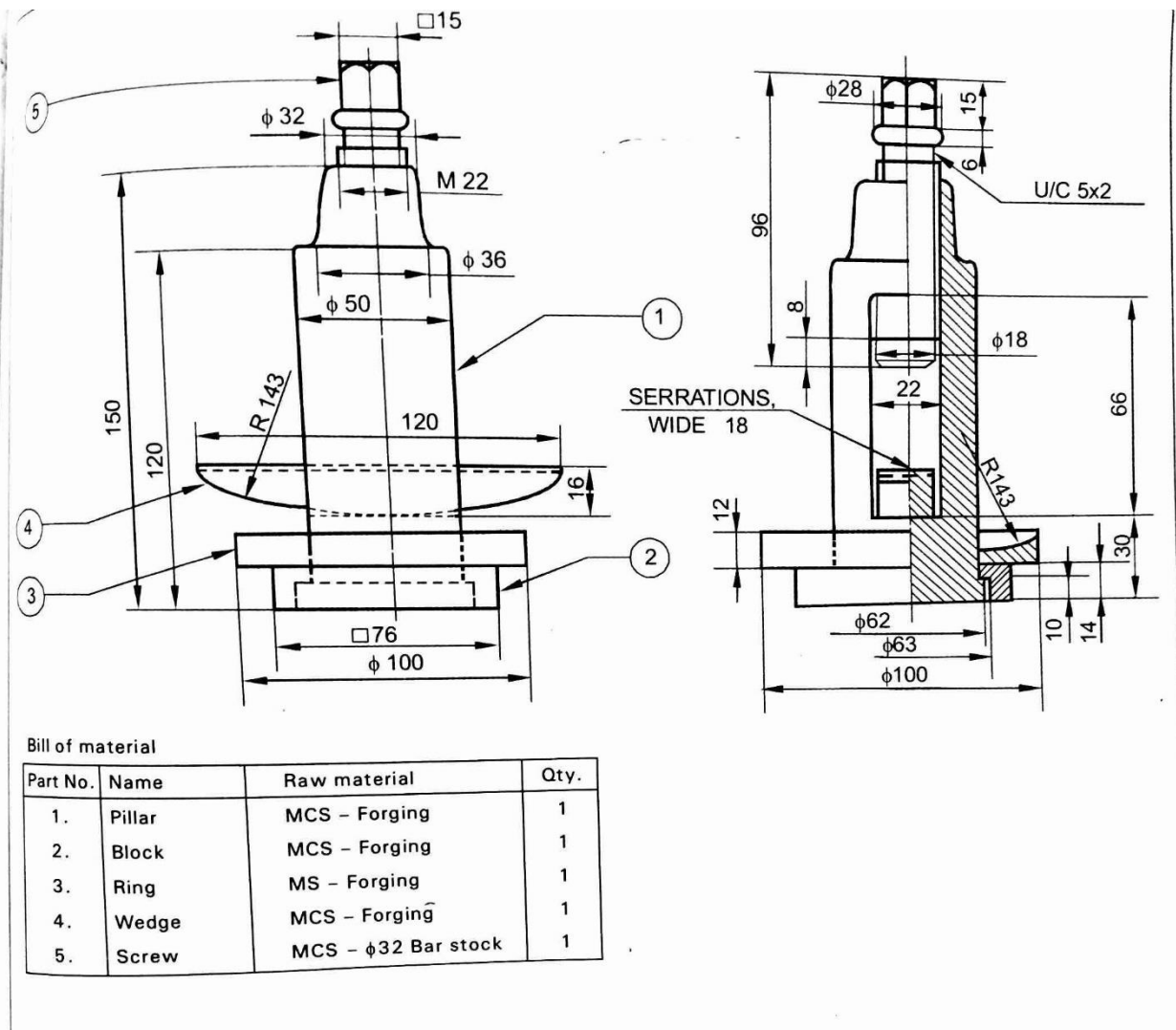
Parts List

Part No.	Name	Qty.
1	Strap	1
2	Sheave	1
3	Shim	2
4	Strap	1
5	Bolt with nut	2

- (c) Draw the component drawings of all except part 5-----14M
- (d) Apply suitable geometric tolerances and fits.-----2M
- (c) Show the surface roughness symbols.-----1M
- (d) Draw the process sheet for bolt -----3M

2. Draw the Component drawings of a Lathe tool post and write the process sheet for block.

- Draw the component drawings of all except part 5----14M
- Apply suitable geometric tolerances and fits.-----2M
- Show the surface roughness symbols. -----1M
- Draw the process sheet for block -----3M



BOARD DIPLOMA EXAMINATION, (C-18)
MECHANICAL BRANCH –IV SEMESTER
END EXAMINATION (SEE)

18M406P -PRODUCTION DRAWING

Time: 2 Hours

[Total Marks: 40]

PART-A

Instructions: 1. Answer all Questions

4X3=12 Marks

2. Each question carries **Three marks**.

3. Answer should be neat & clear with all the necessary Dimensions

4. All Dimensions are in mm. Choose suitable Scale

1. The dimensions of a hole and shaft are given below :

	+0.039		+0.062
Hole : 50	+0.000	Shaft : 50	+0.041

Find (a) maximum allowance, (b) minimum allowance and (c) type of fit.

2. Write the meaning of the following designations of mechanical Components:

(a) Hexagonal Bolt M20 × 60 (b) Bearing 100, 10X26X8 (c) Taper key 12 X 8 X 50v

3. Draw the symbols of the following geometrical tolerances:

a) Straightness.

