

GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

(An Autonomous Institute of Govt. of Maharashtra)

EVEN TERM END EXAM MAY -2019

EXAM SEAT NO.

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LEVEL: FIFTH

PROGRAM: METALLURGY

COURSE CODE: MTF506/MTE504/MG405

COURSE NAME: QUALITY MANAGEMENT

MAX. MARKS: 80

TIME: 3 HRS.

DATE: 22/05/2019

Instruction:-

- 1) Answer to two sections must be written in separate section answer book provided.
- 2) Figure to the right indicates marks.
- 3) Illustrate your answers with sketches wherever necessary.
- 4) Use of non-programmable pocket calculator is permissible.
- 5) Mathematical and other tables shall be made available on request.
- 6) Assume additional suitable data necessary.
- 7) Use of Mobile is strictly prohibited.

Section – I

Marks

Q.1 Attempt any **FOUR**

(08)

- a) Why quality control is required in foundry?
- b) What is maintainability?
- c) What is quality assurance?
- d) Enlist two advantages of quality circles.
- e) Enlist various internal failure cost.
- f) Give two differences between cost of quality & value of quality.

Q.2 Attempt any **TWO**

(16)

- a) Differentiate clearly between Inspection and Quality control. And give quality characteristics.
- b) Explain concept of reliability and maintainability.
- c) i) Explain quality of performance.
ii) Enlist four responsibilities of quality assurance.

Q.3 Attempt any **TWO**

(16)

- a) Describe the audit reporting and essential ingredient of quality audit.
- b) Explain the economics of quality of design and quality of conformance.
- c) Explain External failure cost and Appraisal cost category of quality cost.

P.T.O

Section – II

Marks

Q.4 Attempt any **FOUR**

(08)

- a) What is Deming's principle?
- b) What is ISO 14000?
- c) State the use of control charts.
- d) What is the concept of six sigma?
- e) What is the use of OC?
- f) Define AQL and LTPD.

Q.5 Attempt any **FOUR**

(16)

- a) Describe the benefits of ISO 14001 certified company.
- b) What is meant by process variations?
- c) Explain a typical OC curve.
- d) Give an area distribution of a normal distribution curve & its interpretation.
- e) Give an advantages of ISO 9000 certified company.
- f) Describe the major steps of QFD.

Q.6 Attempt any **TWO**

(16)

- a) Explain the principles of TQM.
- b) Brief the elements of ISO 9000 quality management system.
- c) State frequency distribution, mean, mode & S.D.

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EVEN TERM END EXAM MAY -2019

EXAM SEAT NO.

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LEVEL: THIRD

PROGRAM: METALLURGY

COURSE CODE: MTF308/MTE309

COURSE NAME: MECHANICAL ENGINEERING

MAX. MARKS: 80

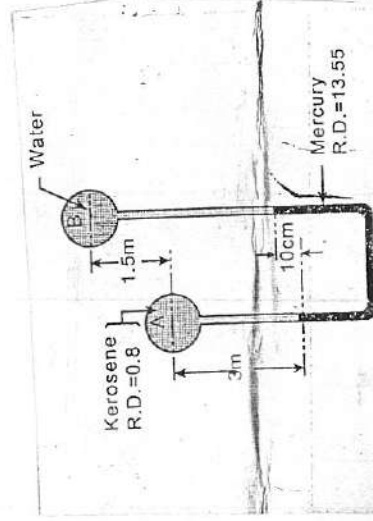
TIME: 3 HRS. DATE: 21/05/2019

Instruction:-

- 1) Answers must be written in the main answer book provided. (and supplements if required)
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN>Question No, SQN>Sub-Question No, R> Remembering, U>Understanding, A>Application CO>Course outcome

QN	S Q N	Question Text	R U A	CO MTF A 308	Marks
Q.1		Attempt any FOUR			(08)
	a)	Draw a conventional representation of revolved section.	U	2	
	b)	State the function of following I.C engine parts- i) Piston ii) Piston ring	A	3	
	c)	Draw a conventional representation of gear.	U	2	
	d)	What is the purpose of insulation?	R	4	
	e)	Draw a conventional representation of partial section.	U	2	
	f)	Define i) Conduction ii) Convection.	R	4	
Q.2		Attempt any FOUR			(16)
	a)	Draw a free hand sectional front view of crank shaft.	U	1	
	b)	Differentiate 2 stroke & 4 stroke engine.	A	3	
	c)	Describe the concept of Black Body used in Heat transfer.	A	4	
	d)	Draw a free hand sectional front view of engine body.	U	1	
	e)	Suggest the material used for following components i) Fly wheel ii) Camshaft iii) Connecting Rod iv) Piston	A	3	
	f)	What is insulation? What are the different types of insulating materials used in foundry? Justify their use?	A	4	
Q.3		Attempt any TWO			(16)
	a)	Draw a neat sketch of sectional orthographic view of pump body?	A	1	
	b)	Explain with neat sketch working of 4 stroke diesel engine?	A	3	
	c)	A steel pipe of inner and outer diameter 6 cm & 8 cm respectively has inside temperature 150 °C & outside temperature 40 °C. The thermal conductivity of steel is 24 w/mk. Calculate the rate of heat transfer through this pipe if length of the pipe is 1.5 m.	A	4	
P.T.O					

