CURRICULUM – 2018

(C-18)

DIPLOMA IN MECHANICAL ENGINEERING

STATE BOARD OF TECHNICAL EDUCATION & TRAINING
TELANGANA, HYDERABAD

TEACHING AND EXAMINATION SCHEME

	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-301F	Applied Engineering Mathematics	3	1	0	60	3	20	20	20	40	14	100	35
2	18M-302C	Solid Mechanics	3	1	0	60	3	20	20	20	40	14	100	35
3	18M-303C	Thermodynamics	3	1	0	60	3	20	20	20	40	14	100	35
4	18M-304C	Basic Manufacturing Technology	3	1	0	60	3	20	20	20	40	14	100	35
5	18M-305C	Engineering Materials	3	1	0	60	3	20	20	20	40	14	100	35
6	18M-306P	Machine Drawing	1	0	2	45	1.5	20	20	20	40	20	100	50
7	18M-307P	Basic MFE Lab I	1	0	2	45	1.5	20	20	20	40	20	100	50
8	18M-308P	Fuels Lab	1	0	2	45	1.5	20	20	20	40	20	100	50
9	18M-309P	Solid Modeling Lab	1	0	2	45	1.5	20	20	20	40	20	100	50
10	18M-310F	Communication and Life skills 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%.

APPLIED ENGINEERING MATHEMATICS

Course Title **: APPLIED ENGINEERING MATHEMATICS**	Course Code **: 18COMMON301F**
SEMESTER : **III**	Course Group **: Foundation**
Teaching Scheme (L : T : P) : **36 :24 : 0 (** in Periods)	Credits : **3 Credits**
Type of Course : **Lecture + Assignments**	Total Contact Periods : **60**
CIE : 6**0 Marks**	SEE : **40 Marks**
Programmes : **Common to all Engineering Diploma Programmes**	

Pre requisites

This course requires the knowledge of Basic Engg. Mathematics and Engg. Mathematics at Diploma 1st and 2nd Semester level.

Course Outcomes: COs

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

CO 1	Integrate different kinds of functions
CO 2	Integrate functions using different methods
CO 3	Find the values of definite integrals.
CO 4	Solve simple problems of Areas, Volumes.
CO 5	Find the Mean and RMS values of various functions and Approximate values of Definite integrals using Trapezoidal and Simpson's 1/3rd rule
CO 6	Form the Differential Equation and Solve Simple DEs of 1st order and 1stdegree.

Course Content:

Unit-I **Duration: 10 Periods (L: 6.0 – T:4.0)**

Indefinite Integration-I

Integration regarded as anti-derivative – Indefinite integral of standard functions. Properties of indefinite integral. Integration by substitution or change of variable. Integrals of the form $\sin^m\theta.\cos^n\theta$. where m and n are positive integers. Integrals of tan x, cot x, sec x, cosec x and powers of tan x, sec x by substitution.

Evaluation of integrals which are reducible to the following forms:

$i)\ \frac{1}{a^2+x^2}, \frac{1}{a^2-x^2}, \frac{1}{x^2-a^2}$

$ii)\ \frac{1}{\sqrt{a^2+x^2}}, \frac{1}{\sqrt{a^2-x^2}}, \frac{1}{\sqrt{x^2-a^2}}$

$iii)\ \sqrt{x^2+a^2}, \sqrt{a^2-x^2}, \sqrt{x^2-a^2}$

Unit – II **Duration: 08 Periods (L: 4.8 – T:3.2)**

Indefinite Integration-II

Integration by decomposition of the integrand into simple rational algebraic functions. Integration by parts, Bernoulli's rule.

Unit-III **Duration: 06 Periods (L: 3.6 – T:2.4)**

Definite Integral and its Properties:

Definite integral-fundamental theorem of integral calculus, properties of definite integrals, evaluation of simple definite integrals. Definite integral as the limit of a sum.

Unit – IV **Duration: 10 Periods (L: 6.0 – T:4.0)**

Applications of Definite Integrals:

Areas under plane curves – Sign of the Area – Area enclosed between two curves. Solid of revolution – Volumes of solids of revolution.

Unit – V **Duration: 08 Periods (L: 4.8 – T:3.2)**

Mean, RMS values and Numerical Integration:

Mean values and Root Mean Square values of a function on a given interval.

Trapezoidal rule, Simpson's 1/3 rule to evaluate an approximate value of a definite integral.

Unit – VI **Duration: 18 Periods (L: 10.8 – T:7.2)**

Differential Equations of First Order:

Definition of a differential equation – order and degree of a differential equation – formation of differential equations – solution of differential equation of first order, first degree : variables - separable, homogeneous, exact, linear differential equation, Bernoulli's equation.

Reference Books:

1. Integral Calculus Vol.I, by M.Pillai and Shanti Narayan
2. Thomas' Calculus, Pearson Addison –Wesley Publishers

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 Use Indefinite Integration to solve engineering problems

1.1 Explain the concept of Indefinite integral as an anti-derivative.

1.2 State the indefinite integral of standard functions and properties of Integrals $\int (u + v)\, dx$ And $\int ku\, dx$ where k is constant and *u, v* are functions of *x.*

1.3 Solve integration problems involving standard functions using the above rules.

1.4 Evaluate integrals involving simple functions of the following type by the method of substitution.

i) $\int f(ax + b)\, dx$ *where* $f(x)\, dx$ is in standard form.

ii) $\int [f(x)]^n f'(x)\, dx$

iii) $\int f'(x)/[f(x)]\, dx$

iv) $\int f\{g(x)\} g'(x)\, dx$

1.5 Find the Integrals of *tan x, cot x, sec x* and *cosec x using*the above.

1.6 Evaluate the integrals of the form $\int Sin^m\theta Cos^n\theta.\, d\theta$ where m and n are positive integers.

1.7 Evaluate integrals of powers of *tan x* and *sec x.*

1.8 Evaluate the Standard Integrals of the functions of the type

$$i)\ \frac{1}{a^2+x^2}, \frac{1}{a^2-x^2}, \frac{1}{x^2-a^2}$$

$$ii)\ \frac{1}{\sqrt{a^2+x^2}}, \frac{1}{\sqrt{a^2-x^2}}, \frac{1}{\sqrt{x^2-a^2}}$$

$$iii)\ \sqrt{x^2+a^2}, \sqrt{a^2-x^2}, \sqrt{x^2-a^2}$$

1.9 Evaluate the integrals of the type

$$\int \frac{1}{a \pm bSin\theta} d\theta, \int \frac{1}{a \pm b\cos\theta} d\theta \text{ and } \int \frac{1}{a\cos\theta \pm b\sin\theta \pm c} d\theta$$

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Unit-II

2.0 Use Indefinite Integration to solve engineering problems

2.1 Evaluate integrals using decomposition method.

2.2 Evaluate integrals using integration by parts with examples.

2.3 State the Bernoulli's rule for evaluating the integrals of the form $\int u.vdx$.

2.4 Evaluate the integrals of the form $\int e^x [f(x) + f'(x)]\, dx$.

Unit-III

3.0 Understand definite integral and use it in engineering applications

3.1 State the fundamental theorem of integral calculus

3.2 Explain the concept of definite integral.

3.3 Calculate the definite integral over an interval.

3.4 State various properties of definite integrals.

3.5 Evaluate simple problems on definite integrals using the above properties.

3.6 Explain definite integral as a limit of sum by considering an area.

Unit –IV

4.0 Understand definite integral and use it in engineering applications

4.1 Find the Areas under plane curves and area enclosed between two curves using integration.

4.2 Obtain the Volumes of solids of revolution.

Unit –V

5.0 Understand Mean, RMS values and Numerical Methods

5.1 Obtain the Mean value and Root Mean Square (RMS) value of the functions in any given Interval.

5.2 Explain the Trapezoidal rule, Simpson's 1/3 rules for approximation of definite integrals and provide some examples.

Unit –VI

6.0 Solve Differential Equations in engineering problems.

6.1 Define a Differential equation, its order and degree

6.2 Form a differential equation by eliminating arbitrary constants.

6.3 Solve the first order first degree differential equations by the following methods:

i. Variables Separable.

ii. Homogeneous Equations.

iii. Exact Differential Equations

iv. Linear differential equation of the form $dy/dx + Py = Q$, where P and Q are functions of x or constants.

v. Bernoulli's Equation (Reducible to linear form.)

6.4 Solve simple problems leading to engineering applications by using above methods.

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

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	Mapped POs
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

MID SEM-I EXAM

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

MID SEM –II EXAM

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

Semester End Examination

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

Legend:	Remembering (R)	1 Mark
	Understanding (U)	3 Marks
	Application (A)	5 Marks

III SEMESTER

SKILL UPGRADATION IN - APPLIED ENGINEERING MATHEMATICS

ACTIVITY ASSESSMENT Steps

1. **Mathematical concepts**
2. **Procedure**
3. **Explanation**
4. **Working with others**
5. **Mathematical errors**

ACTIVITIES

1 .Write a short notes on different types of integrals.

2. Prepare a notes on different methods to evaluate integrals.

3. List out Properties of definite integrals.

4. List out and explain various applications of definite integrals.

5. Explain the procedure to solve problems on Areas using integration

6. Explain the procedure to find volumes of irregular shapes of solids of revolution using integration.

7. Prepare a presentation to find Mean values and R.M.S values of any given function.

8. Explain the procedure to calculate approximate area by using Trapezoidal rule.

9. Explain the procedure to calculate approximate area by Simpson's 1/3 rule

10. Prepare a presentation on solving 1^{st} order differential equations using any suitable method.

CO / PO - MAPPING OF ACTIVITIES

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	2	2	1			1	2	2	3
CO2	3	2	2	1			1	2	2	3
CO3	3	2	2	1			1	2	2	3
CO4	3	2	2	1			1	2	2	3
CO5	3	2	2	1			1	2	2	3
CO6	3	2	2	1			1	2	2	3
CO7	3	2	2	1			1	2	2	3
CO8	3	2	2	1			1	2	2	3
CO9	3	2	2	1			1	2	2	3
CO10	3	2	2	1			1	2	2	3

Rubrics for Activity assessment

CATEGORY	**4**	**3**	**2**	**1**
Mathematical Concepts	Explanation shows complete understanding of the mathematical concepts used to solve the problem(s).	Explanation shows substantial understanding of the mathematical concepts used to solve the problem(s).	Explanation shows some understanding of the mathematical concepts needed to solve the problem(s).	Explanation shows very limited understanding of the underlying concepts needed to solve the problem(s) OR is not written.
Procedures	Typically, uses an efficient and effective procedure to solve the problem(s).	Typically, uses an effective procedure to solve the problem(s).	Sometimes uses an effective procedure to solve problems, but does not do it consistently.	Rarely uses an effective procedure to solve problems.
Explanation	Explanation is detailed and clear.	Explanation is clear.	Explanation is a little difficult to understand, but includes critical components.	Explanation is difficult to understand and is missing several components OR was not included.
Working with Others	Student was an engaged partner, listening to suggestions of others and working cooperatively throughout lesson.	Student was an engaged partner but had trouble listening to others and/or working cooperatively.	Student cooperated with others, but needed prompting to stay on-task.	Student did not work effectively with others.
Mathematical Errors	90-100% of the steps and solutions have no mathematical errors.	Almost all (85-89%) of the steps and solutions have no mathematical errors.	Most (75-84%) of the steps and solutions have no mathematical errors.	More than 75% of the steps and solutions have mathematical errors.

Code: C18-Common-301F

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

TIME: 1: 00 Hour Max. Marks: 20

PART-A

Instructions: 1. Answer **ALL** questions 04 X 01 = 04

2 Each question carries **ONE** mark

1. Integrate: $e^x - \sin x + x^4$
2. Find : $\int \frac{dx}{5x+7}$ dx
3. Write Bernoulli's rule of integration
4. Find : $\int x \log x \, dx$

PART-B

Instructions: 1. Answer any **TWO** questions 02 X 03 = 06

2. Each question carries **THREE** marks

5 a). Evaluate : $\int \frac{x^5}{1+x^{12}} dx$.

Or

5 b) Evaluate : $\int \frac{dx}{(x^{2+}25)}$

6 a). Evaluate : $\int x \sin x dx$

Or

6 b).Evaluate : $\int \frac{3x+2}{(x-1)(2x+3)} dx$.

PART C

Instructions: 1. Answer any **TWO** questions 02 X 05 = 10

2. Each question carries **FIVE** marks

7 a). Evaluate $\int \sqrt{x^2 + 2x + 5}$ dx

Or

7 b) Evaluate : $\int \cos x \cos 2x dx$.

8 a). Find $\int x Tan^{-1} x dx$.

Or

8 b) Find $\int x^4 Cos 2x dx$.

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Code: C18-Common-301F

STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TELANGANA

BOARD DIPLOMA EXAMINATIONS

MID SEM –II, MODEL PAPER, III SEMESTER

APPLIED ENGINEERING MATHEMATICS

TIME: 1: 00 Hour Max. Marks: 20

PART-A

Instructions: 1. Answer **ALL** questions 04 X 01 = 04

2 Each question carries **ONE** mark

1. Integrate : $\int_0^1 (x^4 + 1)\, dx$
2. Evaluate : $\int_0^{\pi} Sin3x dx$
3. Evaluate : $\int_0^1 \frac{1}{1+x^2} dx$
4. Write the formula to find area bounded by the curve y= f(x) , x-axis, between the limits x=a and x =b

PART-B

Instructions: 1. Answer any **TWO** questions 02 X 03 = 06

2. Each question carries **THREE** marks

Find the Mean value of the function y = logx on [1 , e]

5 a) Evaluate: $\int_0^{\frac{\pi}{2}} \sqrt{1 - Sin2x} dx$

Or

5 b) Evaluate : $\int_0^{\frac{\pi}{2}} sin^2 x dx$

6 a). Find the area bounded by the line 2x + y =8, x-axis and the lines x = 2 and x = 4.

Or

6 b). Find the Volume of the Solid generated by revolving the part of the Circle $x^2 + y^2 = 36$ From x = 0 to x = 4 about x – axis.

PART C

Instructions: 1. Answer any **TWO** questions 02 X 05 = 10

2. Each question carries **FIVE** marks

7 a). Evaluate: $\int_0^{\frac{\pi}{2}} \frac{\sqrt{Sinx}}{\sqrt{Sinx}+\sqrt{Cosx}} dx$

Or

7 b). Evaluate : $\int_0^{\frac{\pi}{2}} \log sin\, x dx$

8 a) Find the area enclosed between the Parabolas $y = 3x - x^2 and y = x^2 - x$.

Or

8 b). Find the Volume of the Solid generated by the revolution of the area bounded by the Ellipse $\frac{x^2}{25} + \frac{y^2}{16} = 1$, about x- axis.

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C18-common

SUB.CODE:301F

BOARD DIPLOMA EXAMINATION,(C-18)
MODEL PAPER
III SEMESTER EXAMINATION
APPLIED 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. Integrate: $x^7 - 3/x$

2. Evaluate: $\int_0^1 (x^2 + 1)$ dx

3. Write the formula to find mean value of y = f(x), in the interval (a, b)

4. Find the Order and Degree of the Differential Equation $x\frac{dy}{dx} = \sqrt{1 + \left(\frac{dy}{dx}\right)^2}$.

5 Write Trapezoidal Rule to find the approximate value of $\int_a^b f(x)dx$.

6. Write the formula to find RMS value of y = f(x) over the range x=a and x = b.

7. Solve: $\frac{dy}{dx} = e^{2x+y}$

8. Write the condition for exactness of the differential equation M(x,y)dx + N(x,y)dy =0

PART-B

Instructions: 1. Answer any **FOUR** questions 04 X 03 = 12

2. Each question carries **THREE** marks

9 a). Evaluate: $\int_0^{\frac{\pi}{2}} \sqrt{1 - Sin2x} dx$

Or

9 b) Find the approximate value of $\int_0^6 \frac{dx}{1+x}$ by taking n = 6 using Trapezoidal rule.

10 a) Find the area bounded by the Parabola $y = x^2 - 2x + 1$ and x-axis.

Or

10 b) Form the Differential Equation from $y = Ae^x + Be^{3x}$ where A, B are arbitrary Constants.

11 a) Find the RMS value of $\sqrt{\log x}$ over the range x= 1 and x= e

Or

11 b) Calculate approximate value of $\int_0^4 \frac{dx}{1+x}$ by taking n= 4 using Simpson's 1/3 rule

12 a) Solve: $x\frac{dy}{dx} + 2y = logx$.

Or

12 b) Solve: $x(1-y^2)dx + y(1-x^2)dy = 0$

PART C

Instructions: 1. Answer any **FOUR** questions 04 X 05 = 20

2. Each question carries **FIVE** marks

13 a) Evaluate: $\int \frac{1}{x^2+2x+2}$ dx

Or

13 b) Find the RMS value of $y = \sqrt{8-4x^2}$ between x = 0 and x = 2

14 a) Find the volume of solid generated by revolving the Ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ about Major axis

Or

14 b) Solve: $\frac{dy}{dx} = Sin(x+y)$

15 a) A curve is drawn to passing through the points given by the following table:

x	1	1.5	2	2.5	3	3.5	4
y	3	3.4	3.7	3.8	2.7	2.6	2.1

Calculate the approximate area bounded by the curve , x-axis and the lines x= 1 and x= 4 using Simpson's 1/3 rule

Or

15 b) Evaluate: $\int_0^1 \sqrt{(1-x^2)}dx$ approximately by taking n = 4 using Simpson's 1/3 rd Rule.