b) Circularity

c) Angularity

4. Write the surface roughness values for the following :

(a) Hot rolling

(b) Cylindrical grinding

(c) Lapping

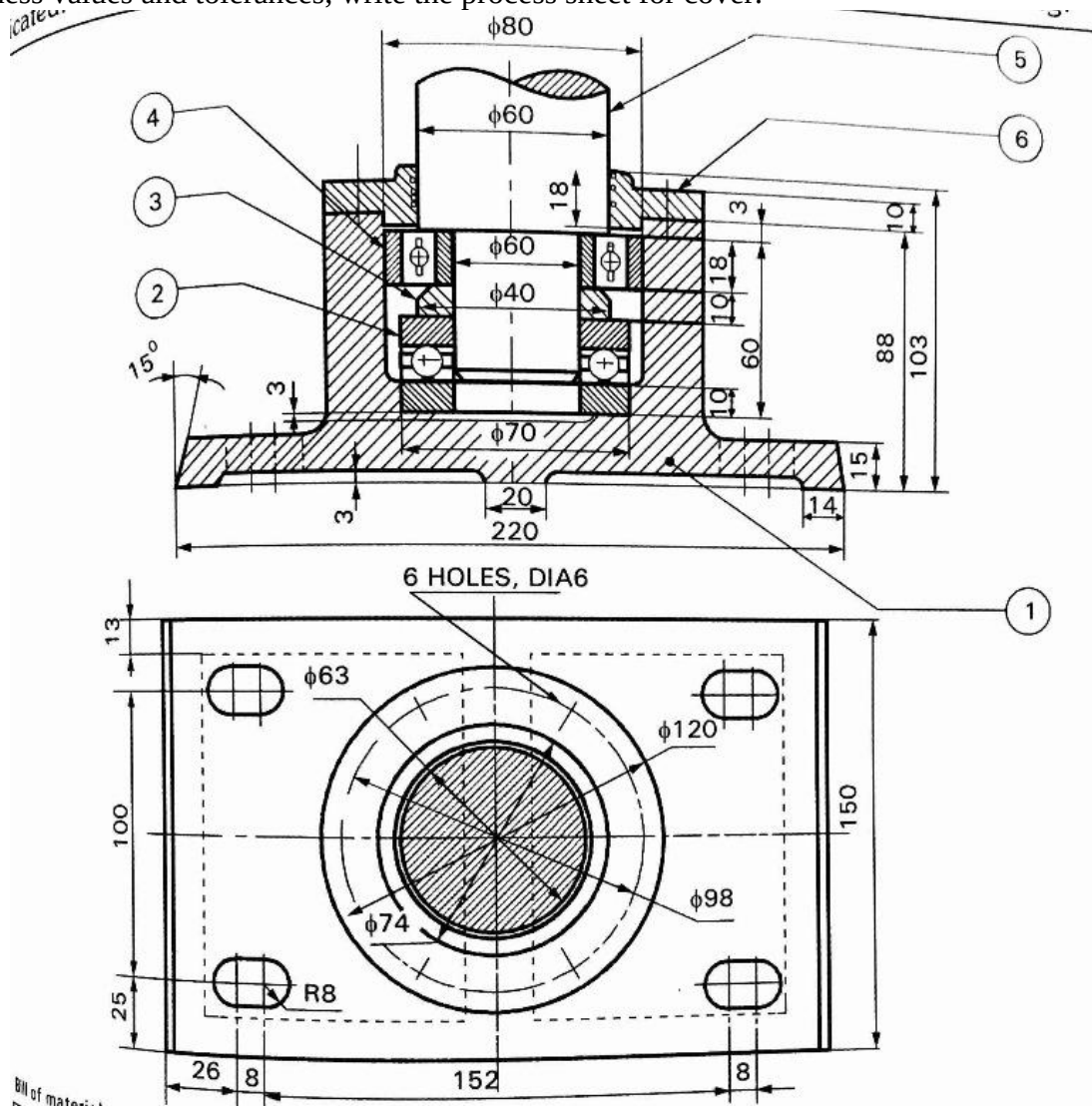
PART-B

Instructions:

1X28=28 Marks

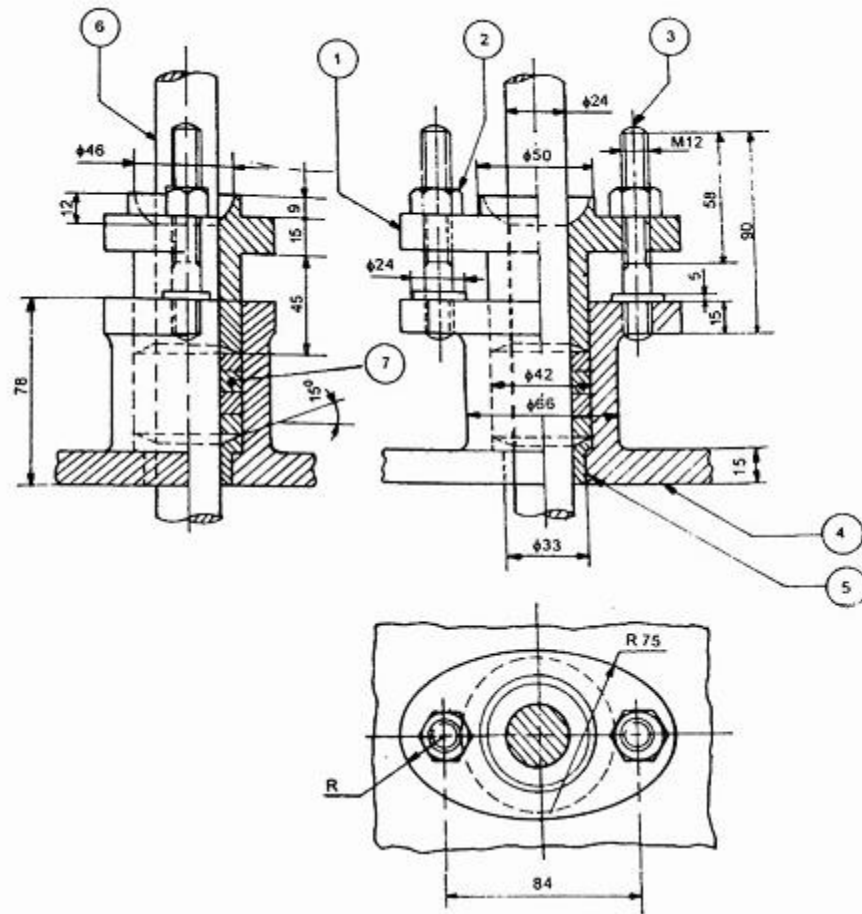
1. Answer any **one** Question
2. Each question carries 28 marks.
3. Answer should be neat & clear with all the necessary Dimensions
4. All Dimensions are in mm. Choose suitable Scale.

5. For the assembly drawing of foot step bearing draw the component drawings indicating fits, roughness values and tolerances, write the process sheet for cover.