Q.4	Attempt any FOUR			(08)
a)	State the components of hydraulic system.	R	8	
b)	Define i) Viscosity ii) Surface Tension	R	5	
c)	Enlist the types of belt drive.	U	6	
d)	What are the applications of rope drive?	A	6	
e)	What is actuator in hydraulics?	U	8	
f)	State the application of chain drive.	A	6	
Q.5	Attempt any FOUR			(16)
a)	How discharge is measured by venturimeter?	U	5	
b)	Explain with sketch meter out circuit.	U	8	
c)	Differentiate between centrifugal and reciprocating pump.	R	7	
d)	State the factors on which selection of a belt depends.	U	6	
e)	Draw symbol of: i) 5/2 DC valve ii) Pressure Relief valve	U	8	
f)	State the advantages & disadvantages of chain drive.	R	6	
Q.6	Attempt any TWO			(16)
a)	Explain' with neat sketch the construction & working of air filter & pressure regulator in FRL.	R	8	
b)	Explain with neat sketch the working and construction of centrifugal compressor.	R	7	
c)	A 'U' tube filled with mercury is connected to piezometers on pipes A & B as shown fig.1. Determine the pressure ($P_B - P_A$)	A	5	



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EVEN TERM END EXAM MAY -2019**EXAM SEAT NO.**

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LEVEL: FIFTH**PROGRAM: METALLURGY****COURSE CODE: MTF502/MTE412****COURSE NAME: ENVIRONMENTAL PROTECTION****MAX. MARKS: 80****TIME: 3 HRS.****DATE: 24/05/2019****Instruction:-**

- 1) Answer to two sections must be written in separate section answer book provided
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) **QN>Question No, SQN>Sub-Question No, R> Remembering, U>Understanding, A>Application CO>Course outcome**

QN	S Q N	Question Text	R U A	CO MEF 502	Marks
Section -I					
Q.1		Attempt any FOUR			(08)
	a)	Write reactions involved in acid rain.	R	5	
	b)	Write about measurements of Noise.	U	4	
	c)	Name any four process gases evolved in Hot Rolling mill.	A	3	
	d)	Write effects of Dust evolved from steel foundries.	A	2	
	e)	Name any four gases evolved from steel industries.	A	2	
	f)	Define environment & Ecosystem.	R	1	
Q.2		Attempt any FOUR			(16)
	a)	Write classification of pollution & pollutants.	R	1	
	b)	Write about air pollution in iron foundries.	U	2	
	c)	Write about dust generation in steel foundries.	U	2	
	d)	Write about process & non process gases evolved in hot rolling mills.	R	3	
	e)	What are the harmful substances evolved in pickling baths of pipe welding etc.	A	3	
	f)	Write in detail about ozone depletion problem.	U	5	

P.T.O

Q.3	Attempt any TWO			(16)
	a) Write sources effects & control noise pollution.	R	4	
	b) Write recommendations for estimating & reducing air pollution.	A	1	
	c) Write about characteristics of waste generation and generation of pollutants in steel foundries.	U	2	

Section-II

Q.4	Attempt any FOUR			(08)
	a) Define thermal pollution.	R	8	
	b) Define preliminary treatment.	R	6	
	c) What is mean by environment Audit?	R	9	
	d) Write a short note on classification of solid waste.	U	7	
	e) Define Hazards waste.	R	7	
	f) Write down the Radiation exposure.	U	8	
Q.5	Attempt any FOUR			(16)
	a) Explain Trickling filter.	R	6	
	b) Why secondary treatment are called as biological treatment.	U	6	
	c) Write down the disposal & treatment of hazardous waste.	U	7	
	d) Explain phyto extraction.	U	7	
	e) Write down the causes of thermal pollution.	U	8	
	f) What are different types of environmental Audit?	U	9	
Q.6	Attempt any FOUR			(16)
	a) Discuss Rotating Biological contactors.	U	6	
	b) Write about ETA.	U	9	
	c) Draw the schematic diagram of waste water treatment process.	A	6	
	d) Write a short note on solid waste management.	A	7	
	e) Write down the sources of Radiation pollution.	U	8	
	f) Describe the steps in environmental audit of foundry.	A	9	

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EVEN TERM END EXAM MAY-2019

EXAM SEAT NO.