16 a) Solve : $(y^2 - xy)dx = x^2dy$.

Or

16 b) . Solve: $\frac{dy}{dx} + yCosx = y^3$Sin2x.

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Solid Mechanics

Course Title :**Solid Mechanics**	Course Code :**18M302C**
Semester :III	Course Group :**Core**
Teaching Scheme in Hrs (L:T:P) : **3:1:0**	Credits :**3**
Methodology **: Lecture + Tutorials**	Total Contact Periods:**60 Pds**
CIE :**60 Marks**	SEE :**40 Marks**

Prerequisites Basic Knowledge of properties of materials and types of loads

Course Outcome

On successful completion of the course, the students will be able to

Course Outcome	
CO1	Understand the concept of forces and Analyze the force system
CO2	Explain and Evaluate Stresses and Strain when a body is loaded
CO3	Calculate the Geometric Properties of Sections
CO4	Draw Shear Force & Bending Moment Diagrams under various loads
CO5	Calculate bending stresses and Deflections in the given beam
CO6	Design a shaft

Course content and Blue Print of Marks for SEE

<table>
<tr><td colspan="2" rowspan="2"></td><td colspan="5">Questions to be set for SEE/Marks</td><td rowspan="2"></td></tr>
<tr><td></td><td colspan="2">R</td><td colspan="2">U</td><td></td></tr>
<tr><td rowspan="2">PART-A</td><td>Force Systems</td><td>10</td><td rowspan="6"></td><td rowspan="2">Q1</td><td colspan="2" rowspan="2">9(a)</td><td rowspan="2">13(a)</td><td></td></tr>
<tr><td>Simple Stresses &strain</td><td>10</td><td></td></tr>
<tr><td rowspan="2">PART-B</td><td>Geometric Properties of Sections</td><td>10</td><td rowspan="2">Q2</td><td colspan="2" rowspan="2">10(a)</td><td rowspan="2">14(a)</td><td></td></tr>
<tr><td>Shear Force &Bending Moment</td><td>10</td><td></td></tr>
<tr><td rowspan="2">PART-C</td><td>Simple Bending</td><td>10</td><td rowspan="2">Q3</td><td>Q5
Q6</td><td>9(b)
11(a)
11(b)</td><td>13(b)
15(a)
15(b)</td><td></td></tr>
<tr><td>Torsion in Shaft</td><td>10</td><td>Q7
Q8</td><td>10(b)
12(a)
12(b)</td><td>14(b)
16(a)
16(b)</td><td></td></tr>
<tr><td colspan="2">TOTAL</td><td>60</td><td>10</td><td></td><td></td><td>06</td><td>06</td><td></td></tr>
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COURSE CONTENT

1. Force Systems:

Force – definition, types. Types of force systems, Resolution of force, resultant of coplanar force system- parallelogram law, triangle law, polygon law, free body diagram, Lamis theorem, conditions of equilibrium, equilibrium of system of force.

2.Simple Stresses and Strains:

Types of forces - Stress, Strain and their nature - Mechanical properties of common engineering materials - stress- strain diagram for M.S. and C.I. Factor of Safety- Relation between elastic constants - Stress and strain in bodies of uniform section and of composite section under the influence of normal forces - Related numerical problems on the above topics - Thermal stresses in bodies of uniform sections.

3. Geometric Properties of Sections

Geometric properties of machine members-Locate the C.G. of a given composite section - moment of Inertia for Rectangle, Triangle, circular, semicircle - Perpendicular and parallel axis theorem - Moment of Inertia of T section, I section and L section -Radius of gyration.

4.Shear force and bending moment diagram:

Beam – types, load – types, shear force and bending moment - Draw shear force and bending Moment diagrams by the analytical method only for the following cases.

a) Cantilever with point loads,

b) Cantilever with uniformly distributed load.

c) Simply supported beam with point loads.

d) Simply supported beam with uniformly distributed loads

e) Over-hanging beam with point loads, at the centre and at free ends

f) Over-hanging beam with uniformly distributed load throughout.

g) Combination of point and UDL.for the above and problems there upon.

5.Theory of simple bending &Deflection of Beams:

Bending-Explanation of terms, a) Neutral layer, b) Neutral Axis, c) Modulus of Section, d) Moment of Resistance, e) Bending stress, f) Radius of curvature.

Assumptions in theory of simple bending. Bending Equation $M / I = \sigma_b / Y = E / R$ without derivation - Problems involving calculation of bending stress modulus of section and moment of resistance. Calculate of safe loads and safe span and dimensions of cross-section.

Deflection of beams formulae without proof for cantilever and simply supported beam with point load and uniformly distributed loads only(Standard cases only).Related numerical problems.

6 Torsion in Shafts

Definition and function of shaft. Calculation of polar M.I. for solid and hollow shaft.

Assumptions in simple torsion. Torsion equation without derivation $T / J = \tau / R = G\theta / L$ and explain the terms involved.

Problems on design of shaft based on strength and rigidity. Numerical Problems related to comparison of strength and weight of solid and hollow shafts.

REFERENCE BOOKS

1. Strength of Materials by B.C.Punmia

2.Strength of Materials by R.S. KhurmiS & Chand Company

3. Strength of Materials by Ramamrutham

Electronic resources

Engineer's Edge engineering data on strength of materials, stress, strain, failure and more

http://www.engineersedge.com/mechanics_material_menu.shtml

Free engineering software for calculating stress etc

http://www.freebyte.com/ca

http://online couses.nptel.ac.in/

Suggested student activities

1. Record various forces applied by human beings in their daily activities.

2. Identify the applications where parallelogram law of forces, Lamis theorem etc are used and prepare a report.

3. Using internet record various properties of commonly used materils and compare strengths.

4. How a corrugated roof sheet differs from plain roof sheet ? Demonstrate with models.

Specific Learning Outcomes

Upon completion of the course the student shall be able to

Understand the concept of forces and Analyze the force system

- Define the force and its units
- Types of force systems
- Explain coplanar force system
- State Parallelogram law
- State triangle law
- Polygon law
- Free body diagrams
- State Lamis theorem
- Conditions of equilibrium
- Equilibrium of system of forces and (related problems from all)

Understand the concept of Simple Stresses and Strains

- Define the term strength,
- Define the Mechanical properties of commonly used engineering materials
- Explain the nature and effect of tensile, compressive and shear forces
- Define the terms stress, strain, Poisson's ratio and elastic moduli
- Draw the stress – strain diagram for MS and CI under tension indicating salient points on it.
- State the significance of factor of safety.
- Write down the relation between elastic constants E, N, K, & 1/m
- Compute stress and strain values in bodies of uniform section and of composite section under the influence of normal forces
- Compute changes in axial, lateral and volumetric dimensions of bodies of uniform sections under the action of normal forces
- Compute thermal stresses in bodies of uniform section (composite sections omitted)

Geometric Properties of Sections

- Definition and explanation of centre of gravity of a laminar area. Centre of Gravity of a body. Centre Gravity of a square, rectangle, triangle, Semi-circle (formulae only without derivations)
- Centre of gravity of a composite section by analytical method only (I-section, T-Section, L-Section and channel section).
- Moment of Inertia. Definition and Explanation. Theorems of Moment of Inertia. Parallel axes theorem. Perpendicular axes theorem. Moment of Inertia for simple Geometrical Sections – Rectangular, Circular and triangular section only. Radius of Gyration.
- Calculation of Moment of Inertia and Radius of Gyration of I – Section. Channel Section. T – Section. L– Section (Equal & unequal lengths) (Simple cases only)

Understand the concept of Shear Force and Bending Moment Diagrams

- List the types of beams.
- List the types of loading
- Explain the terms shear force and bending moment.
- Compute shear force and bending moment at any section of beam (for UDL and Point Loads)
- Practice the diagrams of S.F. & B.M for UDL and Point loads

Calculate bending stresses and Deflections in the given beam

- State the theory of simple bending and explain terminology
- List the assumptions in theory of simple bending.
- State the bending equation M/I=f/y=E/R. Explain the terms involved.
- Calculate Bending stress, modulus of section and Moment of resistance.
- Calculate the safe load, safe span and dimensions of cross section.
- Calculate Deflection of beams for cantilever and simply supported beam with point load and uniformly distributed loads only.

Design a Shaft

- Design of cylindrical shaft
- Explain Polar M.I. of solid and hollow shaft
- List the assumptions in theory of Simple Torsion
- State the torque equation $T / J = \tau / R = G\theta / L$ and explain the terms involved
- Design solid and hollow shafts
- Compare strength and weight of solid and hollow shafts of the same length of the material.

	Course Outcome	**CL**	**Linked PO**	**Teaching Hours**
CO1	Understand the concept of forces and Analyze the force system	**R, U, A**	**1,3,4,9**	**10**
CO2	Explain and evaluate Stresses and Strains when a body is loaded	**R, U, A**	**1,2,3,10**	**10**
CO3	Calculate the Geometric Properties of Sections	**U, A**	**1,2,3,**	**10**
CO4	Draw Shear force and Bending Moment diagrams under various load	**U, A**	**1,2,3,10**	**10**
CO5	calculate bending stresses and Deflections in the given beam	**U, A**	**1,2,3,10**	**10**
CO6	Design a shaft	**R, U, A**	**1,2,3,10**	**10**
		Total Sessions		**60**

Legends: R = Remember U= Understand; A= Apply and above levels (Bloom's revised taxonomy)

Course-PO Attainment Matrix

Course outcome	**Program Outcomes**									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	**3**		**2**	**2**					**1**	
CO2	**3**	**2**	**3**							**1**
CO3	**3**	**2**	**3**							
CO4	**3**	**3**	**3**							**10**
CO5	**3**	**2**	**3**							**10**
CO6	**3**	**3**	**3**							**10.**

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

MID SEM-I EXAM

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

MID SEM –II EXAM

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

Semester End Examination

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

Legend:	Remembering (R)	1 Mark
	Understanding (U)	3 Marks
	Application (A)	5 Marks

MID SEM I
MODEL PAPER
Solid mechanics

Time : 1 Hours] [Total Marks: 20

PART - A

Instructions : 1. Answer **ALL** questions.

2. Each question carries **ONE** mark.

1. Write triangle law of forces. 04x01=04 M
2. Write conditions of equilibrium.
3. Define the term modulus of elasticity.
4. List out three elastic constants.

PART-B

02X03=06M

Instructions : 1. Answer any **TWO** questions.

2. Each question carries **THREE** marks.

5. (a) Write expression for resultant and direction of resultant from parallelogram law of force

(or)

5. (b) forces of 20N,30N,40N,50N are acting along positive X axis, positive Y axis negative X axis and negative Y axis. Find resultant.

6. (a) . Define Stress and strain

(or)

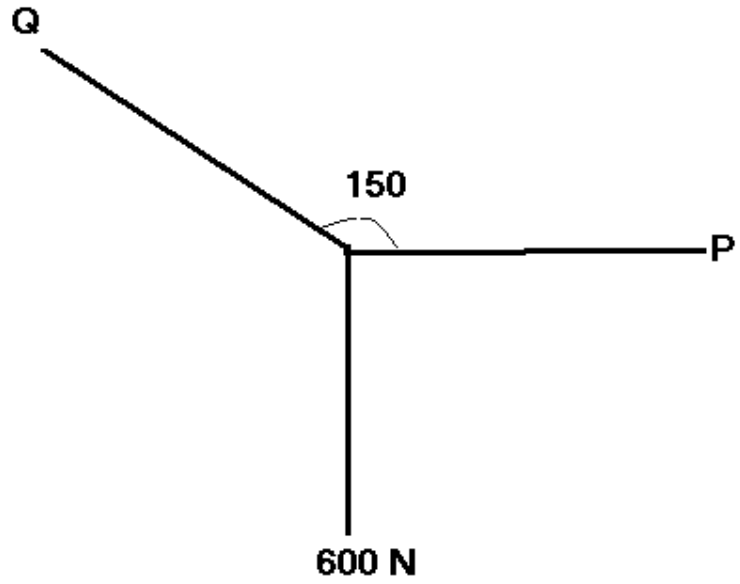
6. (b) A m.s bar carries an axial load of 75 KN.If the allowable tensile stress is $50N/mm^2$, find the diameter of the rod.

PART-C

Instructions : 1. Answer any **TWO** questions. 05X02=10M

2. Each question carries **FIVE** marks.

7. (a) Using Lamis's theorem find the forces P and Q in the given figure



(or)

7. (b) Find resultant of the forces in which a force of 20 N, 30N, 40N act along positive x axis, negative x axis and positive y axis .

8. (a) Explain the term Poisson's ratio

(or)

8. (b) Explain the term factor of safety.

MID SEM II
MODEL PAPER
Solid mechanics

Time : 1 Hours] [Total Marks: 20

PART-A

Instructions : 1. Answer **ALL** questions.

2. Each question carries **ONE** mark.

1. Write formula for centroid of semi circle 04x01=04 M

2. Write formula for M.I of triangle about its base.

3. Define contraflexure.

4. Define term bending moment

PART-B

02X03=06M

Instructions : 1. Answer any **TWO** questions.

2. Each question carries **THREE** marks.

5. (a) Find M.I of a circle about a axis parallel to its diameter and touching its circumference.

(or)

5. (b) Find M.I of triangle passing through its apex and parallel to its base.

6. (a) Draw the SFD and BMD of a cantilever beam of length, L subjected to a point load, W at the free end.

(or)

6. (b) A simply supported beam of length 5m carries a u.d.l of 2KN/m over entire span. Draw SF and BM diagrams .

PART-C

Instructions : 1. Answer any **TWO** questions. 05X02=10M

2. Each question carries **FIVE** marks.

7. (a) Find centroid of C section formed by using rectangles of 100 mm x 20 mm

(or)

7. (b) Find M.I of L section formed by rectangle 150mmX10mm about axis coincide with base.

8. (a) Explain the term Poisson's ratio

(or)

8. (b) Explain the term factor of safety.

BOARD DIPLOMA EXAMINATION, (C-18)
SEE-MODEL PAPER
DME– III SEMESTER EXAMINATION
Solid mechanics

Time : 2 Hours] [Total Marks: 40

PART-A

08X01=08

Instructions : 1. Answer **ALL** questions.

2. Each question carries **ONE** mark.

1 Give an example of compressive force.

2 Write significance of finding centroid of a body.

3. Define Moment of Resistantance.

4. Write the formula for centroid of quadrant of a circle.

5. Define Radius of curvature.

6. Write the Bending Equation.

7. What is Polar Moment of Inertia.

8.Write formulae for torsional stiffness.

PART-B

04X03=12

Instructions : 1. Answer any **FOUR** questions.

2. Each question carries **THREE** marks.

9. (a)Two forces of magnitude 30N and 40N each act on a body. The angle between one forces is 20^0 Find their resultant.

(or)

9. (b)Explain the assumptions in simple bending.

10. (a)Two rectangles of dimension 100mmX10mm form a L section. Find its centroid

(or)

10. (b)A solid shaft of 150mm diameter is used to transimit torque. Find the maximum torque transmitted by the shaft, if the maximum shear stress induced in the shaft is $45N/mm^2$.

11. (a)A steel plate of width 100mm and 30mm depth. Find the Moment of Inertia.

(or)

11. (b)Write the slop& deflection formulae for cantilever with point load.

12. (a)Design the shaft based on strength.

(or)

12. (b)The shear stress of the solid shaft is not to exceed to 40N/mm^2 when the torque transmitted is 20000N-m.detrmine the minimum diameter of the shaft.

PART-C

04X5=20

Instructions : 1. Answer any **FOUR** questions.

2. Each question carries **FIVE** marks.

13. (a)A body of weight 200N is held vertical by means of two strings which make 30^0 and 60^0 with horizontal. Find tension in strings.

(or)

13. (b)A cantilever of length 3m carries a point load of 40 KN at free end. Find the slope and deflection of the cantilever at free end assume I=$8X10^7mm^4$ and E=$2.1X10^5mm^2$.

14. (a) A T- section is formed by two rectangles 150mmX20mm.Find centroidal moment of inertia parallel to its base

(or)

14. (b).A cantilever of 3m is loaded with a uniformly distributed load of 20 KN/m run. Find the slope and deflection at the free end of the beam, if the
I=$7550X10^4mm^4$
E=$2.1X10^5mm^2$

15. (a).A 5m long simply supported beam at the ends carries a point load W at its centre. If the slope at the ends of the beam is not to exceed 1^0, find the deflection at the centre of the beam.