Bill of material			
Part No.	Name	Raw material	Qty.
1.	Base	C.I - Casting	1
2.	Thrust ball bearing	Std. - Component	1
3.	Spacer	C.I - Casting	1
4.	(Radial) ball bearing	Std. Component	1
5.	Shaft	MS $\phi 63$	1
6.	Cover	C.I - Casting	1

6. Draw the Component drawings of Stuffing Box with suitable tolerances and fits and write the process sheet for Gland.



Bill of material

Part No.	Name	Raw material	Qty.
1.	Gland	Brass - Casting	1
2.	Nut	MS - Std. component	2
3.	Stud	MS - Std. component	2
4.	Body	C.I - Casting (part of cylinder)	1
5.	Bush	Brass - Casting	1
6.	Shaft	MS	1
7.	Packing	Asbestos rope	

THERMAL ENGG.LAB

Course Title :	THERMAL ENGG.LAB	Course Code	18M407P
Semester	IV	Course Group	: Practical
Teaching Scheme in Periods(L:T:P)	15:00:30	Credits	: 1.5
Methodology	Lecture + Practical	Total Contact periods:	:45Pds
CIE	60 Marks	SEE	40 Marks

Pre requisites

This course requires the basic knowledge of Thermodynamics

Course out comes

At the end of the course the student should be able to understand the

1. Importance of economic speed of given IC Engine
- 2.Importance of cooling curves on IC Engine
- 3.Importance of Morse Test On Multi-Cylinder IC Engine
- 4.Importance of Performance Characteristics of given IC Engine
- 5.Importance of Heat Balance of Given IC engine
- 6.Investigation of Pressure Vs Temperature relationship of Saturated steam

Course Content and Blue Print of Marks for SEE

Unit No	Unit name	Periods	Marks for SEE			Marks weightage	%Weightage
			Handling	Manipulation	Precision		
1.	Economic Speed Test	6	10	10	20	40	100
2.	Cooling Curves	6	10	10	20	40	100
3.	Morse Test	6	10	10	20	40	100
4.	Performance Curves	12	15	15	10	40	100
5.	Heat Balance Sheet	9	15	15	10	40	100
6.	Marcet Boiler	6	15	15	10	40	100
	Total	45					

Course Contents

1. Economic speed test.
2. Water cooling curves.
3. Morse Test on Multi cylinder IC Engine
4. Performance curves.
5. Heat Balance Sheet.
6. Investigation of pressure VS Temperature relationship of saturated steam

CO-PO MATRIX

Course Outcome		Linked PO	Teaching Hours
CO1	Importance of economic speed of given IC Engine	1,2,3,4,5,9,10	6
CO2	Importance of drawing water cooling curves on IC Engine	1,2,3,4,5,9,10	6
CO3	Importance of Morse Test On Multi-Cylinder IC Engine	1,2,3,4,5,9,10	6
CO4	Importance of Performance Characteristics of given IC Engine	1,2,3,4,5,9,10	12
CO5	Importance of Heat Balance of Given IC engine	1,2,3,4,5,9,10	9
CO6	Investigation of Pressure Vs Temperature relationship of Saturated steam	1,2,3,4,5,9,10	6

BOARD DIPLOMA EXANIMATIONS, (C18)
MID-I ExaminationModel Question paper
DME - IV semester practical Examination

Corse Code: 18M407P
Course Name: THERMAL ENGG. LAB

Duration:1 hours
Max.Marks:20

Instructions to the Candidate:

(i)Answer any One of the following Questions.

(ii)Record the results on a graph sheet if required , and conclude your observation of the experiment

(iii) Draw the diagram for illustration ,choose appropriate values when not mentioned in the question

- 1.To find economical speed of IC engine.
- 2.Determine the variation of the fuel consumption, heat carried away by the cooling water and also find optimum temperature cooling water at the same load.
- 3.Determine the IHP and mechanical efficiency of IC engine
- 4.To conduct a test on IC engine at constant speed and draw the performance curves.
- 5.conduct a test on IC engine and prepare the Heat balance sheet.
- 6.UsingMarcet boiler draw the relationship between pressure and temperature of saturated steam.

BOARD DIPLOMA EXANIMATIONS, (C18)
MID-II ExaminationModel Question paper
DMEIV semester practical Examination

Corse Code:18M407P
Course Name: THERMAL ENGG. LAB

Duration:1 hours
Max.Marks:20

Instructions to the Candidate:

(i)Answer any One of the following Questions.

(ii)Record the results on a graph sheet if required , and conclude your observation of the experiment

(iii) Draw the diagram for illustration ,choose appropriate values when not mentioned in the question

- 1.To find economical speed of IC engine.
2. Determine the variation of the fuel consumption, heat carried away by the cooling water and also find optimum temperature cooling water at the same load.
- 3.Determine the IHP and mechanical efficiency of IC engine
- 4.To conduct a test on IC engine at constant speed and draw the performance curves.
5. Conduct a test on IC engine and prepare the Heat balance sheet.
6. UsingMarcet boiler draw the relationship between pressure and temperature of saturated steam.

BOARD DIPLOMA EXANIMATIONS, (C18)
Semester End ExaminationModel Question paper

DMEIV semester practical Examination

Corse Code:18M407P

Duration:2 hours

Course Name: THERMAL ENGG. LAB

Max.Marks:40

Instructions to the Candidate:

(i) Answer any One of the following Questions.

(ii) Record the results on a graph sheet if required, and conclude your observation of the experiment

(iii) Draw the diagram for illustration; choose appropriate values when not mentioned in the question

1. Find economical speed of IC engine.
2. Determine the variation of the fuel consumption, heat carried away by the cooling water and also find optimum temperature cooling water at the same load.
3. Determine the IHP and mechanical efficiency of IC engine
4. Conduct a test on IC engine at constant speed and draw the performance curves.
5. Conduct a test on IC engine and prepare the Heat balance sheet.
6. Using Marcet boiler draw the relationship between pressure and temperature of saturated steam.

Electrical Technology lab Practice

Course Title : Electrical Technology Lab Practice	Course Code : 18M408P
Semester : IV - Semester	Course Group : Practical
Teaching Scheme in : 15: 0 : 30	Credits : 1.5
Periods (L:T:P)	Total Contact Periods: 45 Periods
Methodology : Lecture + Practical	SEE : 40 Marks
CIE : 60 Marks	(Semester End Examination)
(Continuous Internal Evaluation)	

Pre requisites

This course requires the basic skills of Handling Domestic tools, this course also requires the basic knowledge of basic mathematics at secondary school level.