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LEVEL :- FIFTH **PROGRAM : METALLURGY**
COURSE CODE :- MTE503/MG402
COURSE NAME INDUSTRIAL ORGANIZATION & MANAGEMENT
MAX. MARKS : 80 **TIME : 3 HRS.** **DATE :- 17/05 / 2019**

Instruction :-

- 1) Answers of two sections must be written in separate section answer book provided.
- 2) Figure to the right indicate marks.
- 3) Illustrate your answers with sketches wherever necessary.
- 4) Use of non-programmable pocket calculator is permissible.
- 5) Mathematical and other tables shall be made available on request.
- 6) Assume additional suitable data necessary.
- 7) Use of Mobile is strictly prohibited.

Section - I			Ma rks
QN	S Q N		
Q.1		Attempt any FOUR :	08
	a)	What is management?	
	b)	State the levels of management.	
	c)	Enlist elements of communication.	
	d)	What is meant by public sector organization?	
	e)	What are the types of decisions?	
	f)	Write three decision making conditions.	
Q.2		Attempt any FOUR :	16
	a)	Describe the functions of management.	
	b)	“Management” is a dynamic process, explain.	
	c)	Explain the forms of planning.	
	d)	Discuss the methods of controlling.	
	e)	Explain partnership and give limitations of this type of ownership	
	f)	Explain government undertaking and state its need with one example.	
Q.3		Attempt any TWO :	16
	a)	Describe the principles of management.	
	b)	Describe two approaches to strategic decision making.	
	c)	Give the steps in decision making process and explain.	

P.T.O.

S QN	Section- II	Marks
Q.4	Attempt any FOUR : What is buffer stock with respect to inventory?	08
	a)	
	b) Give formula for EOQ.	
	c) Enlist items under working capital.	
	d) Define the term 'Accident'.	
	e) What is 'critical path'?	
	f) Define the term 'node' and 'activity'.	
Q.5	Attempt any FOUR : Sketch i) Gantry crane ii) Belt conveyour. 'Material management contributes in overall productivity' comment. What is MPS? State its advantages. Compare under capitalization and over capitalization. Describe the role of financial institutions. Describe external sources of finance.	16
Q.6	Attempt any FOUR : How will you report an Accident? Enlist advantages of safety training. Describe various time estimates in PERT. Enlist advantages of BPR. Define linear programming. State its features. What is ERP?	16
	a)	
	b)	
	c)	
	d)	
	e)	
	f)	

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EVEN TERM END EXAMMAY -2019

EXAM SEAT NO.

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LEVEL: Fourth

PROGRAM: Metallurgy

COURSE CODE: MTF 404

COURSE NAME: Powder Metallurgy

MAX. MARKS: 80

TIME: 3 HRS.

DATE: 5/05/2019

Instruction:-

- 1) Answer to each section must be written in separate answer book.
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN>Question No, SQN>Sub-Question No, R> Remembering, U>Understanding, A>Application

QN	S. Q. N	Question Text (Section - I)	Cognition Level R/U/A	Co Code	Marks
Q.1		Attempt any FOUR			(08)
	a)	State the principle of powder metallurgy.	R	1	
	b)	List any four advantages of powder metallurgy.	R	1	
	c)	List powder production methods.	R	2	
	d)	Mention reactions for Iron powder produced by carbonyl method.	R	2	
	e)	Define the terms 1) Apparent density 2) Tap density	R	3	
	f)	List various characteristics of metal powder.	R	3	
Q.2		Attempt any FOUR			(16)
	a)	Compare powder metallurgy with other shaping or forming methods.	U	1	
	b)	State the limitations of powder metallurgy.	R	1	
	c)	Enlist applications of powder metallurgy and explain its application in Automotive sector.	U	1	
	d)	Describe any one atomization method of powder production with diagram.	U	2	
	e)	Describe the advantages and disadvantages of Electrolytic method of powder production.	U	2	
	f)	Compare the characteristics (porosity, size, shape, compatibility, apparent density) and application of following metal powders 1) Carbonyl method 2) Atomization method	R	2	
Q.3		Attempt any FOUR			(16)
	a)	Metal powder with its application is given below; suggest suitable powder production method, with justification. 1) Aluminium powder for Solid fuel. 2) Copper powder for Bearing.	A	2	
	b)	Illustrate principle of carbonyl method with its application.	A	2	
	c)	Illustrate the mechanism of milling for powder production.	A	2	
	d)	Describe the following properties of metal powder 1) specific surface energy 2) specific surface area	U	3	
	e)	Describe 'Hall - flow meter' for determination of flow rate.	U	3	
	f)	Draw a neat and well labeled diagram of an instrument used to measure specific surface area of a powder.	A	3	