(or)

15. (b)A simply supported beam of span 5m is subjected to u.d.l of 10KN/m over the entire span . If I=$8500X10^4mm^4$ E=$2.1X10^5mm^2$. Find the slope and deflection of the beam

16. (a)A solid shaft of diameter 12mm is subjected to a torque of 20Nm. Find the angle of twist over a length of 300mm. take G=$0.8X10^5N/mm^2$.

(or)

16. (b)A solid circular shaft running at 500rpm transmits 300KW power. calculate the suitable diameter of the shaft ,if the maximum allowable shear stress is 100N/mm^2. .

THERMODYNAMICS

Course Title : Thermodynamics	**Course Code : 18M303C**
Semester : III	**Course Group : Core**
Teaching Scheme in Periods (L:T:P:) : 36:24:0	**Credits : 3**
Methodology : Lecture +Tutorials	**Total contact periods : 60**
CIE : 60 Marks	**SEE : 40 Marks**

Prerequisites: Basic knowledge of Physics

COURSE OUTCOMES

	At the end of the course the students will have the ability to:
1	Outline various laws of thermodynamics and interpret the gas laws.
2	Acquire knowledge on various thermodynamic processes and estimate different properties.
3	Classify fuels used, and describe experimental procedure to determine their calorific value
4	Analyze different air standard cycles and compare them.
5	Elaborate principle of working of IC engines.
6	Explain different systems used in IC engines and evaluate the performance of IC engines.

COURSE CONTENT AND BLUE PRINT OF MARKS FOR SEE

<table>
<tr><th rowspan="2">Unit No</th><th rowspan="2">Unit Name</th><th rowspan="2">Periods</th><th colspan="4">Questions to be set for SEE</th><th rowspan="2">Remarks</th></tr>
<tr><th colspan="2">R</th><th>U</th><th>A</th></tr>
<tr><td>1</td><td>Fundamentals of Thermodynamics and perfect gas laws</td><td>10</td><td rowspan="6">QNo 4</td><td colspan="2" rowspan="2">Q No 1</td><td rowspan="2">Q No 9(a)</td><td rowspan="2">Q No 13(a)</td><td></td></tr>
<tr><td>2</td><td>Thermodynamic processes</td><td>10</td><td></td></tr>
<tr><td>3</td><td>Fuels and combustion</td><td>10</td><td colspan="2" rowspan="2">Q No 2</td><td rowspan="2">Q No 10 (a)</td><td rowspan="2">Q No 14 (a)</td><td></td></tr>
<tr><td>4</td><td>Air Standard Cycles</td><td>10</td><td></td></tr>
<tr><td>5</td><td>IC Engines – Working principles</td><td>10</td><td rowspan="2">Q No 3</td><td>Q No 5 , Q No 6</td><td>Q No 9(b), Q No 11(a), Q No 11(b)</td><td>QNo 13(b), QNo 15(a), QNo 15(b)</td><td></td></tr>
<tr><td>6</td><td>IC Engines – systems used and performance of IC engines</td><td>10</td><td>Q No 7 , Q No 8</td><td>Q No 10(b), Q No 12(a), Q No 12(b)</td><td>QNo 14(b), QNo 16(a), QNo 16(b)</td><td></td></tr>
</table>

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

COURSE CONTENT

Thermodynamics

Unit – 1 **Duration: 10 Periods (L: 6.0 – T: 4.0)**

Fundamentals of Thermodynamics and perfect gas laws

Introduction – Thermodynamic systems- Properties – Zeroth law, First Law , First law applied to closed system (NFEE)and Second Law of Thermodynamics -Perfect gas – Boyles' Law, Charles's Law, Avagadro's law, Regnault's law, Joule's law - Ideal Gas equation – Relation between specific heats.

Unit – 2 **Duration: 10 Periods (L: 6.0 – T: 4.0)**

Thermodynamic processes

Expression for work done and heat supplied (without derivation) for Isochoric, Isobaric, Isothermal, Isentropic, Polytropic processes – Free expansion and Throttling process – Entropy – Expression for entropy (without derivation) for the above thermodynamic processes

Unit – 3 **Duration: 10 Periods (L: 6.0 – T: 4.0)**

Fuels and Combustion

Fuel - Types – Calorific values (Heating value) of fuels - Dulong's formula for calorific value - Bomb calorimeter - Junker's Gas calorimeter– Definition of combustion of fuel - Calculation of minimum air required(on mass basis) for the complete combustion of fuel having a given composition – Products of combustion- Orsat Apparatus for flue gas analysis.

Unit – 4 **Duration: 10 Periods (L: 6.0 – T: 4.0)**

Air Standard Cycles

Air standard cycle - Reversible and irreversible process –Explanation and analysis of Carnot cycle ,Otto cycle , Diesel cycle– Expression for efficiency of these cycles (without derivation) – Comparison of performance of Otto cycle and Diesel cycle.

Unit – 5 **Duration: 10 Periods (L: 6.0 – T: 4.0)**

IC Engines – Working principles

Heat engines – Internal combustion engines and external combustion engines - classification of I.C. engines - Components of IC engines - Function of each part and materials used - Principle of working of four stroke petrol engine and four stroke diesel engine - Principle of working of two stroke petrol engine - Valve timing diagram of four stroke petrol engine and four stroke diesel engine.

Unit – 6 **Duration: 10 Periods (L: 6.0 – T: 4.0)**

IC Engines – Systems used and performance of IC engines

Fuel systems – Ignition systems – Cooling Systems – Lubrication systems - Evaluation of performance parameters

REFERENCE BOOKS

1.Engineering Thermodynamics by P. K. NagTMH Publishers

2.Thermal Engineering byR.K Rajput

3.Thermodynamics and Heat Engines Vol 1 and Vol 2 by R Yadav

4.IC Engines by Gill and Smith

SUGGESTED LEARNING OUTCOMES

Fundamentals of Thermodynamics and perfect gas laws

- Define the various terms associated with the thermodynamic system.Explain with examples Open system, Closed system and Isolated System.
- Define the various thermodynamic properties, State, Path, Process, Cycle, Temperature, Heat and Work. Know sign convention of heat and work.
- Define Specific heats, Internal Energy, Enthalpy, Flow work -Solve Problems on properties of thermodynamic systems.
- Define Thermal equilibrium -Statethe Zeroth Law of TD, First law of TD, First law applied to closed system and Second law of Thermodynamics.
- Solve problems on First law applied to closed system (NFEE)
- Define Perfect gas - State Boyle's law, Charle's Law, Know Characteristic gas equation (without derivation), Universal gas constant.
- Solve problems on above gas laws.
- Write relation between specific heats (without derivation)–solve problems State Avogadro's Law, Regnault's law and Joule's law

Thermodynamic processes

- Know expression for work done and heat supplied (without derivation) for Isochoric, Isobaric and Isothermal processes
- Solve problems on the above processes.
- Know expression for work done and heat supplied (without derivation) for Isentropic, Polytropic processes. -Know the relation between pressure, volume and temperature in adiabatic (Isentropic) process.
- Sketch all the above processes during expansion and compression on P-V diagram
- Solve problems on above processes.
- Know Throttling process and free expansion process.

- Define Entropy and know expression for change in entropy for various thermodynamic processes(without derivation)
- Solve problems on change in entropy

Fuels and Combustion

- Define the term fuel- Classification of fuels –Different solid fuels, stages of formation of coal, advantages and disadvantages of solid fuels.
- Different liquid and gaseous fuels - Their advantages and disadvantages.
- Define higher calorific value (heating value) and lower calorific Value- Estimate calorific value of fuel from Du long's formula.
- Explain with line diagram the components of a Bomb calorimeter narrate the sequence of determination of calorific value and write final formula to find calorific value. (Problems omitted)
- Explain the working principle of Junker's gas calorimeter with a line diagram, narrate the sequence of determination of calorific value of a gaseous fuel and write final formula to find calorific value. (Problems omitted)
- Define combustion of fuel, know the expression for minimum air required (on mass basis) for complete combustion and solve problems.
- Know the products of combustion (problems omitted)
- Explain with a line diagram the working of Orsat's apparatus and narrate the sequential procedure in conducting flue gas analysis by using Orsat's apparatus.

Air Standard Cycles

- Define the term air standard cycle. Know assumptions for air standard cycle.
- State the assumptions made in Carnot cycle and explain its working with a line diagram
- Write the formula for the air standard efficiency of a Carnot cycle (without derivation) and solve simple problems
- State the assumptions made in Otto cycle and explain its working with a line diagram
- Write the formula for the air standard efficiency of Otto cycle (without derivation) and solve simple problems
- State the assumptions made in Diesel cycle and explain its working with a line diagram
- Write the formula for the air standard efficiency of a Diesel cycle (without derivation) and solve simple problems.
- Compare Otto cycle and Diesel cycle.

IC Engines – Working principles

- Define Heat Engine - Compare internal combustion engines and external combustion engines - Classify Internal Combustion Engines.

- Draw the line diagram of an I.C. engines, name the various parts and briefly explain their function. Know the various basic terms associated with IC Engine
- Explain with line diagram the working of a four-stroke petrol engine (SI).
- Explain theoretical indicator diagram, valve timing diagram of a four stroke petrol (SI) engine.
- Explain with line diagram the working of a four-stroke diesel(CI) engine.
- Explain theoretical indicator diagram, valve timing diagram of a four stroke diesel (CI) engine.
- Explain with line diagram the working of a two-stroke petrol engine. Draw the indicator diagram.
- Compare two stroke engines with four stroke engines and compare diesel engines with petrol engines.

I C Engines – Systems used and performance of IC engines

- Know the functions of the elements of the fuel system in a petrol engine.(Fuel tank, Fuel pump, Fuel filter, Air cleaner and Carburettor)
- Know the functions of various elements of the fuel systems of diesel engine. (Fuel Feed pump, Filter, Injection pump and Injector)
- Explain with line diagram the working of a battery ignition system.
- Explain with line diagram working of a magneto ignition system.Compare the battery ignition system with magneto ignition system
- Know the necessity of cooling of IC engine. Explain with a legible sketch air cooling system , forced circulation water cooling system, forced circulation liquid coolant system and compare them
- Know the necessity of lubrication of IC engine and know the parts to be lubricated.Draw the line diagram of lubricating system and explain briefly the components of lubricating system (Oil pump, Oil strainer, Pressure relief valve, Oil gallery, Pressure gauge etc).
- Define the performance parameters of IC Engines like Indicated power, Brake power, indicated and brake mean effective pressure, Friction power, Specific fuel consumption, Mechanical Efficiency, Thermal Efficiency and know their formula
- Solve simple problems involving above parameters.

SUGGESTED E RESOURCES/STUDENT ACTIVITIES

1. Make a list of different bikes available in market and know their capacities.
2. Make a list of different cars available in market and know their capacities
3. Visit to a hospital/industry and see how a boiler works.

4. Make a report on the solid, liquid fuels available in market and know their calorific values.
5. Collect data of pressure required in tyres of a two wheeler and four wheeler.
6. Collect data of different engine oils used in automobiles.
7. Collect information of different liquid coolants used in automobile
8. Working of bomb calorimeter
   https://www.youtube.com/watch?v=nJOH29SGcCk
9. Study of cut out models of IC engines.
10. Visit to automobile workshop.
11. Working of IC Engine
    https://www.youtube.com/watch?v=O9tfIfwlmz8
12. Know fuel system
    https://www.youtube.com/watch?v=DCfyUm3I4oI
13. *Know battery ignition system*
    https://www.youtube.com/watch?v=OMLSNwQiiKg
14. *Know cooling system in automobile*
    https://www.youtube.com/watch?v=V7inC4lOpGs
15. *Know lubrication system*
    https://www.youtube.com/watch?v=mmmcj53TNic

CO-PO Matrix

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**Mapping Pos**
18M303C.1	3	1	1	-	-	-	-	-	-	-	1, 2,3
18M303C.2	3	2	2	-	-	-	-	1	-	-	1, 2, 3,8
18M303C.3	1	3	-	-	--	-	-	-	-	-	1, 2
18M303C.4	2	2	1	-	-	-	-	1	-	-	1, 2, 3,8
18M303C.5	2	1	-	-	-	-	-	2	-	1	1, 2 8, 10
18M303C.6	2	1	-	-	-	-	-	2	-	1	1,2,8, 10

QUESTION PAPER BLUE PRINT FOR CIE (MID SEM I)

Unit No	Unit Name	Questions to be set for CIE			**Remarks**
		R	U	A	
1	Fundamentals of Thermodynamics and perfect gas laws	Q No 1 Q No 2	Q No 5(a) Q No 5(b)	Q No 7(a) Q No 7(b)	
2	Thermodynamic processes	Q No 3 Q No 4	Q No 6(a) Q No 6(b)	Q No 8(a) Q No 8(b)	

QUESTION PAPER BLUE PRINT FOR CIE (MID SEM II)

Unit No	Unit Name	Questions to be set for CIE			**Remarks**
		R	U	A	
3	Fuels and combustion	Q No 1 Q No 2	Q No 5(a) Q No 5(b)	Q No 7(a) Q No 7(b)	
4	Air Standard Cycles	Q No 3 Q No 4	Q No 6(a) Q No 6(b)	Q No 8(a) Q No 8(b)	

C-18M303C

BOARD DIPLOMA EXAMINATION

DME III SEMESTER

THERMODYNAMICS

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. Write SI units of Energy and Power.
2. Define the term higher calorific value.
3. Define I C engine
4. State Zeroth law of Thermodynamics.
5. What is the function of piston rings in IC engine
6. What is the necessity of cooling an IC engine (any two).
7. A engine has a swept volume of 80 cc and clearance volume of 10 cc. Find its compression ratio.
8. A IC engine working on Otto cycle has a compression ratio of 8. Find its air standard efficiency.

PART – B

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

4x 3 M = 12M

9 (a) A gas undergoes a change of state from pressure of 1 bar, volume 20 m^3 and temperature 300 K to pressure of 2 bar, volume 10 m^3, temperature 300K . Which gas law does it obey? Support your answer.

OR

9 (b) Classify IC engines.

10 (a) A gas undergoes a change of state from pressure of 1 bar, volume 20 m^3 and temperature 300 K to pressure of 2 bar, volume 10 m^3, temperature 300K . Which gas law does it obey?

OR

10 (b) Write three advantages and three disadvantages of liquid fuels over solid fuels

11(a) Draw a neat sketch of an IC engine and show its components.

OR

11(b) Draw valve timing diagram of 4 stroke petrol engine.

12(a) Write the function of Fuel pump and carburetor in a SI engine.

OR

12(b) Write the function of fuel feed pump and Fuel Injector in a CI engine..

PART – C

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

4x 5 M = 20 M

13 (a) 0.25 m^3 of air at a pressure of 140 kN/m^2 occupies 0.15 m^3 is compressed to 1.4 MN/m^2 according to $pV^{1.25}$ = constant. Determine change in internal energy, work done and heat rejected .

OR

13 (b) Explain working of four stroke petrol engine

14 (a) Explain construction and working of Bomb calorimeter.

.OR

14 (b) Explain with line diagram the working of battery ignition system.

15 (a) Explain construction and working of Junker's gas calorimeter.

OR

15 (b) Explain with line diagram the lubrication system used in IC engine.

16 (a) The following data refers to a test on a petrol engine.

Indicated Power = 30 kW, Brake power = 26 kW

Engine speed= 1800 RPM Brake specific fuel consumption = 0.35 kg/kWh

Calorific value of fuel = 44100 kJ/kg.

Calculate Mechanical Efficiency, The indicated thermal efficiency, The brake thermal efficiency.

.

.OR

16 (b) Explain with line diagram the magneto ignition system used in IC engine.

C-18M303C

DME III SEMESTER

MID SEM I EXAMINATION

THERMODYNAMICS

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. Define the term thermal equilibrium.
2. Convert a pressure of 10 MPa into bar.
3. What is another name of reversible adiabatic process.
4. What are SI units of entropy.

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 specific heat, write it units and write value of specific heat of water.

OR

5. (b) Write sign convention for work done on the system and heat supplied to the system.

6. (a) Which gas law does isothermal process follow.

OR

6 (b)A ideal gas at 200^{o}C and 12 bar expands adiabatically to 2.4 bar. Calculate its final temperature.

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) A system undergoes a cycle composed of four processes and the energy transfers are tabulated as below

Process	Q (kJ/min)	W (kJ/min)	du (kJ/min)
1-2	550	230	------
2-3	230	------	380
3-4	-500	---------	-----
4-1	0	70	-----

a. Complete the table
b. Determine the rate of work in kW

OR

7 (b) Write Kelvin Planck and Claussius statement of second law of thermodynamics.

8 (a) 0.12 m^3 of air at 1.5 MPa and 1500 ^{0}C expands adiabatically to 175 KPa . Find (i) The final temperature and (ii) The work done

OR

8 (b) A gas has an initial pressure, volume and temperature of 95kN/m^2, 14 litres and 100^{o}C respectively. The gas is compressed according to the law $pV^{1.3} = C$ through the volume ratio of 14:1. Determine the change in internal energy.