Course Outcomes

On completion of course the student should be able to

CO1	Network Laws & Theorems
CO2	Calibration of meters
CO3	Measurement of Power
CO4	Speed control of D.C.Shunt motors
CO5	Earthing & Safety

Unit No	Unit name	Periods	Questions for SEE	Marks weightage	% of Weightage
			Handling/Manipulation/ Precision		
1	Network Laws & Theorems	09	1	40	100
2	Calibration of meters	09	1		
3	Measurement of Power	09	1		
4	Speed control of D.C.Shunt motors	09	1		
5	Earthing & Safety	09	1		
	Total	45	5	40	100
Note: 1. Student can answer any one question out of 5 questions. 2. To pass in practical Exam student should acquire 50% marks in both CIE and SEE separately and CIE & SEE put together.					

Course Outcome (CO)		Cognizant Level	Linked Program Outcomes (PO)	Teaching periods
CO1	Network Laws & Theorems	R/U/A	1,2,3,4,9,1	5
CO2	Calibration of meters	R/U/A	1,2,3,4,9,10	6
CO3	Measurement of Power	R/U/A	1,2,3,4,9,10	11
CO4	Speed control of D.C.Shunt motors	R/U/A	1,2,3,4,9,10	12
CO5	Earthing & Safety	R/U/A	1,2,3,4,9,10	11
R: Remembering, U: Understanding, A: Applying				

Suggested Learning Outcomes

1.0 Verify Network Laws

1. Verify Ohm's Law
2. Make the connections for one lamp controlled by one switch
3. Make the connections for one lamp controlled by Two switches
4. Make the connections of Tube light

2.0 Calibrate the different meters

- 2.1. Calibrate Dynamometer type of wattmeter
- 2.2. Calibrate single phase Energy meter

3.0 Measure Power in DC and AC circuit

- 3.1. Measure power across a Resistor using voltmeter and ammeter when connected across a DC supply
- 3.2. Measure power and Power factor in 1 - ϕ inductive circuit by using Wattmeter, Volt meter and Ammeter when connected across an AC supply

4.0 Perform Speed control of DC Shunt Motor

- 4.1. Armature / Rheostatic control method
- 4.2. Field control method

5.0 Demonstrate Earthing and Safety

- 5.1. a) Demonstrate Pipe Earthing
- b) Demonstrate Plate Earthing
- 5.2. Demonstrate measurement of earth resistance using megger
- 5.3 Demonstrate the Procedure of first aid on Electric shock

Safety Precautions

General Safety Precautions to be observed by the student for all Electrical laboratory Practices

1. Every student has to bring insulated tool kit and follow the general safety precautions throughout the lab sessions
2. Whenever handling/using a meter check for 'zero' position of the pointer and adjust for 'zero' position if there is any deviation

Competencies and key competencies to be achieved by the student

S.No	Experiment title	Competencies
I (1a,b, 2,3)	Verification of Network Laws & Theorems	• Draw the relevant circuit diagram • Select proper supply and load. • Select proper meters with proper ranges • Select proper wires to make connections as per circuit diagram • Ensure that all the meters are connected with proper polarity • Perform the experiment by carefully following the experimental procedure and precautions • Observe the readings without any scope for errors and tabulate
II (4,5)	Calibration of meters	• Short M & C terminals of wattmeter • Connect for proper Current range. • Calculate Multiplication factor • Calculate P, Error, %Error • Draw graph between W and % Error

III (6,7)	Measure Power in DC and AC circuit	• Select proper supply and load. • Select proper meters with proper ranges • Short M & C Terminals of wattmeters and connect for proper current coil range • Find out the M.F of Wattmeter • Reverse wattmeter terminals for negative readings (Lead values) • Calculate P, power factor($\cos \phi$)
IV (8,9)	Perform Speed control of DC Shunt Motor	• Draw the relevant circuit diagram • Select the proper DC supply voltage • Choose the proper range of voltmeter, ammeter and rheostat. • Make the connections according to circuit diagram. • Ensure that all the instruments are connected in proper polarity • Keep the Rheostat connected to armature in maximum position in Rheostatic control method • Keep the Rheostat in field in minimum position in Field control method • Observe the speed variation with respect to speed
V (10)	Demonstrate Earthing	• . Draw Earthing diagram with specifications • Select suitable GI plate, GI wire and funnel with wire mesh • Prepare the earth pit of 1.5 m below the surface of the ground • Place Earth plate in vertical position • Draw GI wire to the GI pipe fastened to GI plate / copper plate with bolts & nuts. • Pour sand, char coal and salt in alternate layers of about 15 cm around the earth pipe. • Test the earth resistance with Megger. • Verify the earth resistance.
(11)	Practice Safety Precautions.	• Practice the various first aid techniques. • Know the safety precautions.

BOARD DIPLOMA EXANIMATIONS, (C18)

MID I

Model Question paper

DME IV semester practical Examination

Corse Code:18M408P

Duration:1 hour

Course Name: Electrical Technology Lab Practice

Max.Marks:20

Instructions to the Candidate:

(i)Answer any One of the following Questions.

(ii)Record the results on a graph sheet if required , and conclude your observation of the experiment

((iii) Draw the diagram for illustration; choose appropriate values when not mentioned in the question

1. Verify Ohm's Law for given resistive circuit.
2. Make the connections for one lamp controlled by one switch
3. Make the connections for one lamp controlled by two switches
- 4 Calibrate Dynamometer type of wattmeter
- 5 Calibrate single phase Energy meter
- 6 Make the connections for Tube light.

BOARD DIPLOMA EXANIMATIONS, (C18)

MID II

Model Question paper

DME IV semester practical Examination

Corse Code:18M408P

Duration:1 hour

Course Name: Electrical Technology Lab Practice

Max.Marks:20

Instructions to the Candidate:

(i)Answer any One of the following Questions.

(ii)Record the results on a graph sheet if required , and conclude your observation of the experiment

((iii) Draw the diagram for illustration; choose appropriate values when not mentioned in the question

1. Measure power across a Resistor using voltmeter and ammeter when connected across a DC supply
2. Measure power and Power factor in 1 - Ø inductive circuit by using Wattmeter, Volt meter and Ammeter when connected across an AC supply
3. Control the speed of a DC Motor by using Armature / Rheostatic control method
4. Control the speed of a DC Motor by using Field control method

BOARD DIPLOMA EXANIMATIONS, (C18)

SEMESTER END EXAM

Model Question paper

DME IV semester practical Examination

Corse Code:18M408P

Duration:3 hour

Course Name: Electrical Technology Lab Practice Max.Marks:40

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Instructions to the Candidate:

(i)Answer any One of the following Questions.