***

C-18M303C

DME III SEMESTER

MID SEM I EXAMINATION

THERMODYNAMICS

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. State two advantages of solid fuel.
2. Define lower calorific value of a fuel.
3. Why is carnot cycle not practicable?
4. Define cut off ratio in a diesel cycle.

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) Explain Natural gas which is used as fuel.

OR

5 (b) A fuel has liberated 20000kJ of heat when 2 Kg of fuel is burnt. Find its calorific value.

6. (a) Draw P-V and T-S diagram of carnot cycle.

OR

6 (b) List the processes involved in a Carnot cycle.

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) Explain construction and working of Junker's gas calorimeter.

OR

7 (b) Explain construction and working of Bomb gas calorimeter.

8 (a) In an Otto cycle the air at the beginning of isentropic compression is at 1 bar and 15 ^{o}C and is compressed through a ratio of 8. The heat added is 1008 kJ/kg during constant volume process. Determine Maximum temperature in the cycle, The air standard efficiency, work done per kg of air and heat rejected per kg of air.

OR

8. (b) Compare performance of Otto cycle and Diesel cycle for same compression ratio and heat addition

BASIC MANUFACTURING TECHNOLOGY

Course Title :	**Basic Manufacturing Technology**	Course Code	**18M304C**
Semester	**III**	Course Group	**:Core**
Teaching Scheme in Hrs(L:T:P)	**36:24:0**	Credits	: **3**
Methodology	**Lecture + Tutorials**	Total Contact Hours :	**: 60Periods**
CIE	**60 Marks**	SEE	**40 Marks**

Prerequisites: **Basic knowledge of Manufacturing Processes**

COURSE OUTCOMES

	At the end of the course the students will have the ability :
CO1	Illustrate the Working of a Lathe Machine and Classify Lathe machines to perform operations in engineering applications.
CO 2	Describe the construction and Working of a Broaching machine and identify components manufactured by broaching.
CO 3	Identify Parts of Shaper, Slotter and Planer and Explain their working to and assess the requirement in various fields of engineering
CO 4	Identify the Properties, composition of Cutting Fluids, Coolants & Lubricants to select depending on the application
CO 5	Classify the welding processes and Explain soldering, brazing and Gas cutting and assess the requirement in various fields of engineering
CO 6	Classify and Identify Parts of a Milling machine, Methods of Gear making

COURSE CONTENT AND BLUE PRINT OF MARKS FOR SEE

<table>
<tr><th rowspan="2">Unit No</th><th rowspan="2">Unit Name</th><th rowspan="2">Periods</th><th colspan="3">Questions to be set for SEE</th><th rowspan="2">Remarks</th></tr>
<tr><th colspan="2">R</th><th>U</th><th>A</th></tr>
<tr><td>1</td><td>Lathe & Lathe Work</td><td>10</td><td rowspan="6">QNo 4</td><td rowspan="2">Q No 1</td><td rowspan="2">Q No 9(a)</td><td rowspan="2">Q No 13(a)</td><td></td></tr>
<tr><td>2</td><td>Broaching Machine</td><td>10</td><td></td></tr>
<tr><td>3</td><td>Shaper, Slotter, Planner</td><td>10</td><td rowspan="2">Q No 2</td><td rowspan="2">Q No10(a)</td><td rowspan="2">Q No 14 (a)</td><td></td></tr>
<tr><td>4</td><td>Cutting Fluids, Coolants and Lubricants</td><td>10</td><td></td></tr>
<tr><td>5</td><td>Welding</td><td>10</td><td rowspan="2">Q No 3</td><td>Q No 5 , Q No 6</td><td>Q No 9(b), Q No 11(a), Q No 11(b)</td><td>QNo 13(b), QNo 15(a), QNo 15(b)</td><td></td></tr>
<tr><td>6</td><td>Milling, Gear making</td><td>10</td><td>Q No 7 , Q No 8</td><td>Q No 10(b), Q No 12(a), Q No 12(b)</td><td>QNo 14(b), QNo 16(a), QNo 16(b)</td><td></td></tr>
</table>

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

COURSE CONTENT

1.0 Lathe and Lathe Work

Working Principle of Lathe , Types of Lathes - Engine lathe – construction details–specifications., geometry and nomenclature of single point cutting tool, tool signature, functions of tool angles. General and special operations – (Turning, facing, taper turning thread cutting, knurling, forming, drilling, boring, reaming, key way cutting.)Methods of taper turning – explanation Lathe accessories viz., work holding devices and tool holding devices Turret lathe: sketch – operation – advantages. Capstan lathe: sketch – operation – advantages. Comparison of engine (centre lathe) – turret – capstan lathe, Semi automatic lathe – features ,Automatic lathe – features, Copying lathe – applications.

2.0 Broaching Machines

Introduction to broaching, Types of broaching machines–horizontal type (single ram & duplex ram) vertical type, pull up, pull down, and push down. Elements of broach tool, broach teeth details – nomenclature – types – tool material.

3.0 Shaping, Slotting, and Planing

Introduction to shaper, slotter, planer, Constructional details and specifications of shaper, slotter and planer. Operations on these machines. Tools and materials. Driving mechanisms - quick return arrangement - crank & slotted lever mechanism, whit worth mechanism, hydraulic drive.

4.0 Cutting Fluids, Coolants & Lubricants

Introduction, Types of cutting fluids. Properties and functions of fluids and coolants. Fluids and coolants required in turning, drilling, shaping, sawing & Broaching, Selection of cutting fluids, methods of application of cutting fluid. Classification of lubricants (solid, liquid, gaseous) Properties and applications of lubricants.

5.0 Welding

Introduction, Classification of welding processes. Applications, Advantages and limitations of welding, Principles of arc welding, Arc welding equipment, Choice of electrodes for different metals, Principle of gas (oxy – acetylene) welding. Equipment of gas welding. Welding procedures (arc & gas),Soldering and Brazing techniques., Types and applications of solders & fluxes ,Various flame cutting processes. Advantages and limitations of flame cutting, Defects in welding., Testing and inspection. Modern welding methods, (Submerged, CO_2, Atomic – Hydrogen, ultrasonic welding), Brief description of MIG & TIG Welding.

6.0 The concept of Milling

The principle of working of a Milling machine, Classify the milling machines, constructional details of milling machine, functions of each part of the milling machine, various milling

operations, different milling cutters, selection of tool and work holding devices, different indexing methods –direct, simple and compound indexing - specifications of milling machines.

The concept of Gear Making

Different methods of producing gears, Gear shaping, Gear hob and its components. Working of the above m/c, sequence of operations in generating gear by gear hobbing m/c., Different methods of finishing, Specification of gear, Various gear materials.

REFERENCE BOOKS

1.	Welding Technology	by	Little.
2.	Elements of Work Shop Technology vol. I & II	by	Hazra Choudry
3.	Engineering Metrology	by	Jain
4.	Welding Technology	by	Parmar
5.	Manufacturing Technology (volume-1)	by	P.N.Rao (MGH Pub)
6.	Production technology	by	RK Jain

Suggested Learning outcomes

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

Understand the construction details of Lathe & Lathe Work

- State the working principle of lathe.
- Classify lathes.
- Draw the line diagram of engine lathe.
- List the parts of lathe.
- Describe the functions of each part in lathe.
- Indicate the specifications of a lathe.
- List the various operations performed on lathe including special operations.
- Explain methods of taper turning with line diagrams.
- Calculate the included angle for taper turning.
- List different work holding devices.
- Explain the Nomenclature of Lathe (single point) tool with the help of legible sketch
- Explain the Significance of various angles.
- List the various types of production lathes.
- Illustrate the working principle of turret lathe, Capstan, Automatic and Semi-automatic lathes & copying lathes.
- Distinguish between automatic and semi-automatic lathes.
- Explain the need of copying lathes.
- State the advantages and applications of production lathes.

Understand the construction details and working principle of Broaching machine

- Define Broaching.
- Classify broaching machines.
- Illustrate the working principles of broaching machines.
- Illustrate the constructional details of the broaching machines.
- State the advantages & limitations of broaching.

Understand the construction details and working principle of Shaper, Slotter and Planer

- Illustrate the working principles of shaper, slotter, and planer.
- Illustrate the constructional details of the above machines.
- Explain the functions of important parts of the above machines.
- List the operations performed on these machines.
- State the specifications of each machine.
- Explain the principle of quick-return mechanism as applied to shaper/planer.
- Describe the different methods of obtaining quick return motion.
- Explain the principle of hydraulic drive with the help of a line diagram applied to shaper.

Understand the concept of Cutting Fluids, Coolants & Lubricants.

- State the properties of cutting fluids and coolants.
- Mention the types of fluids.
- List the relative merits of the cutting fluids and coolants.
- Select the proper cutting fluids and coolants for various machining operations.
- Classify the lubricants.
- List all the properties of lubricants.

Understand the joining process of Welding.

- State the necessity of welding.
- Classify the welding processes.
- State the applications, advantages and limitations of welding.
- Explain the principle of arc welding.
- List the tools and equipment of arc welding.
- Name the proper electrodes for given metals.
- Explain the principle of gas welding.
- List the tools and equipment of oxy-acetylene welding.
- Explain different welding procedures in arc and gas welding.

- Define the terms soldering & brazing.
- Differentiate soldering from brazing.
- Explain the principles of soldering & brazing.
- Explain soldering / brazing techniques.
- List the gas cutting equipment.
- State the principle of flame cutting.
- State the relative advantages of flame cutting over other types of cutting.
- List the various defects in welds.
- List the reasons and remedies for the above.
- Explain non-destructive testing of welds.
- List various (special) modern welding techniques.
- State the principle of at least four modern welding techniques.
- Explain the principle of TIG and MIG welding.

Understand the concept of Milling, Gear making

- Explain the principle of working of a Milling machine.
- Classify the milling machines.
- Illustrate the constructional details of milling machine
- Explain the functions of each part of the milling machine.
- Explain the various milling operations.
- List the different milling cutters.
- Explain selection of tool and work holding devices.
- Explain the different indexing methods.
- Explain the specifications of milling machines.
- List the different methods of producing gears.
- Illustrate gear shaping
- Draw the gear hob and label its components
- Describe the working of the above m/c
- List the sequence of operations in generating gear by gear hobbing m/c.
- Explain the different methods of finishing.
- Specify the gear
- List the various gear materials.

Suggested Student Activities

1. Student inspects the available equipment in the lab/workshops to identify different machine tools .

2. visit nearby workshop/ industry identify machine tools, operations , safety precautions taken and prepare a report.

3.Quiz

4.Group discussion

5.Surprise test

6. Seminar

CO-PO Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	Mapping Pos
1	2	3			2				1		
2	2	3			2				1		
3	2	3			2				1		
4	2	3			2				1		
5	2	3			2				1		
6	2	3			2				1		

Course Outcome		CL	Linked PO
CO1	Illustrate the Working of a Lathe Machine and Classify Lathe machines to perform operations in engineering applications.	R/U/A	1,2,5,9
CO2	Describe the construction and Working of a Broaching machine	R/U/A	1,2,5,9
CO3	Identify Parts of Shaper, Slotter and Planer and Explain their working to and assess the requirement in various fields of engineering	R/U/A	1,2,5,9
CO4	State the Properties, composition of Cutting Fluids, Coolants & Lubricants to select depending on the application	R/U/A	1,2,5,9
CO5	Classify the welding processes and Explain soldering, brazing and Gas cutting and assess the requirement in various fields of engineering	R/U/A	1,2, 5,9
CO6	Classify and Identify Parts of a Milling machine, Methods of Gear making	R/U/A	1,2, 5,9

QUESTION PAPER BLUE PRINT FOR CIE (MID I)

Unit No	Unit Name	Questions to be set for CIE			**Remarks**
		R	U	A	
1	Lathe & Lathe Work	Q No 1 Q No 2	Q No 5(a) Q No 5(b)	Q No 7(a) Q No 7(b)	
2	Broaching Machine	Q No 3 Q No 4	Q No 6(a) Q No 6(b)	Q No 8(a) Q No 8(b)	

QUESTION PAPER BLUE PRINT FOR CIE (MID II)

Unit No	Unit Name	Questions to be set for CIE			**Remarks**
		R	U	A	
3	Shaper, Slotter, Planner	Q No 1 Q No 2	Q No 5(a) Q No 5(b)	Q No 7(a) Q No 7(b)	
4	Cutting Fluids, Coolants and Lubricants	Q No 3 Q No 4	Q No 6(a) Q No 6(b)	Q No 8(a) Q No 8(b)	

State Board of Technical Education, Telangana State
Model Paper
BASIC MANUFACTURING TECHNOLOGY **(C-18)**
Mid Sem-I (CIE)

Time : 1 Hour **Total Marks : 20 M**

PART – A Marks: 4 X 1M = 4Marks

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

1. List the various operations performed on a lathe machine.
2. List the parts of a lathe machine.
3. State the applications of broaching.
4. List various types of broaching machines.

PART – B **Marks : 2 X 3M= 6 Marks**

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

5(a) Differentiate between automatic and semiautomatic lathes.

or

5(b) Draw a line diagram of engine lathe and describe functions of main parts.

6(a) Explain the Mechanism of Broaching.

or

6(b) State advantages and limitations of broaching.

PART – C **Marks : 2 X 5M = 10 Marks**

NOTE :

*1) Answer any **Two** 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) List different methods of taper turning and explain taper turning by compound rest method.

or

7(b) Explain the procedure for thread cutting on a lathe machine with a new sketch

8(a) Draw a horizontal broaching machine and explain it.

or

8(b)Draw internal pull broach and show various elements on it. Briefly explain them.

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State Board of Technical Education, Telangana State
Model Paper
BASIC MANUFACTURING TECHNOLOGY **(C-18)**
Mid Sem-II (CIE)

Time : 1 Hour **Total Marks : 20**

PART – A Marks: 4 X 1M = 4 Marks

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

1. Write the specifications of a slotter.
2. List any four work holding devices in a planer.
3. List types of Lubricants.
4. List the applications of cutting fluids.

PART – B Marks : 2 X 3M= 6 Marks

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

5(a) State the main differences between a shaper and a planer

or

5(b)Explain the working principle of a slotter.

6(a)Mention any three purpose of Lubricants.

or

6(b) Write short notes on a) soluble oils b) Chemical compounds.

PART – C Marks : 2 X 5M= 10 Marks

*NOTE : 1)Answer any **Two** questions and each question carries **Five** marks*

7(a)Explain the different operations performed by a shaper

or

7(b)Draw the line diagram of a slotter and label its parts

8(a) Draw a neat sketch of standard double housing planer and explain its main parts.

or

8(b) Name four cutting fluids and state the situation in which each fluid must be used.

C18-M-304C

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

BASIC MANUFACTURING TECHNOLOGY

Time : 2 Hours [Total Marks: 40]

PART-A

08X01=08

Instructions : 1. Answer **ALL** questions.

2. Each question carries **ONE** mark.

1. What are the different types of Lathe?
2. How are shapers classified?
3. List out various attachments in milling machine.
4. What are the advantages of using cutting fluids.
5. List equipment needed for gas welding.
6. What is need of flux in soldering?
7. Name few important parts of milling machine.
8. List out various methods of gear manufacturing.

PART-B

04X03=12

Instructions : 1. Answer any **FOUR** questions.

2. Each question carries **THREE** marks.

9. (a)What is the need of a Copying Lathe

(or)

9. (b)Mention advantages of ultrasonic welding.

10. (a)List out the quick return mechanisms used in a Planer

(or)

10. (b)Mention three quick return mechanisms used in a slotter

11. (a)Sketch an oxyacetylene flame and identify the various zones.

(or)

11. (b)State the difference between soldering and brazing.

12. (a)What is indexing and state the principle of direct indexing.

(or)

12. (b)Write short notes on various gear finishing operations.

PART-C

04X5=20

Instructions : 1. Answer any **FOUR** questions.

2. Each question carries **FIVE** marks.

13. (a)Draw a line diagram of engine Lathe and describe functions of main parts.

(or)

13. (b)Differentiate between soldering and brazing.

14. (a)Explain the principle of whit-worth quick return mechanism of a shaper.

(or)

14. (b)Explain the methods of applications of cutting fluids.

15. (a)Explain the principle of arc welding with a neat sketch and list out different equipment's and accessories used in it.

(or)

15. (b)Explain the principle of atomic hydrogen welding with a neat sketch. State its advantages, limitations and applications.

16. (a)Draw a line diagram of vertical milling machine and mention function of each part.

(or)

16. (b)Explain the gear hobbing operation with the help of neat sketch and mention its advantages.

*****

ENGINEERING MATERIALS

Course Title : Engineering Materials	**Course Code : 18M305C**
Semester : III	**Course Group :Core**
Teaching Scheme in Periods (L:T:P:) : 36:24:0	**Credits : 3**
Methodology : Lectures + Tutorials	**Total contact periods: 60**
CIE : 60 marks	**SEE : 40 marks**

Prerequisites : Basic knowledge of Physics and Chemistry

COURSE OUTCOMES

	At the end of the course the students will have the ability to
1	Outline various mechanical properties of engineering materials and test them to know properties.
2	Acquire knowledge on structure of materials.
3	Elaborate the process of producing Iron and steel
4	Explain Iron-Carbon equilibrium diagram and interpret it.
5	Discuss and compare different heat treatment processes of steel.
6	Explain composition, application of important Ferrous and Nonferrous metals, their alloys and summarize the process followed in powder metallurgy.