(ii)Record the results on a graph sheet if required , and conclude your observation of the experiment

((iii) Draw the diagram for illustration; choose appropriate values when not mentioned in the question

1. Verify Ohm's Law for a restive circuit.
2. Make the connections for one lamp controlled by one switch
3. Make the connections for one lamp controlled by two switches
- 4.Make the tube light connections
- 5 Calibrate given Dynamometer type of wattmeter
- 6 Calibrate given single phase Energy meter
7. Measure the power across a Resistor using voltmeter and ammeter when connected across a DC supply
8. Measure power and Power factor in 1 - ϕ inductive circuit by using Wattmeter, Volt meter and Ammeter when connected across an AC supply
9. Control the speed of a DC Motor by using Armature / Rheostatic control method
10. Control the speed of a DC Motor by using Field control method
- 11.** Draw and prepare Pipe Earthing
12. Draw and prepare Plate Earthing
- 13 Measure the resistance of given electrical installation using megger
- 14 Write the Procedure of first aid on Electric shock

MATERIAL TESTING LAB

Course Title :	MATERIAL TESTING LAB	Course Code	18M409P (A)
Semester	IV	Course Group	:Practical
Teaching Scheme in Periods(L:T:P)	7.5:00:15	Credits	:0.75
Methodology	Lecture + Practical	Total Contact periods:	:22.5 Pds
CIE	30Marks	SEE	20 Marks

Pre requisites

This course requires the basic knowledge of Thermodynamics

Course Content and Blue Print of Marks for SEE

Unit No	Unit name	Periods	Marks for SEE			Marks weightage	%Weightage
			Handling	Manipulation	Precision		
1.	Introduction	1.5	--	--	--	--	--
2.	Tensile test	3	10	10	20	40	100
3.	Compression test	3	10	10	20	40	100
4.	Impact test	3	10	10	20	40	100
5.	Hardness test	3	10	10	20	40	100
6.	Torsion test	3	10	10	20	40	100
7	Study of micro structure of metals and alloys	6	15	15	10	40	100

Course outcomes

Course Outcome		Linked PO	Teaching Hours
CO1	Analyze the various parameters in tensile testing	1,2,3,4,5,9,10	06
CO2	Determine the ultimate strength of wood	1,2,3,4,5,9,10	06
CO3	Determine the impact strength	1,2,3,4,5,9,10	06
CO4	Calculate the hardness number of the given material	1,2,3,4,5,9,10	06
CO5	Conduct torsion test on solid shaft and hollow shaft	1,2,3,4,5,9,10	06
CO6	Analyze the micro structure of the metals and alloys	1,2,3,4,5,9,10	15

Course Contents

1. Analyze the various parameters in UTM machine.
2. Determine the ultimate crushing strength of wood. When the load applied is perpendicular to grains and load applied is along the grains of the wooden block.
3. Determine the impact strength or toughness of material by conducting an impact test on izod testing machine.
4. Calculate the hardness number of the given material on Brinell hardness testing machine.
5. Calculate modulus of rigidity by conducting torsion test on solid shaft and hollow shaft

6. Analyze the micro structure of the metals and alloys

MATERIAL TESTING LAB PRACTICE

Subject Title : Material Testing Lab Practice

Title of the experiment	Competencies	Key competency
1. Tensile test	A. Fix specimen in the jaws of the machine B. Fit strain gauge to the specimen C. Apply load gradually on the specimen D. Record load, elongation, diameter without error E. Plot graph stress vs strain F. Locate points of elastic limit, yield stress, ultimate stress on the graph	- Record load, elongation, diameter without error - Plot graph stress vs strain - Locate points of elastic limit, yield stress, ultimate stress on the graph
2. Compression test	A. Place the specimen in the machine properly B. Apply load on the specimen C. Record load	- Apply load on the specimen - Record load
3. Impact test	A. Prepare specimen by making V notch at the required height B. Fix specimen on the machine C. Release load to hit the specimen precautions D. Record load	- Release load to hit the specimen precautions - Record load
4. Hardness test	A. Place the specimen on the machine at correct location B. Identify suitable indenter for the specimen C. Make indent on the specimen properly D. Measure diameter of indentation E. Calculate hardness number	- Make indent on the specimen properly - Measure diameter of indentation
5. Torsion test on mild steel bar	A. Measure diameter and length of mild steel bar. B. Take down the value of torque from the indicating dial for particular value of angle of twist. C. Calculate maximum shear stress and shear modulus	Measure the diameter of the MS bar with vernier callipers.
6. Study of micro structure of Metals and alloys	A. Prepare specimen B. Handling microscope to observe micro structure C. Plot microstructure	- Handling microscope to observe micro structure - Plot microstructure

BOARD DIPLOMA EXANIMATIONS, (C18)

MID I

Model Question paper

DME IV semester practical Examination

Corse Code:18M409P(A)

Course Name: MATERIAL TESTING LAB

Duration:1 hour

Max.Marks:10

Instructions to the Candidate:

(i)Answer any One of the following Questions.

(ii)Record the results on a graph sheet if required , and conclude your observation of the experiment

(iii) Draw the diagram for illustration; choose appropriate values when not mentioned in the question

1. Determine the tensile strength of the given material using UTM.
- 2.Determine the ultimate strength of the given material using UTM.
3. Determine the impact strength or toughness of material by conducting an impact test on izodtestingmachine.
4. Determine the Brinell hardness number of a given material using BHM.
5. Determine the Rockwell hardness number of a given material.
- 6.Draw the micro structures of a) Mild Steel b)Pure iron, c) Grey cast iron d)Brass e)Aluminium

BOARD DIPLOMA EXANIMATIONS, (C18)

MID II

Model Question paper

DME IV semester practical Examination

Corse Code:18M409P(A)

Course Name: MATERIAL TESTING LAB

Duration:1 hour

Max.Marks:10

Instructions to the Candidate:

(i)Answer any One of the following Questions.

(ii)Record the results on a graph sheet if required , and conclude your observation of the experiment

((iii) Draw the diagram for illustration; choose appropriate values when not mentioned in the question

1. Determine the tensile strength of the given material using UTM.
- 2.Determine the ultimate strength of the given material using UTM.
3. Determine the impact strength or toughness of material by conducting an impact test on izod testingmachine.
4. Determine the Brinell hardness number of a given material using BHM.
5. Determine the Rockwell hardness number of a given material.