COURSE CONTENT AND BLUE PRINT OF MARKS FOR SEE

<table>
<tr><th rowspan="2">Unit No</th><th rowspan="2">Unit Name</th><th rowspan="2">Periods</th><th colspan="4">Questions to be set for SEE</th><th rowspan="2">Remarks</th></tr>
<tr><th colspan="2">R</th><th>U</th><th>A</th></tr>
<tr><td>1</td><td>Mechanical properties and Testing of engineering materials</td><td>10</td><td rowspan="6">QNo 4</td><td rowspan="2">Q No 1</td><td rowspan="2">Q No 9(a)</td><td rowspan="2">Q No 13(a)</td><td></td></tr>
<tr><td>2</td><td>Structure of materials</td><td>10</td><td></td></tr>
<tr><td>3</td><td>Production of Iron and Steel</td><td>10</td><td rowspan="2">Q No 2</td><td rowspan="2">Q No 10 (a)</td><td rowspan="2">Q No 14 (a)</td><td></td></tr>
<tr><td>4</td><td>Iron -Carbon Equilibrium Diagram</td><td>10</td><td></td></tr>
<tr><td>5</td><td>Heat treatment of Steel</td><td>10</td><td rowspan="2">Q No 3</td><td>Q No 5 , Q No 6</td><td>Q No 9(b), Q No 11(a), Q No 11(b)</td><td>QNo 13(b), QNo 15(a), QNo 15(b)</td><td></td></tr>
<tr><td>6</td><td>Ferrous, Non FerrousMetals - their alloys and Powder Metallurgy</td><td>10</td><td>Q No 7 , Q No 8</td><td>Q No 10(b), Q No 12(a), Q No 12(b)</td><td>QNo 14(b), QNo 16(a), QNo 16(b)</td><td></td></tr>
</table>

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

COURSE CONTENT

Engineering materials

Unit – 1 **Duration: 10 Periods (L: 6.0 – T:4.0)**

Mechanical properties and testing of engineering materials

Engineering Materials – importance and applications, mechanical properties :Tensile strength, Compressive strength, Ductility, Malleability, Hardness, Toughness, Brittleness, Impact strength, Fatigue, Creep.

Testing of Engineering materials: **Destructive tests** - Tensile, Compressive and shear strengths , stress- strain curve for different materials – Brinell, Rockwell and Vicker's hardness test –Izod & Charpy impact test. **Non-destructive testing** – purpose – Different methods (without explanation)

Unit – 2 **Duration: 10 Periods (L: 6.0 – T:4.0)**

Structure of materials

Space lattices, Unit cells – BCC, FCC,HCP structures. **Crystallization of metal**: dendrite growth, grain boundary, grain size and its effect on properties–factors affecting grain size - Re crystallisation

Unit – 3 **Duration: 10 Periods (L:6.0 – T:4.0)**

Production of Iron and Steel

Raw materials used in production of Iron and steel – **Production of :** Pig Iron by Blast Furnace, Wrought Iron by Puddling furnace, Cast Iron from Cupola, Steel by Bessemer Process, L.D. Process, Open Hearth Process, Electric Arc process, Electrical Induction process

Unit – 4 **Duration: 10 Periods (L: 6.0 – T:4.0)**

Iron-Carbon Equilibrium Diagram

Phase, equilibrium, Gibbs phase rule, alloy, solid solution: Interstitial, substitutional, chemical compound, mechanical mixture – Cooling curves of pure metals – Allotorpic forms of pure iron and critical points – Micro constituents of Iron & Carbon alloy – Iron Carbon equilibrium diagram.

Unit – 5 **Duration: 10 Periods (L: 6.0 – T:4.0)**

Heat Treatment of Steel.

Stages in heat treatment – critical rate of cooling – martensite, bainite, sorbite and troostite- Isothermal transformation (TTT curves) - Austenite decomposition on continuous cooling transformation (CCT) diagram

Heat treatment processes: Annealing – Full Annealing, Sub critical annealing, spheroidise annealing and isothermal annealing .Normalising, Hardening, Tempering – Austempering and Martempering , Surface hardening and Case hardening (only definition).

Unit – 6 **Duration: 10 Periods (L: 6.0 – T:4.0)**

Ferrous, Non Ferrous Metals - their alloys and Powder Metallurgy

Ferrous Metals and alloys–cast iron and types – composition, properties and applications of white cast iron, gray cast iron, nodular iron and malleable Iron – Plain carbon steels – effect of carbon on properties. classification of plain carbon steels – **Alloy steels** : Effect of adding alloying elements chromium, cobalt, manganese, molybdenum, nickel, tungsten, vanadium – composition, properties and application of chromium steel, nickel steel, manganese steel , stainless steel and HSS steel.

Non Ferrous metals and alloys - composition, properties and application of duralumin, dow metal, **Brass** : catridge brass, admiralty brass, muntz metal, and naval brass. **Bronze:** gun and bell metal **Nickel:** constantan, monel, nichrome and invar. Babbit

Powder metallurgy: Definition and applications – Manufacturing process in powder metallurgy, methods to produce metal powders – methods to compact powders (without explanation) – Pre sintering and sintering (definition) – Advantages and limitations of powder metallurgy

REFERENCE BOOKS

1. Introduction to Physical metallurgy by Avner
2. Physical metallurgy by V. Raghavan
3. Material science and engineering by V. Raghavan
4. Material science and metallurgy by Dr. O.P.KHANNA
5. Powder Metallurgy by TTTI,ECH

SUGGESTED LEARNING OUTCOMES

Mechanical properties and testing of engineering materials

- Discuss the importance of materials in industry
- Explain different mechanical properties like Tensile strength, Compressive strength, Ductility, Malleability, Hardness, Toughness, Brittleness, Impact strength, Fatigue, Creep.
- Demonstrate tensile, compressive and shear strength tests.
- Draw stress – strain curves for different materials and interpret them
- Compare Brinell, Rock Well and Vicker's hardness test.
- Conduct Izod and charpy impact tests.
- List different Non-destructive tests used in industry and state their applications.

Structure of materials

- Define the terms Space lattices, Unit cells
- Draw the structure, calculate effective number of atoms of BCC, FCC and HCP structures .
- Explain the process of crystallisation of metals and discuss the process of grain formation, dendritic growth and grain boundaries
- Explain factors effecting grain size.
- Explain the process of recrystallisation

Production of Iron and Steel

- Name the raw materials used in production of Iron and steel
- Explain the production of Pig Iron by Blast Furnace
- Describe the production of Wrought Iron by Puddling furnace
- Discuss the production of Cast Iron from Cupola
- Describe the production of steel by Bessemer Process, L.D. Process, Open Hearth Process, Electric Arc process, Electrical Induction process

Iron-Carbon Equilibrium Diagram

- State Gibbs phase rule and define the terms involved. - alloy, solid solution: Interstitial, substitutional, chemical compound, mechanical mixture.
- Sketch Cooling curves of pure metals
- Discuss allotorpic forms of pure iron and identify the critical points
- Explain the following microconstituents of Iron & Carbon alloy: ferrite, austinite, cementite, leduburite, pearlite, steel, eutectoid steel, hypo eutectoid steel, hyper eutectoid steel and cast iron.
- Sketch Iron Carbon equilibrium diagram and explain salient points.

Heat Treatment of Steel.

- List the stages in heat treatment
- Define critical rate of cooling, martensite, bainite, sorbite and troostite
- Draw TTT curves (isothermal transformations) and interpret it.
- Sketch austenite decomposition on continuous cooling transformation (CCT) diagram .
- Explain Annealing heat treatment process
- Summarize and compare full Annealing, Sub critical annealing, spheroidise annealing and isothermal annealing
- Differentiate Normalising and Hardening
- Explain Tempering along with Austempering and Martempering
- Define Surface hardening and Case hardening

Ferrous, Non ferrous metals - their alloys and Powder metallurgy

- Discuss the effect of carbon on cast iron
- Compare the composition and applications of white cast iron, gray cast iron, nodular iron and malleable Iron
- Classify the plain carbon steels
- Describe the effect of adding alloying elements chromium, cobalt, manganese, molybdenum, nickel, tungsten, vanadium to steel
- Define ternary, quarternary and complex alloy steel
- Explain the composition, properties and application of chromium steel, HSS steel, nickel steel, manganese steel and stainless steel.
- List composition, properties and application of duralumin, dow metal
- Give composition, properties and application of brass, cartridge brass, admiralty brass, muntz metal, and naval brass.
- Explain the importance of Bronze**,** gun and bell metal
- Discuss the composition and application of **Nickel alloys:** constantan, monel, nichrome and invar.
- Write composition and application of babbit.
- Define Powder metallurgy
- Describe the manufacturing process in powder metallurgy.
- Write the processes to produce metal powders.
- List the methods to compact powders
- Define Pre sintering and sintering.
- Write advantages and limitations of powder metallurgy

SUGGESTED E-RESOURCES / STUDENT ACTIVITIES

1. Make a list of commonly used materials in daily life like blade, knife, scissors etc and write the material used.
2. Study microstructure of given specimen.
3. Study micro structure of given specimen after it is welded and notice the difference.
4. Visit to a steel plant
5. Compare hardness of commonly available materials and interpret.
6. Make a list of major parts of a two wheeler and know the material used.

7. Visit a heat treatment plant.
8. Crystal lattice and unit cell
   https://www.youtube.com/watch?v=BjVTdZ_htu8
9. BCC, FCC and HCP crystal structure
   https://www.youtube.com/watch?v=tq7botEnakA
10. Production of pig iron by blast furnace
    https://www.youtube.com/watch?v=D3ejDgChEhw
11. Production of Wrought Iron by Puddling furnace
    https://www.youtube.com/watch?v=XJ0GyofGchI
12. Production of Cast Iron from Cupola
    https://www.youtube.com/watch?v=Cgbpbw5GRK4
13. Production of Steel by Bessemer Process
    https://www.youtube.com/watch?v=uh_RAMqRgrk
14. Production of Steel by Open Hearth Process
    https://www.youtube.com/watch?v=LxH-B1efDnI
15. Production of Steel by electric arc furnace
    https://www.youtube.com/watch?v=7oSbZgjXlFo
16. Production of Steel by electrical induction process
    https://www.youtube.com/watch?v=5TLBdBXzMsg

CO-PO Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	Mapping Pos
18M305C.1	2	3	-	-	-	-	-	-	-	-	1, 2
18M305C.2	3	2	-	-	-	-	-	-	-	-	1, 2
18M305C.3	3	3	-	2	-	-	-	1	-	-	1, 2, 4, 8
18M305C.4	2	-	-	2	-	-	-	1	-	-	1, 4, 8
18M305C.5	-	3	-	-	-	-	-	1	-	-	2, 8
18M305C.6	2	2	-	-	-	-	-	-	-	-	1,2

QUESTION PAPER BLUE PRINT FOR CIE (MID SEM I)

Unit No	Unit Name	Questions to be set for CIE			**Remarks**
		R	U	A	
1	Mechanical properties and Testing of engineering materials	Q No 1 Q No 2	Q No 5(a) Q No 5(b)	Q No 7(a) Q No 7(b)	
2	Structure of materials	Q No 3 Q No 4	Q No 6(a) Q No 6(b)	Q No 8(a) Q No 8(b)	

QUESTION PAPER BLUE PRINT FOR CIE (MID SEM II)

Unit No	Unit Name	Questions to be set for CIE			**Remarks**
		R	U	A	
3	Production of Iron and Steel	Q No 1 Q No 2	Q No 5(a) Q No 5(b)	Q No 7(a) Q No 7(b)	
4	Iron -Carbon Equilibrium Diagram	Q No 3 Q No 4	Q No 6(a) Q No 6(b)	Q No 8(a) Q No 8(b)	

C-18M305C

BOARD DIPLOMA EXAMINATION

DME III SEMESTER

ENGINEERING MATERIALS

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 the term strength?
2. What is percentage of carbon in steel?.
3. Why is heat treatment essential for engineering materials.
4. Mention any two ductile materials?
5. Define critical rate of cooling.
6. What do you mean by normalising of steel,
7. Give an example of ternary alloy.
8. Give composition of gun metal.

PART – B

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

4x 3 M = 12M

9(a) Explain the difference between: Toughness and Brittleness

OR

9(b) What do you mean by martensite and troostite.

10(a) What is the necessity of using coke and lime stone in production of iron and steel

OR

10(b) Discuss the effect of adding chromium, molybdenum and nickel as alloying elements in steels

11(a) Explain the term surface hardening.

OR

11(b) Explain the term case hardening

12(a) Classify plain carbon steels

OR

12(b) What is the effect of adding manganese to steel.

PART – C

*Answer **all** questions . Each question carries **five** marks* **4 x 5 M = 20 M**

13 (a) Explain the process of grain formation and dendritic growth

OR

13 (b) Explain TTT curves

14 (a) Explain production of pig iron by blast furnace.

OR

14 (b) Define powder metallurgy and explain its manufacturing process.

15 (a) Explain continuous cooling transformation curves.

OR

15 (b) Explain annealing heat treatment process

16 (a) Write composition and properties of brass, cartridge brass and admiralty brass

OR

16 (b) Write composition and properties of bronze, gun and bell metal.

C-18M305C

MID SEM I EXAMINATION
DME III SEMESTER
ENGINEERING MATERIALS

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. What is brittle material. Give one example.
2. Define fatigue.
3. Define a space lattice.
4. Draw the shape of dendrite.

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) List various hardness tests .

OR

5 (b) List different non destructive tests used to test materials.

6 (a) List different non destructive tests used to test materials.

OR

6 (b) Calculate effective number of atoms in FCC structure

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) Draw stress strain curve of a ductile material and show salient points.

OR

7(b) Explain Izod testing of materials.

8 (a) Explain factors effecting grain size.

OR

8 (b) Explain the process of recrystallisation

C-18M305C

MID SEM II EXAMINATION
DME III SEMESTER
ENGINEERING MATERIALS

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. What is function of lime stone in production of iron and steel?
2. What is the process of acid steel making?
3. Write Gibbs phase rule?
4. What is a solid solution?

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) Briefly explain open hearth process of production of steel .

OR

5 (b) Briefly explain electrical induction process of production of steel.

6 (a) Define interstitial solid solution and substitutional solid solution.

OR

6 (b) Define cementite and pearlite.

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) Explain production of cast iron from cupola.

OR

7(b) Explain production of wrought iron by puddling furnace.

8 (a) Sketch cooling curves of pure metals.

OR

8(b) Sketch Iron carbon equilibrium diagram.

18M306P, MACHINE DRAWING

Course title:	**MACHINE DRAWING**	Course Code:	**18M306P**
Semester:	**III**	Course group:	**Practical**
Teaching scheme in periods (L:T:P):	**15:0:30**	Credits:	**1.5**
Methodology:	**Lecturer + Practice**	Total contact periods :	**45**
CIE:	**60 Marks**	SEE:	**40 Marks**

Pre requisites

This course requires the knowledge of Engineering Drawing

COURSE OUTCOMES

	At the end of the course the students will be able to :
CO1	Understand the difference between engineering and machine drawing.
CO2	Draw the screwed fasteners, welded joints, piping layout and riveted joints as per IS standards.
CO3	Study the part drawings and to draw the assembly drawing

Course Content and Blue Print of Marks for SEE

UNIT NO	UNIT NAME	PERIODS	QUESTION FOR SEE			REMARKS
			R	U	A	
1	INTRODUCTION, FASTENING DEVICES	10		1,2		
2	PIPING LAYOUTS AND JOINTS, WELDING FABRICTION DRAWING SYMBOLS	05		3,4		
3	ASSEMBLY-I Assembly drawings of cotter joint, Gib and Cotter joint, Knuckle Joint, Muff coupling, universal coupling, Flange couplings, Screw Jack, Stuffing Box	15			1	
4	ASSEMBLY –II Assembly Drawings of Bearings (Foot step Bearing, Plummer block), cross Head, connecting rod, Eccentric, lathe tail stock	15			1	
	TOTAL	45		4	2	

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

COURSE CONTENT

1.0 Introduction

Importance of Machine Drawing - Brief revision of 1st and 3rd angle projections - Understand the concepts of Orthographic projections and Sectional views.

Fastening Devices

Temporary and Permanent fastenings and their areas of application-thread nomenclature, forms of screw thread profiles, metric, B.A., Acme, Knuckle, etc.

Bolts and Nuts: Specification of bolts and nuts, Different types of bolted joints (like using through bolts, studs, screws etc.,) in different applications. Purpose of lock nuts and their Types - Keys and cotters: Types of keys and cotters: Difference between key and cotter uses.

Rivets and Riveted joints: Types and proportions and specification of rivets: Different types of riveted joints: Lap, butt-single row, double row etc., chain and zigzag riveting – calculation of diameter of rivet: Pitch and arrangement of rivets in row – use – of standard proportions.

Exercises:1

1. Thread Nomenclature and forms of screw thread profiles.
2. Exercises in drawing – bolted connections using standard proportions.
3. Drawing of various types of lock nuts & types of keys indicating their proportionate dimensions.
4. Exercise in drawing riveted joints using standard proportions: Single row, double row (chain and zigzag) in lap and butt joints (single & double strap).

2.0 Piping layouts

Classification of pipes and tubes- Components of pipes lay-out.-Screw fitting bend, elbow, tee, lateral Cross-nipple, reducing socket and plug - Unions: Screwed ground and flanged - Valves: Gate valve: angle valve, check valve - Various conventional symbol used for the above components.

Exercise: 2

1. Single line diagram of pipe layout one exercises.
2. Double line diagram of pipe layout one exercise.

Welded fabrication drawings

Different types of weld and their basic symbols including sectional representation as per table of I.S. standards, fillet, square butt, single V-Butt, double V-Butt, single bevel butt, double bevel butt, stud, bead (edge or seal) spot, seam. - Elements of welding symbol and their standard location the symbol as per IS standards reference code arrow head, weld symbol supplementary symbol dimensions of welds, method of welding process, special reference - Significance of arrow & position of arrow head significance of reference line as per I.S. standards with reference to fillet, V-Butt an stud welds.- Supplementary symbols and special instructions: surface of reference line; as per I.S. standards with

reference to fillet, V-Butt an stud welds.- Dimensions of welds: length, location and spacing of welds as per I.S., B.I.S., standards with showing dimensions required on a welding - Need of special reference

Exercise: 3

1. Drawing tables and figs. Referred in the contents above taking form I.S. standards.
2. Dimensioning a given welding drawings as per I.S., SP-46-1988.
3. Preparing working drawing of welding fabrication from given data.

3.0 Assembly Drawings-I

Need and functions of assembly and detailed drawings - Steps in preparing assembly drawings -. - Exercises in preparing assembly drawings of commonly available engineering components.

Exercise: 4

Draw the views / sectional views of

1. Cotter joint
2. Jib and cotter joint assembly
3. Knuckle joint assembly
4. Assembly of muffs coupling (solid & split) coupling, Flange couplings
5. Screw jack assembly,
6. Stuffing box.

4.0 Assembly Drawings-II

With the knowledge gained by the above exercises the students shall be able to draw exercises on Bearings, Socket and spigot joint, protective type flanged coupling, piston of petrol engine, cross head, connecting rod, eccentric, flexible coupling, , sleeve and cotter joint, , lathe tool post, big end of a connecting rod, foot step bearing, Plummer block, lathe tail stock.

REFERENCE BOOKS

1. T.S.M & S.S.M in respect of Technical Drawing by TTTI, Madras
2. Machine Drawing by A.C. Parkinson.
3. Machine Drawing by Jones & Jones.
4. Machine Drawing by N.D. Bhatt.

MID SEM-1 EXAM

S.No.	**UNIT NAME**	**R**	**U**	A	**REMARKS**
1	UNIT-I			1,2,3	Answer any four questions
2	UNIT-2			4,5,6	

MID SEM-II

S.NO.	**UNIT NAME**	**R**	**U**	**A**	**REMARKS**
1	UNIT-3			1,2	Answer any one

MID –I MODEL PAPER

18M306 P MACHINE DRAWING

TIME: 2 HOUR **Max.Marks:20**

Instructions: Answer any four questions .Each question carries Five Marks

4 x 5=20

1. Draw the SQURE Thread Profiles with proportions.
2. Draw the views of a Square headed bolt.
3. Draw a double riveted chain lap joint connecting two plates of 6mm Thick.
4. Draw the symbols of the following welded joints.

   (a) concave fillet Weld (b) single v-butt weld (c) Spot weld

   (d) Seam Weld (e) Square Butt Weld

5. Draw the following piping joint symbols(single line)

   (a) Tee (b)Plug(c) Gate valve(d)Lateral(e)Union

6. Draw a Hexagonal headed bolt with nut and washer of 20 mm dia

MID –II MODEL PAPER

18M306 P MACHINE DRAWING

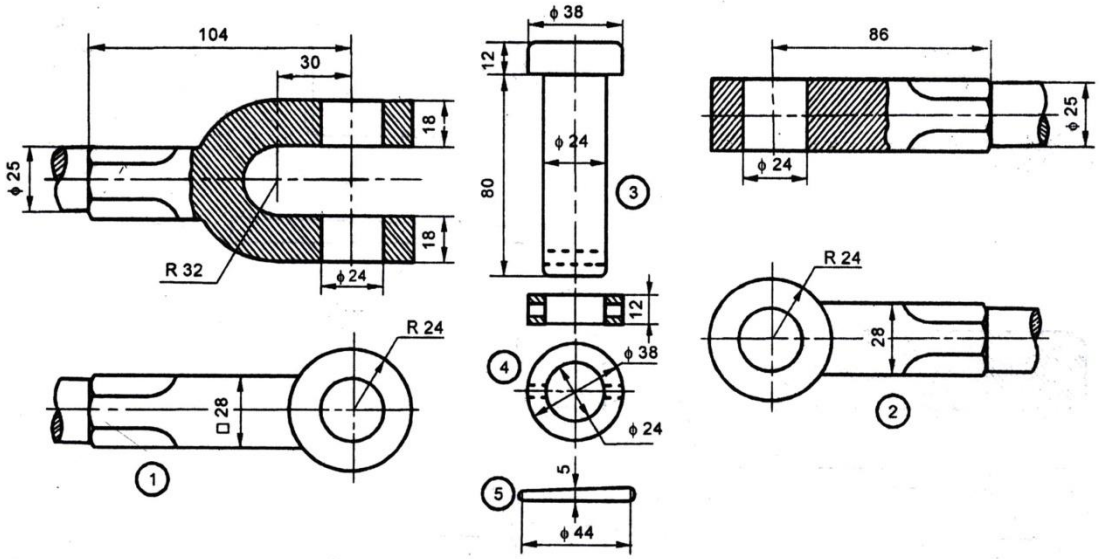
TIME: 2 HOUR **Max.Marks:20**

Instructions: Answer any ONE questions .Each question carries TWENTY Marks

1. Assemble all the parts of the KNUCKLE JOINT and Draw the

   (a) Sectional Front View 12

   (b) Top View 08



Parts list

No.	Name	Matl	Qty
1	Fork end	F S	1
2	Eye end	F S	1
3	Pin	M S	1
4	Collar	M S	1
5	Taper pin	M S	1

KNUCKLE JOINT

2. Draw the sectional front view of the gib and cotter joint as given part drawing

State Board of Technical Education and Training, Telangana

Semester End Examination Model Question paper

DME III Semester MACHINE DRAWING Examination

Corse Code:18M306P

Course Name: MACHINE DRAWING

Max.Marks:40 **Duration:3 hours**

PART-A **3 X 4 = 12 MARKS**

INSTRUCTIONS: (1) Answer ALL Questions
(2) Each question carri es FIVE Marks.
(3) Answer should be neat & clear with all the necessary Dimensions.
(4) All Dimensions are in mm. Choose suitable Scale.

1. Draw the following Thread Profiles with proportions.
   (a) BUTTRESS (b) WHITH WORTH

2. Draw the views of a Square headed bolt.

3. Draw a double riveted chain lap joint connecting two plates of 6mm Thick.

4.Draw the symbols of the following welded joints.

   (a) concave fillet Weld (b) single v-butt weld (c) Spot weld

   (d) Seam Weld (e) Square Butt Weld

PART –B **28 marks**

INSTRUCTIONS: (1) Answer any ONE question.

(2) Each question carries twenty-eight Marks.

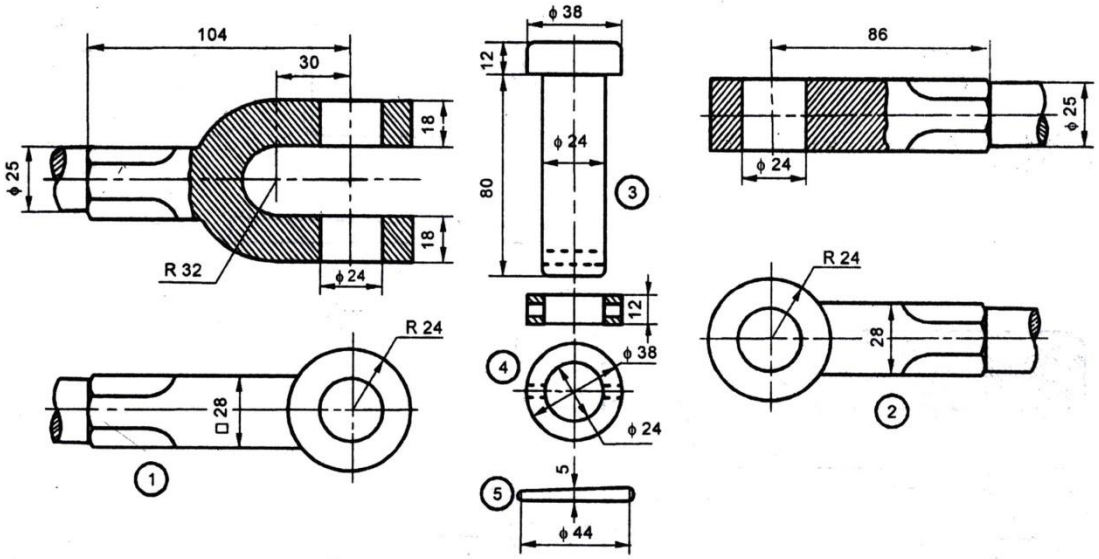
(3) All Dimensions are in mm and assume missing

Dimensions if any and choose suitable scale.

5. Assemble all the parts of the KNUCKLE JOINT and Draw the

   (a) Sectional Front View 18

   (b) Top View 10



Parts list

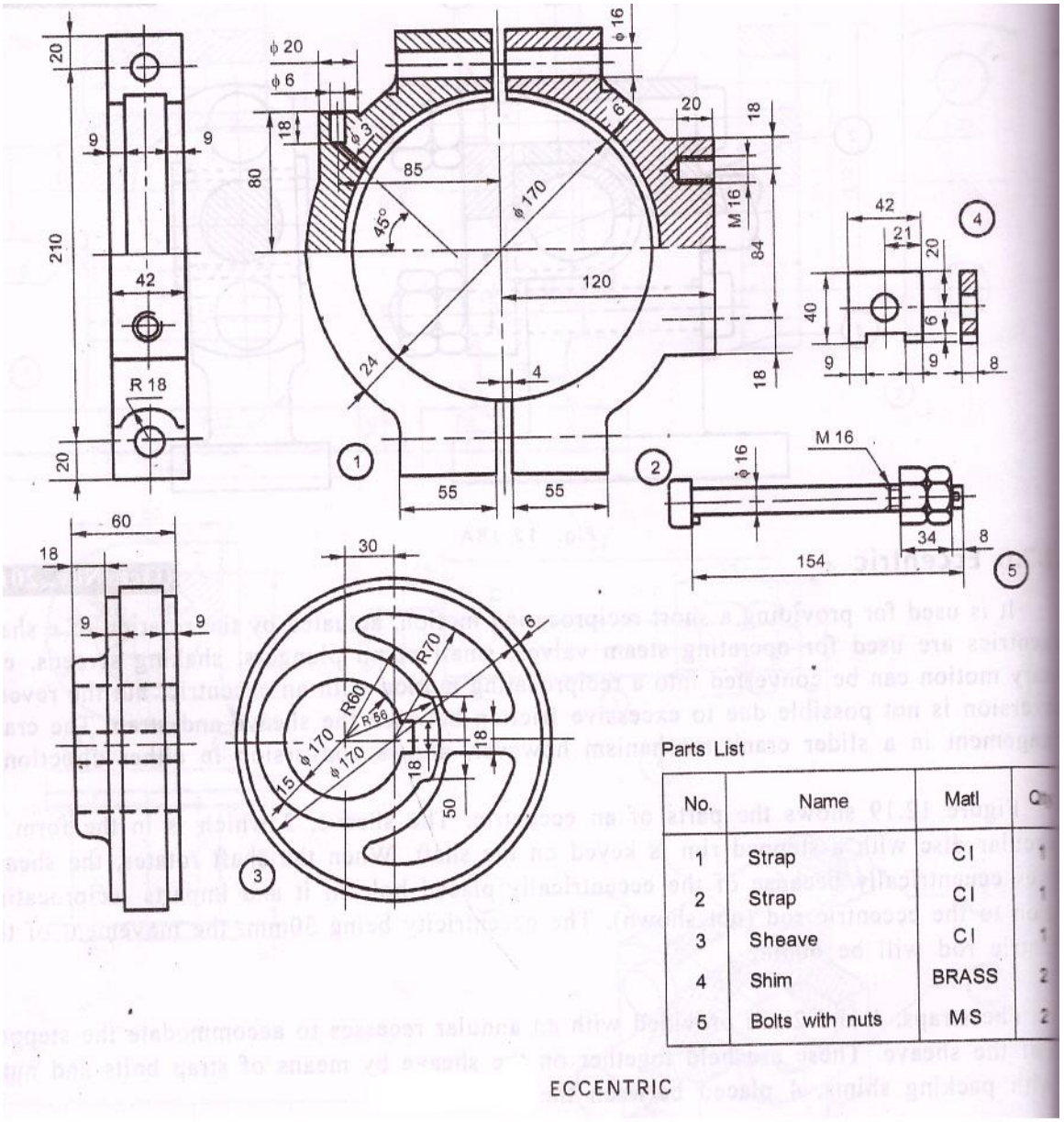
No.	Name	Matl	Qty
1	Fork end	F S	1
2	Eye end	F S	1
3	Pin	M S	1
4	Collar	M S	1
5	Taper pin	M S	1

KNUCKLE JOINT

6. Assemble all the parts of the ECCENTRIC and draw the

(a) Half Sectional Front View 18

(b) Right side View 10



Parts List

No.	Name	Matl	Qty
1	Strap	CI	1
2	Strap	CI	1
3	Sheave	CI	1
4	Shim	BRASS	2
5	Bolts with nuts	MS	2

ECCENTRIC

BASIC MANUFACTURING & FABRICATION ENGINEERING LAB

Course Title :	**BASIC MFE LAB**	Course Code	**18M307P**
Semester	**III**	Course Group	**:Practical**
Teaching Scheme in Periods(L:T:P)	**15:00:30**	Credits	: **1.5**
Methodology	**Lecture + Practical**	Total Contact Hours :	**:45Pds**
CIE	**60 Marks**	SEE	**40 Marks**

Pre requisites

This course requires the knowledge in basic manufacturing technology

Course Outcome	
CO1	Leaning the operation and safety precautions of lathe and performing certain lathe operations
CO2	Basic knowledge in operating welding equipment and performing some welding operations.
CO3	Basic knowledge in sand preparation for moulds and making the moulds ready for casting operation.
CO4	Safety precautions in operating the workshop equipment.

Course Content and Blue Print of Marks for SEE

Unit No	**Unit name**	**Periods**	**Marks for SEE**			**Marks weightage**	**%Weightage**
			Handling	**Manipulation**	**Precision**		
1.	**Hands on practice on Lathe**	15	10	15	15	40	100
2.	**Hands on practice in welding**	15	10	15	15	40	100
3.	**Hands on practice in foundry processes**	15	10	15	15	40	100
	Total	45					

COURSE CONTENT

1 Foundry

Moulding and casting of

1.1 Solid bearing

1.2 Flange coupling

1.3 Split bearing

1.4 Connecting rod

1.5 V – Pulley

1.6 Gear pulley

2 Machine Shop (Turning)

2.1 Plain Turning

2.2 Step Turning

2.3 Taper Turning

2.4 Turning Collars

2.5 Knurling

2.6 Facing

3. Welding

3.1 Layout of Beads

3.2 Butt joints.

3.3 Lap joints.

Course outcomes

Course Outcome		Linked PO
CO1	Leaning the operation and safety precautions of lathe and performing certain lathe operations	1,2,3,4,5,6,9,10
CO2	Basic knowledge in operating welding equipment and performing some welding operations.	1,2,3,4,5,6,9,10
CO3	Basic knowledge in sand preparation for moulds and making the moulds ready for casting operation.	1,2,3,4,5,6,9,10
CO4	Safety precautions in operating the workshop equipment.	1,2,3,4,5,6,9,10

LEARNING OUTCOMES

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

- Practice the casting principles and operations in foundry
- Write the sand moulding procedures in foundry.
- Prepare a mould sand mix.
- Identify various tools used in foundry shop.
- Prepare mould in two boxes, three boxes.