6. Draw the micro structures of a) Mild Steel b) Pure iron, c) Grey cast iron d) Brass e) Aluminium

BOARD DIPLOMA EXAMINATION, (C18)

Semester End Examination Model Question paper

DME IV semester practical Examination

Corse Code: 18M409P(A)

Duration: 1.5 hours

Course Name: MATERIAL TESTING LAB

Max. Marks: 20

Instructions to the Candidate:

(i) Answer any One of the following Questions.

(ii) Record the results on a graph sheet if required, and conclude your observation of the experiment

(iii) Draw the diagram for illustration; choose appropriate values when not mentioned in the question

1. Determine the tensile strength of the given material using UTM.
2. Determine the ultimate strength of the given material using UTM.
3. Determine the impact strength or toughness of material by conducting an impact test on izod testing machine.
4. Determine the Brinell hardness number of a given material using BHM.
5. Determine the Rockwell hardness number of a given material.
6. Draw the micro structures of a) Mild Steel b) Pure iron, c) Grey cast iron d) Brass e) Aluminium

FLUID MECHANICS & HYDRAULIC MACHINES LAB

Course Title:	FM & HYDRAULIC MACHINES LAB	Course Code	18M409P(B)
Semester	IV	Course Group	: Practical
Teaching Scheme in Periods(L:T:P)	7.5:00:15	Credits	: 0.75
Methodology	Lecture + Practical	Total Contact Periods:	:22.5
CIE	30 Marks	SEE	20 Marks

Pre requisites

This course requires the basic knowledge Fluid Mechanics

Course Outcome	
CO1	Calibration of Venturi meter
CO2	Calculate the friction factor of a given pipe
CO3	Calculate the brake power and efficiency of Pelton turbine
CO4	Calculate the brake power and efficiency of Kaplan turbine.
CO5	Calculate the brake power and efficiency of Francis turbine
CO6	Calculate the efficiency of Reciprocating Pump
CO7	Calculate the efficiency of Centrifugal Pump

Course Content and Blue Print of Marks for SEE

Unit No	Unit name	Hours/ Periods	Marks for SEE			Marks weightage	% Weightage
			Handling	Manipulation	Precision		
1.	Introduction	1.5	0	0	0	0	0
2.	Venturi meter	3	5	7.5	7.5	20	100
3.	Pipe Friction	3	5	7.5	7.5	20	100
4.	Pelton Wheel	3	5	7.5	7.5	20	100
5.	Kaplan turbine	3	5	7.5	7.5	20	100
6.	Francis turbine	3	5	7.5	7.5	20	100
7.	Reciprocating pump	3	5	7.5	7.5	20	100
8	Centrifugal Pump	3	5	7.5	7.5	20	100
	Total	22.5					

Note: For subject 18M-409P, the student has to appear either A. Material testing or B. Fluid mechanics and Hydraulics laboratory based on lottery system for Mid Sem – I , II and External examination.

Course Contents

1. Determination of Coefficient of discharge of Venturimeter.
2. Determination of losses in pipes due to friction.
3. Determination of B.P. and efficiency of Pelton wheel.
4. Determination of B.P. and efficiency of Kaplan turbine.
5. Determination of B.P. and efficiency of Francis turbine.
6. Determination of overall efficiency of a reciprocating pump
7. Determination of overall efficiency of the Centrifugal pump

Suggested Learning Outcomes

Up on Completion of the Lab the student shall be able to

1.0 Venturimeter

- 1.1 State the practical applications of venturimeter.
- 1.2 Record the manometric head readings from U-tube manometer
- 1.3 Record the time taken for collecting discharge by varying the discharge
- 1.4 Calculate the areas of the pipe and throat of the given venturimeter
- 1.5 Calculate coefficient of discharge of venturimeter.

2.0 Pipe friction

- 2.1 Measure the length of the given pipe
- 2.2 Record the manometric head readings from U-tube manometer
- 2.3 Record the time taken for collecting discharge by varying the discharge
- 2.4 Calculate the loss of head through the pipe
- 2.5 Calculate the friction factor

3.0 Pelton Wheel

- 3.1 Identify the components of Pelton wheel
- 3.2 Start turbine by switching on jet of water slowly
- 3.3 Apply load steadily
- 3.4 Record load, speed
- 3.5 Calculate power and efficiency of turbine

4.0 Kaplan Turbine

- 4.1 Identify the components of Kaplan Turbine
- 4.2 Start turbine by giving input water supply
- 4.3 Apply load steadily
- 4.4 Record load, speed
- 4.5 Calculate power and efficiency of turbine

5.0 Francis Turbine

- 5.1 Identify the components of Francis Turbine

- 5.2 Start turbine by switching on jet of water slowly
- 5.3 Apply load steadily
- 5.4 Record load, speed
- 5.5 Calculate power and efficiency of turbine

6.0 Reciprocating Pump

- 6.1 Identify the components of reciprocating pump
- 6.2 Record the suction and delivery pressures from pressure gauges
- 6.3 Record the time taken for collecting the discharge
- 6.4 Record the energy meter readings and calculate input power
- 6.5 Calculate the output power
- 6.6 Calculate the efficiency

7.0 Centrifugal Pump

- 7.1 Identify the components of centrifugal pump
- 7.2 Record the suction and delivery pressures from pressure gauges
- 7.3 Record the time taken for collecting the discharge
- 7.4 Record the energy meter readings and calculate input power
- 7.5 Calculate the output power
- 7.6 Calculate the efficiency

Key competencies to be acquired by students

Exercise	Key competency expected
Calculation of coefficient of discharge of Venturimeter	A. Maintain constant head B. Record readings of U- tube manometer without parallax error C. Record time taken for collection of specific quantity of water D. Calculate discharge and coefficient of discharge of venturimeter E. Repeat experiment for different heads (discharge)
Determination of pipe friction	A. Ensure flow through pipe is full to remove air bubbles B. Record time taken for collection of specific quantity of water in tank C. Calculate pipe friction using formula
Pelton wheel	A. Start turbine by switching on jet of water slowly B. Apply load steadily C. Record load, speed D. Calculate power and efficiency of turbine E. Plot performance curves
Kaplan Turbine	A. Start turbine by switching on water supply B. Apply load steadily C. Record load, speed D. Calculate power and efficiency of turbine E. Repeat experiment by Varying load/speed; Plot performance curves
Reciprocating Pump	A. Maintain steady flow in suction and delivery pipes B. Record suction and delivery pressure gauge readings C. Record time for collection of specific quantity of water, electrical meter reading (input power) D. Calculate indicated power and efficiency E. Vary the head (flow) and repeat experiment