- Prepare a mould ready for casting with proper provision for runners, risers and gates
- Place the cope over the drag without any mismatch
- Prepare the molten metal and calculate the amount of metal to be poured in the mould
- Core making and uses

- Practice the operation of Lathe
- Perform a plain turning operation on a lathe machine.
- Select proper tool to perform the job.
- Centre the job by dial gauge
- Select the suitable speed for different operations
- Use various measuring instruments for taking dimensions.
- Perform step turning operation on lathe.
- Calculate the taper angle.
- Practice different taper turning methods on lathe
- Turn the required tapers by swivelling the compound rest.
- Produce articles of industrial application such as ring gauges, plug gauges, handle etc.
- Tapper turning – Hands on experience in swivelling the compound rest method

- Practice the joining of metals in Arc Welding, Gas welding, brazing
- Prepare the edges for welding
- Select the suitable electrode, voltage and current
- Handle the Electrode Holder for laying welding beads.
- Operate the welding transformer and generator.
- Perform various weld joint operations.

KEY competencies to be achieved by the student.

Title of the experiment	Key competency
Moulding and Casting of solid bearing	– Select the suitable sand and mix it for the mould – Cut gates and runners – Pour sufficient quantity of molten metal
Moulding and Casting of flange coupling	– Prepare and place the core – Cut the gates and runners – Pour the sufficient quantity of molten metal
Moulding and Casting of split bearing	– Prepare and place the core – Cut the gates and runners – Pour the sufficient quantity of molten metal
Plain turning	- Check the centering of the work piece using dial gauge

	- Fix the cutting tool at proper inclination - Select the suitable speed, feed and depth of cut for rough and finishing operations - Check the dimensions
Step turning	• Check the centering of the work piece using dial gauge • Fix the cutting tool at proper inclination • Select the suitable speed, feed and depth of cut for rough and finishing operations • Check the dimensions
Taper turning	• Just an introduction of 4 methods. Student is expected to show how they work on machine. • Hands on exposure to swiveling compound rest method

Title of the experiment	**Key competency**
Collar turning	• Check the centring of the work piece using dial gauge • Fix the cutting tool at proper inclination to turn the work piece • Select the suitable speed, feed and depth of cut for rough and finishing operations • Check the dimensions
Knurling	• Check the centring of the work piece using dial gauge • Fix the cutting tool at proper inclination to turn the work piece • Select the suitable speed, feed and depth of cut for rough and finishing operations • Check the dimensions • Fix the knurling tool and selecting the suitable speed and feed
Welding Layout of beads	• Perform Edge preparation • Hold the electrode at suitable angle and distance with respect to the work piece to maintain the arc • Check the bead
Lap joint	• Perform Edge preparation • Hold the electrode at suitable angle and distance with respect to the work piece to maintain the arc • Check the bead
Butt joint	• Perform Edge preparation • Hold the electrode at suitable angle and distance with respect to the work piece to maintain the arc • Check the bead

State Board of Technical Education, Telangana State
Model Paper
18M307P-ADVANCED MANUFACTURING & FABRICATION ENGINEERING LAB
Mid Sem-I (CEE)

Time : 1 Hour **Total Marks : 20 M**

Note: Answer any one question.

1. Prepare the plain turning as per the given figure.
2. Prepare the step turning as per the given figure.
3. Prepare the taper turning as per the given figure.
4. Prepare Lap joint as per the given figure.
5. Prepare Butt joint as per the given figure.
6. Prepare mould for given pattern solid bearing
7. Prepare mould for given pattern flange coupling
8. Prepare mould for given pattern split bearing
9. Prepare a core for making hallow section.

State Board of Technical Education, Telangana State
Model Paper
18M307P-ADVANCED MANUFACTURING & FABRICATION ENGINEERING LAB
Mid Sem-II (CEE)

Time : 2 Hours **Total Marks : 20 M**

Note: Answer any one question.

1. Prepare the plain turning as per the given figure.
2. Prepare the step turning as per the given figure.
3. Prepare the taper turning as per the given figure.
4. Prepare Lap joint as per the given figure.
5. Prepare Butt joint as per the given figure.
6. Prepare mould for given pattern solid bearing
7. Prepare mould for given pattern flange coupling
8. Prepare mould for given pattern split bearing
9. Prepare a core for making hallow section.

State Board of Technical Education, Telangana State
Model Paper
18M307P-ADVANCED MANUFACTURING & FABRICATION ENGINEERING LAB
(SEE)

Time : 3 Hours **Total Marks : 40 M**

Note: Answer any one question.

1. Prepare the plain turning as per the given figure.
2. Prepare the step turning as per the given figure.
3. Prepare the taper turning as per the given figure.
4. Prepare Lap joint as per the given figure.
5. Prepare Butt joint as per the given figure.
6. Prepare mould for given pattern solid bearing
7. Prepare mould for given pattern flange coupling
8. Prepare mould for given pattern split bearing
9. Prepare a core for making hallow section.

FUELS LAB

Course Title :	**FUELS LAB**	Course Code	**18M308P**
Semester	**III**	Course Group	**: Practical**
Teaching Scheme in Periods(L:T:P)	**15:00:30**	Credits	: **1.5**
Methodology	**Lecture + Practical**	Total Contact Hours :	**:45Pds**
CIE	**60 Marks**	SEE	**40 Marks**

Pre requisites

This course requires the basic knowledge of Thermodynamics

Course out comes

At the end of course student should be able to

1. Determine flash and fire points of various fuels and lubricants using Abel's, Pensky Martin's, and Cleveland's apparatus.
2. Determine Kinematics and Absolute viscosities of the fuel and lubricating Oils using Redwood & Saybolt viscometers.
3. Determine Calorific values of Solid and liquid fuels using Bomb calorimeter. and Determination of Calorific value of gaseous fuel by using Junker's calorimeter.
4 Determine Carbon residue using Conradson's apparatus.
5. Calibrate a pressure gauge using dead weight pressure gauge tester

Course Content and Blue Print of Marks for SEE

Unit No	Unit name	Periods	Marks for SEE			Marks weightage	%Weightage
			Handling	Manipulation	Precision		
1.	**Flash and Fire point test using Cleveland Apparatus(open cup)**	**3**	**10**	**10**	**20**	**40**	**100**
2.	**Flash and Fire point test using Pensky MartinsApparatus(Closed cup)**	**3**	**10**	**10**	**20**	**40**	**100**
3.	**Flash and Fire point test using AblesApparatus(Closed cup))**	**3**	**10**	**10**	**20**	**40**	**100**
4.	**Viscosity Measurement**	**12**	**15**	**15**	**10**	**40**	**100**

5.	**Calorific value test using Bomb Calorimeter**	**6**	**15**	**15**	**10**	**40**	**100**
6.	**Calorific value test using Junkers Gas Calorimeter**	**6**	**15**	**15**	**10**	**40**	**100**
7.	**Carbon Residue Test**	**6**	**15**	**15**	**10**	**40**	**100**
8.	**Calibration of Pressure Gauge**	**6**	**10**	**10**	**20**	**40**	**100**
	Total	**45**					

Course content:

1.Flash and Fire point test using Cleveland Apparatus(open cup)

2.Flash and Fire point test using Pensky MartinsApparatus(Closed cup)

3.Flash and Fire point test using AblesApparatus(Closed cup))

4.Viscosity Measurement

5.Calorific value test using Bomb Calorimeter

6.Calorific value test using Junkers Gas Calorimeter

7.Carbon Residue Test

8.Calibration of Pressure Gauge

CO-PO MATRIX

Course Outcome		**Linked PO**	**Teaching Hours**
CO1	Measure the Flash and Fire points of different fuels.	1,2,3,4,5,9,10	09
CO2	Evaluate the Kinematic and Absolute viscosities of the fuel and lubricating oils.	1,2,3,4,5,9,10	12
CO3	Determine the Calorific values of solid and liquid fuelsand gaseous fuels.	1,2,3,4,5,9,10	12
CO4	Estimate the percentage carbon residue.	1,2,3,4,5,9,10	06
CO5	Measure the gauge pressure and % error.	1,2,3,4,5,9,10	06

State Board of Technical Education and Training,Telangana

MID-I AND MID-II Examination Model Question paper

Corse Code:18M308P **Duration:2 hours**

Course Name: FUELS 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 Flash and Fire point using Cleveland apparatus.

2. Determine the Flash and Fire point using Abels apparatus

3. Determine the Flash and Fire point using Pensky apparatus

4.Determine the viscosity of a given sample oils.

5. Determine the calorific value of solid fuels using Bomb Calorimeter.

6. Determine the calorific value of Gaseous fuels using Junkers gas Calorimeter.

7.Determine the percentage of carbon residue using conradsons apparatus.

8.Calibrate the given pressure gauge and determine gauge pressure.

State Board of Technical Education and Training,Telangana

Semester End Examination Model Question paper

DME III semester practical Examination

Corse Code:18M308P **Duration:3 hours**

Course Name: FUELS 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.Determine the Flash and Fire point using Cleveland apparatus.

2. Determine the Flash and Fire point using Abels apparatus

3. Determine the Flash and Fire point using Pensky apparatus

4.Determine the viscosity of a given sample oils.

5. Determine the calorific value of solid fuels using Bomb Calorimeter.

6. Determine the calorific value of Gaseous fuels using Junkers gas Calorimeter.

7.Determine the percentage of carbon residue using conradsons apparatus.

8.Calibrate the given pressure gauge and determine gauge pressure.

SOLID MODELING LAB

Course Title :	**SOLID MODELING LAB**	Course Code	**18M309P**
Semester	**III**	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 manufacturing process and Auto CAD

COURSE OUTCOMES

At the end of the course the students will have the ability :	
CO 1	**List the commands of 3D**
CO2	**Create three-dimensional entities using different methods**
CO3	**Practice on Primitives with 3d Basics**
CO4	Apply edit tools on Primitives
CO5	**Apply the selection of material from library**
CO6	**Create the part drawing with a given geometry using Solid Modeling software**

COURSE CONTENT

Viewing entities in three dimensions

- setting a new viewing direction
- dynamically setting a view direction

Creation of three-dimensional entities using different methods

- Drawing of two dimensional entities in three dimensional space
- Converting two dimensional planar entities into three dimensional entities by applying elevation and thickness
- Converting two dimensional planar entities into three dimensional entities by revolving or extruding.

Creation of three-dimensional faces, rectangular meshes, ruled surface meshes, extruded surface meshes, revolved surface meshes, three dimensional entities such as

boxes, Cylinders, Cones, Spheres, wedges, torus, Regions, extruded solids, revolved solids, composite solids, intersect solids.

Editing in three dimensions

Rotating in three dimensions, Array in three dimensions (Rectangular and polar)

Mirroring in three dimensions, Aligning in three dimensions

Editing of three dimensional solids

Sectioning and Slicing of solids, hiding, shading and rendering

Selection of material from library

Enable the material library, Editing materials and material library

The importance of Solid Modeling software like CREO/ SOLID EDGE/SOLID WORKS /

Use any of the solid modelling packages stated above and generate a solid model of a machine component for different 3D components

A) Solid mpodeling lab practice

Suggested learning outcomes

Upon completion of the course the student shall be able to understand the concepts of 3D

- View entities in three dimensions
    - To set a new viewing direction
    - To dynamically set a view direction

Create three-dimensional entities using different methods

- Draw two dimensional entities in three dimensional space
- Convert two dimensional planar entities into three dimensional entities by applying elevation and thickness
- Convert two dimensional planar entities into three dimensional entities by revolving or extruding.
- Create three-dimensional faces
- Create rectangular meshes
- Create ruled surface meshes
- Create extruded surface meshes
- Create revolved surface meshes
- Create three dimensional entities such as boxes, Cylinders, Cones, Spheres, wedges, torus, Regions,
- Create extruded solids
- Create revolved solids
- Create composite solids

- Create intersect solids

Edit in three dimensions

- Rotate in three dimensions
- Array in three dimensions (Rectangular and polar)
- Mirror in three dimensions
- Align in three dimensions

Edit three dimensional solids

- Practice Sectioning and Slicing solids
- Practice hiding, shading and rendering

Practice the selection of material from library

- Enable material library
- Edit materials and material library

- Use any of the solid modelling packages stated above and generate a solid model of a machine component for different 3D components

Exercise	Key components	Periods
1.0 View entities in three dimensions	A. Set a new viewing direction B. Set dynamically view direction	**02**
2.0 Create three-dimensional entities	A. Create three-dimensional faces B. Create rectangular meshes, ruled surface meshes, extruded surface meshes, revolved surface meshes C. Create three dimensional entities such as boxes, Cylinders.	**18**
3.0 Edit in three dimensions	A. Rotate in three dimensions B. Array in three dimensions (Rectangular and polar) C. Mirror in three dimensions D. Align in three dimensions	**06**
4.0 Edit three dimensional solids	A. Practice Sectioning and Slicing solids B. Practice hiding, shading and rendering	**10**
5.0Practice the selection of material from library	A. Enable material library B. Edit materials and material library	**03**
6.0 Appreciate the importance of Solid Modelling software like PRO-E / UNIGRAPHICS / CATIA	A. Use any of the solid modelling packages stated above and Generate a solid model of a machine component for different 3D components using Solid modelling packages	**06**
Total		**45**

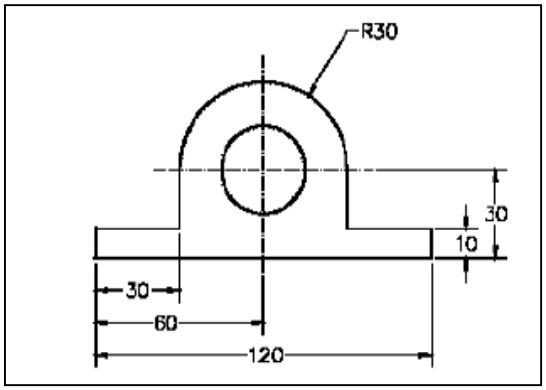
18M309P- SOLD MODELLING LAB PRACTISE
MODEL PAPER FOR MID -1 (CIE)

TIME: 2hr **Marks: 20M**

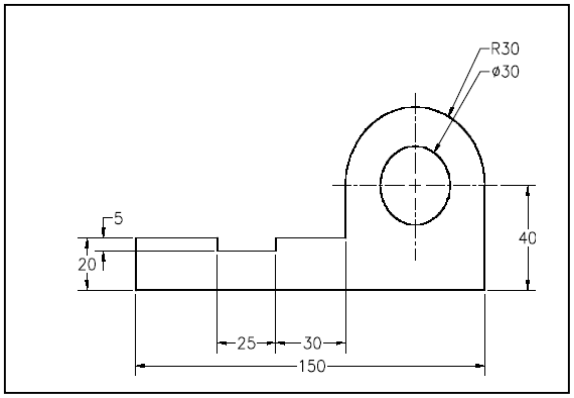
NOTE: Answer any one of the following

PART-A

1. Create the below 2D drawing and dimension it using any solid modeling software.



2. Create the below 2D drawing and dimension it using any solid modeling software.

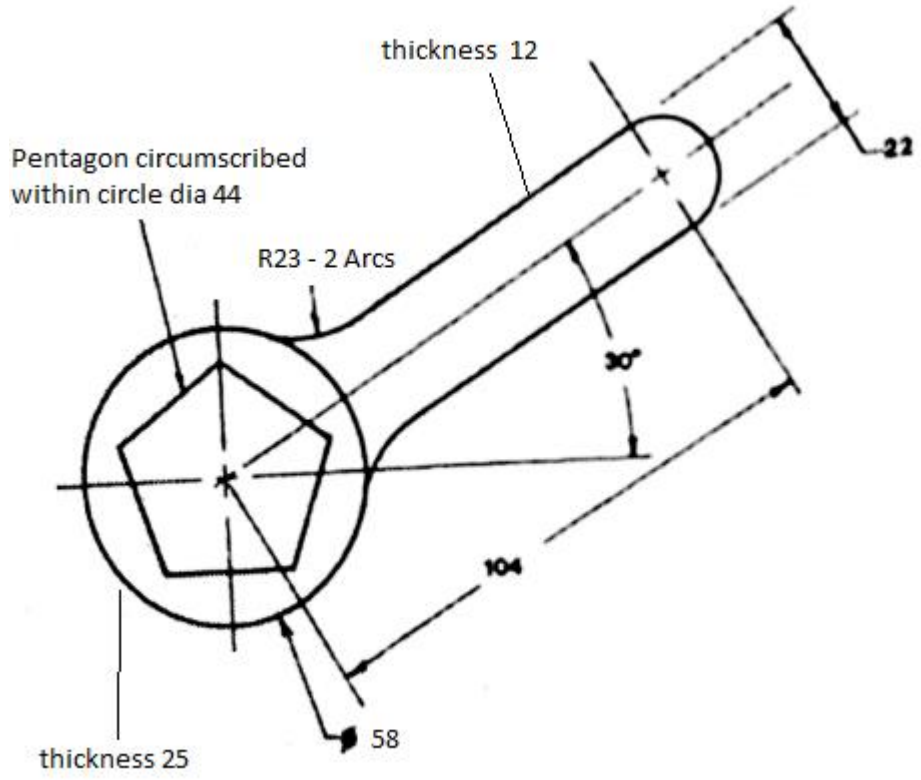


18M309P- SOLD MODELLING LAB PRACTISE
MODEL PAPER FOR MID -2 (CIE)