Centrifugal Pump	A. Maintain steady flow in suction and delivery pipes B. Record suction and delivery pressure gauge readings C. Record time for collection of specific quantity of water, electrical meter reading D. Calculate indicated power and efficiency E. Vary the head (flow) and repeat experiment
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CO-PO MATRIX

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	Mapping Pos
18M506P.1	3	3	3	3	1	--		--	-	1	1,2,3,4,5,10
18M506P.2	3	3	3	3	1	--		--	-	1	1,2,3,4,5,10
18M506P.3	3	3	3	3	1	--		--	-	1	1,2,3,4,5,10
18M506P.4	3	3	3	3	1	--		--	-	1	1,2,3,4,5,10
18M506P.5	3	3	3	3	1	--		--	-	1	1,2,3,4,5,10
18M506P.6	3	3	3	3	1	--		--	-	1	1,2,3,4,5,10

BOARD DIPLOMA EXANIMATIONS, (C18)

Semester End Examination Model Question paper

DMEIV semester practical Examination

Course Code:18M409P (B)

Duration:1.5 hours

Course Name: Fluid Mechanics & Hydraulic Machines Lab

Max.Marks:20

Instructions to the Candidate:

(i) Answer any One of the following Questions.

(ii) Record the results on a graph sheet if required , and conclude your observation of the experiment

(iii) Draw the diagram for illustration ,choose appropriate values when not mentioned in the question

- 1.Determine the coefficient of Discharge of Venturimeter.
2. Determine the losses due to fiction in a pipe and find the friction factor.
3. Determine Brake Power and Efficiency of Pelton Turbine
4. Determine Brake Power and Efficiency of Francis Turbine
5. Determine Brake Power and Efficiency of Kaplan Turbine.
6. Calculate the efficiency of Reciprocating Pump.

7. Calculate the efficiency of Centrifugal Pump.

BOARD DIPLOMA EXANIMATIONS, (C18)

Mid Sem I Model Question paper

DMEIV semester practical Examination

Course Code:18M409P (B)

Duration:1 hour

Course Name: FM & Hydraulic Machines Lab

Max.Marks:10

Instructions to the Candidate:

(i)Answer any One of the following Questions.

(ii)Record the results on a graph sheet if required, and conclude your observation of the experiment

(iii) Draw the diagram for illustration, choose appropriate values when not mentioned in the question

- 1.Determine the coefficient of Discharge of Venturimeter.
2. Determine the losses due to fiction in a pipe and find the friction factor.
3. Determine Brake Power and Efficiency of Pelton Turbine
4. Determine Brake Power and Efficiency of Francis Turbine
5. Determine Brake Power and Efficiency of Kaplan Turbine.
6. Calculate the efficiency of Reciprocating Pump.
7. Calculate the efficiency of Centrifugal Pump.

BOARD DIPLOMA EXANIMATIONS, (C18)

Mid Sem II Model Question paper(CIE)

DMEIV semester practical Examination

Course Code:18M409P (B)

Duration:1 hour

Course Name: FM & Hydraulic Machines Lab

Max.Marks:10

Instructions to the Candidate:

(i)Answer any One of the following Questions.

(ii)Record the results on a graph sheet if required, and conclude your observation of the experiment

(iii) Draw the diagram for illustration, choose appropriate values when not mentioned in the question

- 1.Determine the coefficient of Discharge of Venturimeter.
2. Determine the losses due to fiction in a pipe and find the friction factor.
3. Determine Brake Power and Efficiency of Pelton Turbine
4. Determine Brake Power and Efficiency of Francis Turbine

5. Determine Brake Power and Efficiency of Kaplan Turbine.
6. Calculate the efficiency of Reciprocating Pump.
7. Calculate the efficiency of Centrifugal Pump.

NOTE: As experiments are done on rotational basis all experiments will be considered for evaluation.

Advanced Communication Skills and Life Skills

Course Title	Advanced Communication Skills and Life Skills	Course Code	18 Common 410 P
Semester	IV	Course Group	Foundation
Teaching Scheme in Periods- L:T:P	15:0:30	Credits	1.5
Methodology	Lecture + Practical	Total Contact Hours	45 Periods (3 Periods per Week)
CIE	60 Marks	SEE	40 Marks

Rationale:

This course is designed to impart writing skills and employability skills to the students of diploma which will help them in obtaining and maintaining the employment.

Prerequisites:

This course requires the basic knowledge of vocabulary, grammar and four language learning skills, viz. Listening, Speaking, Reading and Writing.

Course Outcomes:

Modules	At the end of the course the students will have the ability to:
Presentation Skills	Prepare a presentation. Use presentation aids effectively. Develop public speaking skills. Learn to make PowerPoint Presentations effectively. Present a Paper using appropriate body language.
Writing Reports	Learn kinds of reports. Learn the format of a report. Organise ideas. Develop essential vocabulary useful to write scientific and technical reports.

Interview Skills	Learn the techniques to face an interview. Learn the etiquette to communicate with employers. Learn the dos and don'ts of an interview. Learn the frequently asked questions in interviews. Use appropriate body language. Learn to face interviews telephonically. Gain the confidence to face an interview by attending mock interview.
Group Discussion	Learn the dos and don'ts of a Group Discussion. Participate in a Group Discussion in a healthy manner. Use effective non-verbal communication. Use appropriate phrases and expressions useful in a group discussion.
Workplace Awareness	Learn workplace etiquette. Identify the knowledge, skills and attributes useful at workplace. Build strong workplace relationships. Learn professional ethics. Understand gender equality at the workplace Develop a sense of responsibility towards the society.
Writing Skills Useful at Workplace	Learn various writing formats useful at workplace. Develop an ability to apply technical information in documentation. Revise and edit written documents effectively. Develop corresponding skills - learn the kinds of business letters - the format of a business letter. Learn effective e-mail writing skills. Learn Business Memos.

	Learn Notes and Narratives. Learn Forms and Applications. Prepare templates for different purposes. Prepare an agenda of a meeting. Prepare the minutes of a meeting. Prepare Notices / Circulars for various purposes. Prepare Press release.
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CO-PO Matrix

	Course Outcome		Linked PO
CO 1	Making effective presentations	R/U/A	1, 2, 3,4, 5,6,7,8,9,10
CO 2	Writing scientific and technical reports	R/U/A	1,2,3,4, 5,6,7,8,9,10
CO 3	Learn to face oral and telephonic interviews	R/U/A	1,2,3,4, 7,9,
CO 4	Learn to face group discussion	R/U/A	1,2,3,7,8,9
CO 5	Learn to write various formats useful at workplace	R/U/A	1,2,3,5,7,8,9,10
CO6	Learn workplace etiquette and ethics	R/U/A	1,2,3,7,8,9,10

Course Contents:

I. Presentation Skills	Duration: 6 periods
II. Writing Reports	Duration: 9 periods
III. Interview Skills	Duration: 9 periods
IV. Group Discussion	Duration: 6 periods
V. Workplace Awareness	Duration: 6 periods
VI. Writing Skills Useful at Workplace	Duration: 9 periods

Suggested Student Activities:

- Paper Presentations
- Seminars
- Mock Interviews
- Telephonic Interviews
- Group Discussions
- Role Plays
- Creating advertisements
- Five-minute activities
- Creating a model of workplace

Evaluation Pattern:

I. Continuous Internal Examination: 60 Marks

- | | |
|--------------------------------|----------|
| a. Mid Sem - I | 20 marks |
| Syllabus: | |
| i. Presentation Skills | |
| ii. Writing Reports | |
| b. Mid – II: | 20 Marks |
| Syllabus: | |
| i. Interview Skills | |
| ii. Group Discussion | |
| c. Internal assessment: | 20 marks |
| i. Seminars: | 10 marks |
| ii. Assignments: | 5 marks |
| iii. Lab record submission: | 5 marks |

II. Semester End Examination : 40 Marks

- | | |
|---|----------|
| a. Write an essay on a given topic or participate in an activity: | 15 Marks |
| b. Interview or Group Discussion: | 15 Marks |
| c. <i>Viva Voce</i> | 10 marks |

References:

- Adair, John. *Effective Communication*. London: Pan Macmillan Ltd., 2003.
- Ajmani, J. C. *Good English: Getting it Right*. New Delhi: Rupa Publications, 2012.
- Amos, Julie-Ann. *Handling Tough Job Interviews*. Mumbai: Jaico Publishing, 2004.
- Collins, Patrick. *Speak with Power and Confidence*. New York: Sterling, 2009.
- Fensterheim, Herbert and Jean Baer. *Don't Say Yes When You Want To Say No*. New York: D
- Raman, Meenakshi & Sangeeta Sharma. *Technical Communication: Principles and Practice*. Second Edition. New Delhi: Oxford University Press, 2011

E-Learning Resources:

- <http://www.dailywritingtips.com/>
- <http://www.englishdaily626.com/c-errors.php>
- <http://www.owlnet.rice.edu/~cainproj/>
- <http://www.thehumorsource.com/>
- <http://www.indiabix.com/group-discussion/topics-with-answers/>
- <http://networketiquette.net/>
- <https://public.wsu.edu/~brians/errors>
- <http://www.bbc.co.uk/worldservice/learningenglish/radio/specials/15>

BOARD DIPLOMA EXAMINATION (C-18)
FOURTH SEMESTER COMMON-410P
ADVANCED COMMUNICATION SKILLS AND LIFE SKILLS

MID SEM - I

Time : 1 Hour

Total Marks: 20 Marks

Part – A

10 marks

Instruction: Answer any one of the following questions.

1. Write the guidelines for preparing a PowerPoint presentation.
2. How do you prepare yourself for presenting a technical paper?
3. Mention a few presentation aids and how do you use them effectively?

Part – B

10 marks

Instruction: Answer any one of the following questions.

4. Write the format of a report and describe it.
5. Write a report on the accident you have seen recently.
6. Give the outline of a project report and describe it.

BOARD DIPLOMA EXAMINATION (C-18)
FOURTH SEMESTER COMMON-410P
ADVANCED COMMUNICATION SKILLS AND LIFE SKILLS

MID SEM - II

Time : 1 Hour

Total Marks: 20 Marks

Part – A

10 marks

Instruction: Answer any one of the following questions.

1. What are the dos and don'ts for a formal interview?
2. What at least ten frequently asked questions in a formal interview?
3. How do you prepare for a telephonic interview?

Part – B

10 marks

Instruction: Answer any one of the following questions.

4. What are the dos and don'ts of a group discussion?
5. Mention some phrases and expressions commonly used in a group discussion.
6. Write a short paragraph on the steps you take while participating in a group discussion.

BOARD DIPLOMA EXAMINATION (C-18)
FOURTH SEMESTER 18 COMMON-410P
ADVANCED COMMUNICATION SKILLS AND LIFE SKILLS
SEMESTER END EXAM

Time : 3 Hours

Total Marks: 40 Marks

Part – A

10 marks

Instruction: Pick any one question from the given lot.

1. Prepare the outline of a project report and describe it.
2. Write the guidelines for preparing the slides of a PowerPoint presentation.
3. Write the minutes of the meeting conducted at the Principal's chamber to conduct the annual day celebrations. Prepare the agenda of the annual day celebrations.
4. Describe the workplace etiquette.
5. Prepare a press note for the 'Job Mela' which is going to be conducted at your institute.

Part – B

15 marks

6. Interview / Group Discussion

Part – C

15 marks

7. *Viva Voce*

8. *Viva Voce*

SKILL UPGRADATION IN IV SEMESTER

Course Title : Skill Upgradation	Course Code : -
Semester :IV	Course Group : Practical
Teaching Scheme in Periods (L:T:P:) : 0:0:105	Credits : 2.5
Methodology : Practicals	Total contact periods : 105

1. Visit a workshop to know the working of air compressor.
2. Survey on different types of Gas Turbines, Jet propulsion systems.
3. Make the electrical connections in a room for a bulb, fan.
4. Visit a nearby power station.
5. Prepare a model of Turbines, Pumps.
6. Make a working model to prove Bernoulli's Theorem.
7. Make a gear using wood or plastic.
8. Visit to a Workshop related to manufacturing.
9. Make a report on latest alternate fuels -availability and usage.
10. Prepare some models using modern machining processes.