TIME: 2hr **Marks: 20M**

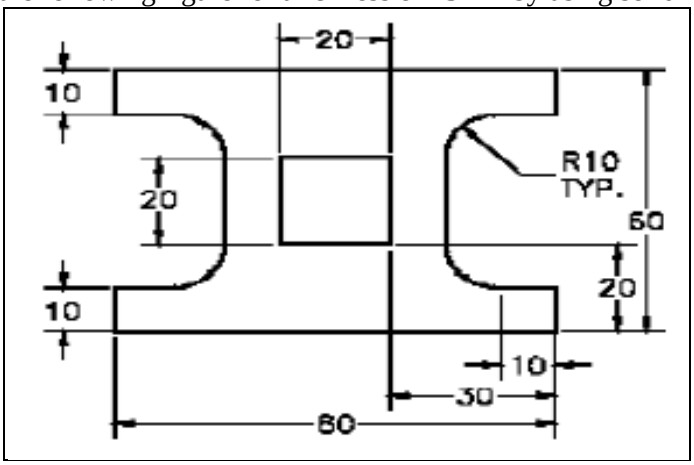
NOTE: Answer any one of the following

1. Draw the following figure by using solid modeling software.



Note: All dimensions are in mm

2. Draw the following figure for thickness of 25mm by using solid modeling software.



Note: All dimensions are in mm

BOARD DIPLOMA EXAMINATION-UNIT TEST-2,

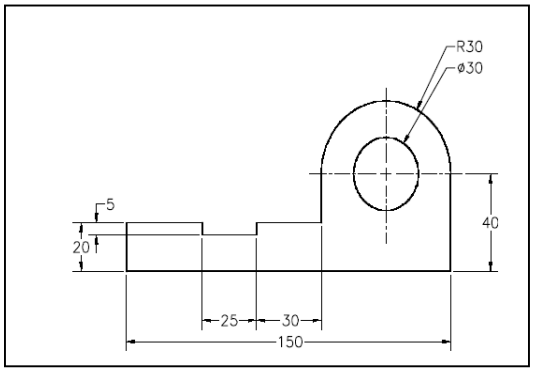
18M309P- SOLD MODELLING LAB PRACTISE

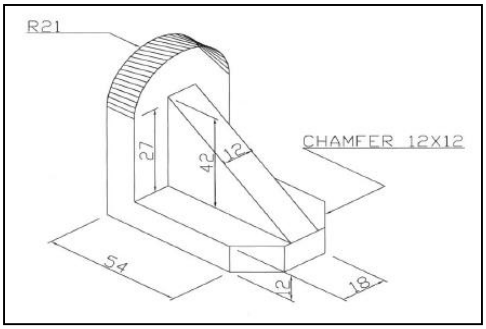
MODEL PAPER FOR SEE

Time: 03 Hour **Total Marks: 40**

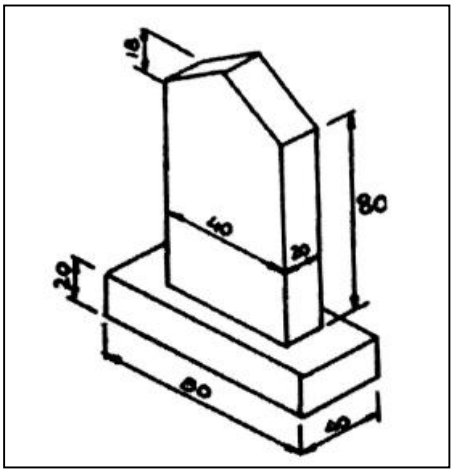
Answer any ONE question. **01×40=40 M**

3. 1. Draw the following figure by using solid modeling software.





.



Marks breakup

1. Model creation – 25M
2. Viva – 10M
3. For writing answer – 5M

Communication Skills and Life Skills

Course Title	**Communication Skills and Life Skills**	Course Code	**18 Common 310 P**
Semester	**III**	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 communication skills and life skills to the students of diploma which will help them a great deal in personal and professional fronts.

Prerequisites:

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

Course Outcomes:

	At the end of the course the students will have the ability to:
Listening Skills	Identify the main or the central idea. Listen for specific details. Learn the pronunciation.
Communication Skills – I	Learn relevant vocabulary to make introductions. Learn to introduce oneself in formal and informal situations. Learn vocabulary and expressions useful for describing objects Describe objects

Communication Skills – II	Learn vocabulary to talk about the past Describe the incidents that happened in the past Learn the techniques of organising the matter / content for one-minute speech. Speak fluently and accurately using appropriate body language.
Life Skills – I	Think positively. Develop positive attitude. Overcome negative attitude. Know the importance of setting goals. Set goals using SMART features.
Life Skills – II	Know the reasons for a problem. Learn to overcome problems. Learn the various techniques to solve the problems. Learn to make proper decisions on time. Think ‘out of the box’. Learn to be creative. Think innovatively. Think critically.
Life Skills – III	Know how to be a leader. Learn the qualities of a good leader. Learn the qualities of a good team. Learn the advantages and disadvantages of a team. Manage time effectively. Learn various time management techniques. Learn the importance of prioritisation.

CO-PO Matrix

	Course Outcome		Linked PO
CO 1	Listening for main idea and specific details	**R/U/A**	**1, 2, 3, 4, 5,7,8, 9,10**
CO 2	Introduce oneself and Describe Objects	**R/U/A**	**1,2,3,8,9,10**
CO 3	Talk about the past and speak fluently for one minute	**R/U/A**	**1,2,3,7,8.9,10**
CO 4	Develop positive attitude and set short term and long term goals	**R/U/A**	**1,2,3,7,8,9,10**
CO 5	Learn to solve a problem, make decisions and think innovatively	**R/U/A**	**1,2,3,7,8,9,10**
CO6	Learn to become a good team member and leader	**R/U/A**	**1,2,3,7,8,9,10**

Course Contents:

I. Listening Skills **Duration: 9**

1. Listening – I
    - Digital Camera
    - A Dialogue
    - Wild Animal / Human conflict
2. Listening – II
    - A Recipe
    - A Telephone conversation
    - An Interview

II. Communication Skills – I **Duration:6**

3. Introducing Oneself
4. Describing Objects

III. Communication Skills – II **Duration:6**

5. Talking About the Past
6. Just A Minute

IV. Life Skills – I **Duration:6**

7. Attitude
8. Goal Setting

V. Life Skills – II **Duration:9**

9. Problem Solving and Decision-Making Skills
10. Critical Thinking & Creativity

VI. Life Skills – III **Duration:9**

11. Leadership and Teamwork
12. Time Management

Suggested Student Activities:

- Listening Comprehension
- Seminars
- Paper Presentations
- Line ups for introducing oneself
- Describing persons / places / things
- Picture description

- Role Plays
- Dumb charades
- What is in the bag? (Identify the objects)
- Games using Online Dictionaries
- Sharing the information using emails, chats and groups
- Just A Minute
- Writing diary events
- Find a solution to the problem
- Making innovative things through recycling
- Creating advertisements
- Five-minute activities on Life Skills
- Watching videos on life skills and making presentations
- Case studies

Evaluation Pattern:

I. Continuous Internal Examination: 60 Marks

a. **Mid Sem- I** 20 marks
Syllabus:
i. Listening Skills
ii. Communication Skills - I

b. **Mid Sem – II** 20 Marks
Syllabus:
i. Communication Skills - II
ii. Life Skills - I

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. Listening: 10 Marks
b. JAM or Role plays: 15 Marks
c. *Viva Voce* on any life skills topic : 15 Marks

References:

Flint, Chrisand Jamie Flockhart*Listening: A2 (Collins English for Life: Skills)*Collins. 2013

Brown, Stephen E. English in Everyday Life. McGraw-Hill Education.2008

Mohanraj, Jayashree. *Let Us Hear Them Speak: Developing Speaking-Listening Skills in English*.Sage. 2015

Susan Earle – Carlin. *Q Skills for Success: Listening and Speaking 5: Student Book with Online Practice*. Oxford University Press. 2013

Kumar, Sanjay and Pushpa Latha. *Communication Skills: A Work Book*.Oxford University Press. 2018

Carnegie, Dale.*The Leader in You*. Simon & Schuster: 1995

Carnegie, Dale.*The Art of Public Speaking*. Prabhat Prakashan. NewDelhi.2013

Kaye, Martin. *Goal Setting (Workbook Included): Goals & Motivation: Introduction To A Complete & Proven Step-By-Step Blueprint For Reaching Your Goals (Goal Setting Master Plan 1)*. Kindle Edition. MK Coaching.2016.

West, Steven. *Critical Thinking Skills: Practical Strategies for Better Decision making, Problem-Solving and Goal Setting.* Kindle Edition.2018

Tracy, Brain. *Goals*. Berret-Koehler PublishersInc. San Francisco. 2017

Tracy, Brain. *Master your Time Master your Life.* Penguin Random House Inc. New York. 2017

Sean Covey . *The 7 Habits of Highly Effective Teens.* Simon and Schuster,2011

E-Learning Resources:

http://www.bbc.co.uk/worldservice/learningenglish/youmeus/learnit/learnitv39.shtml

https://www.examenglish.com/leveltest/listening_level_test.htm

https://www.oxfordonlineenglish.com/listening?utm_referrer=https%3A%2F%2Fwww.google.co.in%2F

https://takeielts.britishcouncil.org/prepare-test/free-ielts-practice-tests/listening-practice-test-1

https://learnenglish.britishcouncil.org/en/listening

https://www.cambridgeenglish.org/learning-english/activities-for-learners/?skill=listening

https://www.businessenglishsite.com/business-english-listening.html

BOARD DIPLOMA EXAMINATION (C-18)

THIRD SEMESTER 18 COMMON-310P

COMMUNICATION SKILLS AND LIFE SKILLS

MID SEM - I

Time : 1 Hour **Total Marks: 20 Marks**

Part – A **10 marks**

1. Listening Comprehension: 5 X 2 = 10

(Teacher should give the questions before reading the passage given below)

Florence Nightingale was an English social reformer and a statistician, and the founder of modern nursing. She was born in Florence, Italy, on May 12, 1820. Part of a wealthy family, Nightingale defied the expectations of the time and pursued what she saw as her God-given calling of nursing during the Crimean War. She and a team of nurses improved the unsanitary conditions at a British base hospital, greatly reducing the death count. Her writings sparked worldwide health care reform, and in 1860 she established St. Thomas' Hospital and the Nightingale Training School for Nurses. A revered hero of her time, she died on August 13, 1910, in London. Nightingale came to prominence while serving as a manager and trainer of nurses during the Crimean War, in which she organized care for wounded soldiers. She gave nursing a favourable reputation and became an icon of Victorian culture, especially in the persona of "The Lady with the Lamp" making rounds of wounded soldiers at night.

Questions:

1. Who was Florence Nightingale?
2. When and where was she born?
3. What does the passage convey?
4. When did she pass away?
5. Where did she establish nursing school?

PART- B **10 Marks**

Instruction: Answer any one of the questions in 150 words.

2. How do you introduce yourself formally in an interview?
3. Describe your polytechnic.

BOARD DIPLOMA EXAMINATION (C-18)

THIRD SEMESTER 18 COMMON-310P

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 in 150 words.

1. Describe how you have spent your summer vacation.

2. What are the features of good JAM presentation? What precautions do you before speaking for one minute on the given topic?

Part – B **10 marks**

Instruction: Answer any one of the following questions in 150 words.

3. What is positive attitude? Give examples of positive attitude from your life.

4. Mention your long term goal with SMART features. How do you achieve it?

BOARD DIPLOMA EXAMINATION (C-18)
THIRD SEMESTER 18 COMMON-310P
COMMUNICATION SKILLS AND LIFE SKILLS
SEMESTER END EXAM

Time : 3 Hours **Total Marks: 40 Marks**

Part – A **10 marks**

1. Listen to the following passage and answer the questions give below it**. 5 X 2 = 10**

(Teacher should give the questions before reading the passage)

Answer the following questions after teacher reads the following paragraph.

Prof. Jayashankar was born to Mahalaxmi and Laxmi Kantha Rao on 6th August 1934 in Akkampet village, Warangal District. He was a Doctorate in Economics. He worked as a Vice-Chancellor of Kakatiya University. He worked in many capacities. He was popularly known as "Pedda Sir." He inspired many a people to fight for the cause of Telangana Statehood.

At the age of twelve, Jayashankar refused to sing songs in praise of the Nizam and insisted on singing Vande Mataram instead. As an intermediate student, in 1952, he protested against State Reorganization Committee plan to merge with the Andhra Rashtra. He took an active part in the agitations of "Non – Mulki go back" and " Idli Sambar go back." He took an active part in Telangana separate statehood agitation in 1969 too. In 1999, Prof. Jayashankar started the Telangana Development Forum in the USA which helped to propagate the injustice, discrimination and exploitation meted out to Telangana region and people in the aspects of employment, funds and water resources. He relentlessly put his efforts to end the struggle of Telangana people. He passed away on June 21, 2011. He was 76 years old at the time of his death.

Questions:

1. Where was Prof. Jayashankar born?
2. Why didn't he sing songs in praise of the Nizam?
3. Why did Jayashankar start the Telangana Development Forum in USA?
4. What are the two agitations in which he took an active part?
5. What is the meaning of 'relentlessly'?

Part – B **15 marks**

2. JAM / Role Plays

Part – C **15 marks**

3. Viva Voce on Life Skills topics

SKILL UPGRADATION IN

III SEMESTER

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

Suggested student activities

MATHEMATICS

1 .Write a short notes on different types of integrals.

2. Prepare a notes on different methods to evaluate integrals.

3. List out Properties of definite integrals.

4. List out and explain various applications of definite integrals.

5. Explain the procedure to solve problems on Areas using integration

6. Explain the procedure to find volumes of irregular shapes of solids of revolution using integration.

7. Prepare a presentation to find Mean values and R.M.S values of any given function.

8. Explain the procedure to calculate approximate area by using Trapezoidal rule.

9. Explain the procedure to calculate approximate area by Simpson's 1/3 rule

10. Prepare a presentation on solving 1^{st} order differential equations using any suitable method.

Rubrics for Activity assessment (Mathematics)

CATEGORY	4	3	2	1
Mathematical Concepts	Explanation shows complete understanding of the mathematical concepts used to solve the problem(s).	Explanation shows substantial understanding of the mathematical concepts used to solve the problem(s).	Explanation shows some understanding of the mathematical concepts needed to solve the problem(s).	Explanation shows very limited understanding of the underlying concepts needed to solve the problem(s) OR is not written.
Procedures	Typically, uses an efficient and effective procedure to solve the problem(s).	Typically, uses an effective procedure to solve the problem(s).	Sometimes uses an effective procedure to solve problems, but does not do it consistently.	Rarely uses an effective procedure to solve problems.
Explanation	Explanation is detailed and clear.	Explanation is clear.	Explanation is a little difficult to understand, but includes critical components.	Explanation is difficult to understand and is missing several components OR was not included.
Working with Others	Student was an engaged partner, listening to suggestions of others and working cooperatively throughout lesson.	Student was an engaged partner but had trouble listening to others and/or working cooperatively.	Student cooperated with others, but needed prompting to stay on-task.	Student did not work effectively with others.
Mathematical Errors	90-100% of the steps and solutions have no mathematical errors.	Almost all (85-89%) of the steps and solutions have no mathematical errors.	Most (75-84%) of the steps and solutions have no mathematical errors.	More than 75% of the steps and solutions have mathematical errors.

ENGINEERING SUBJECTS.

1. Record various forces applied by human beings in their daily activities.

2. Identify the applications where parallelogram law of forces, Lamis theorem etc are used and prepare a report.

3. Using internet record various properties of commonly used materials and compare strengths.

4. How a corrugated roof sheet differs from plain roof sheet? Demonstrate with models.

5. Make a list of different bikes available in market and know their capacities.

6. Make a list of different cars available in market and know their capacities

7. Visit to a hospital/industry and see how a boiler works.

8. Make a report on the solid, liquid fuels available in market and know their calorific values.

9.Collect data of pressure required in tyres of a two wheeler and four wheeler.

10.Collect data of different engine oils used in automobiles.

11.Collect information of different liquid coolants used in automobile

12.Working of bomb calorimeter

https://www.youtube.com/watch?v=nJOH29SGcCk

13. Study of cut out models of IC engines.

14. Visit to automobile workshop.

15. Working of IC Engine

https://www.youtube.com/watch?v=O9tfIfwlmz8

16. Know fuel system

https://www.youtube.com/watch?v=DCfyUm3I4oI

17. Know battery ignition system

https://www.youtube.com/watch?v=OMLSNwQiiKg

18. Know cooling system in automobile

https://www.youtube.com/watch?v=V7inC4lOpGs

19. Know lubrication system

https://www.youtube.com/watch?v=mmmcj53TNic

Rubrics for student activities can be generated by subject teacher.