Section – II					
Q.4	Attempt any FOUR				Marks (08)
a)	Enlist different methods of powder compaction.				
b)	Define Isostatic compaction.	R		4	
c)	Define sintering of powder.	R		4	
d)	Give list of various mechanisms of sintering.	R		5	
e)	Which metal powders are necessary for manufacturing magnets?	R		5	
f)	State the requirements of a bearing material.	R		6	
Q.5	Attempt any FOUR	U		6	
a)	Enlist the additives used during powder compaction. State role of each additive.	U		4	(16)
b)	Explain any one method of pressureless powder compaction.	U		4	
c)	Draw (only) neat labeled diagrams showing stage in die compaction.	U		4	
d)	Explain the effect of sintering on various parameters/properties of powder compact.	U		5	
e)	Explain the brief the stages in powder sintering.	U		5	
f)	Draw a flow chart showing various stages in manufacturing of porous bearings by powder metallurgy.	A		6	
Q.6	Attempt any FOUR				(16)
a)	Differentiate between single acting and double acting compaction.	U		4	
b)	State advantages and disadvantages of loose sintering method.	U		4	
c)	Enlist different methods of pressure compaction with heat. Explain Hot isostatic pressing.	U		4	
d)	Describe liquid phase sintering of powder compacts.	U		5	
e)	Explain in brief the stages in manufacturing of electrical contact materials by powder metallurgy.	U		6	
f)	Powder metallurgy is an ideal method for manufacturing of cemented carbides. Explain with reasons.	A		6	

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EVEN TERM END EXAM MAY -2019

EXAM SEAT NO.

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LEVEL: FIRST

PROGRAM: COMMON

COURSE CODE: CCF105/0107/R107/X104/CEE105 COURSE NAME: BASIC MATHEMATICS

MAX. MARKS: 80

TIME: 3 HRS.

DATE: 14/05/2019

Instruction:-

- 1) Answers must be written in the main answer book provided. (and supplements if required)
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
- 6) Use of Mobile is strictly prohibited.

7) QN>Question No, SQN>Sub-Question No, R> Remembering, U>Understanding, A>Application CO>Course outcome

QN	S	Question Text	R	CO	Mar
Q.1	N		U	CCCF10	ks
		Attempt any FOUR	A	5	(08)
	a)	Expand $\begin{bmatrix} 1 & 3 & -1 \\ 2 & 0 & 5 \\ 6 & -2 & -7 \end{bmatrix}$	R / U	1	
	b)	Resolve into partial fractions: $\frac{x+1}{x^2-2x+1}$	R / U	2	
	c)	Resolve into partial fractions: $\frac{1}{(x^2+2)(x^2+5)}$	R / U	2	
	d)	Expand $(3a-b)^4$ by using Binomial theorem.	R / U	4	
	e)	Find the values of 'a' and 'b' if $\begin{bmatrix} a-4b & 5 \\ 6 & -a+b \end{bmatrix} = \begin{bmatrix} 11 & 5 \\ 6 & -5 \end{bmatrix}$	A	3	
	f)	If $A = \begin{bmatrix} 3 & -1 \\ 2 & 4 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 2 \\ -3 & 0 \end{bmatrix}$ find matrix x such that $2x + 3A - 4B = I$.	A	3	
Q.2		Attempt any FOUR			(16)
	a)	Show that the following equation are consistent $4x - 3y + 1 = 0$, $7x - 8y + 10 = 0$, $x + y - 5 = 0$	U	1	
	b)	Resolve into partial fractions: $\frac{x^2}{(x+1)(x+2)(x+3)}$	A / U	2	
	c)	Resolve into partial fractions: $\frac{3x^2+17x+14}{x^3-8}$	A / U	2	
	d)	Expand $\left(x^2 - \frac{2}{y^3}\right)^6$ by using Binomial theorem.	A	4	
	e)	Express the following matrix as the sum of symmetric and skew symmetric matrices. $A = \begin{bmatrix} -1 & 7 & 1 \\ 2 & 3 & 4 \\ 5 & 0 & 5 \end{bmatrix}$	U	3	
	f)	Find x, y, z if $\left\{ \begin{bmatrix} 1 & 0 \\ 5 & 0 & 1 \\ 1 & 1 \end{bmatrix} - 3 \begin{bmatrix} 1 & 2 \\ -2 & 3 \\ 3 & 1 \end{bmatrix} \right\} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} x \\ y \\ z \end{bmatrix}$	A / U	3	
P.T.O					

Q.3	Attempt any FOUR			(16)
a)	Solve by Cramer's Rule $\frac{2}{x-1} + \frac{3}{y-2} = 5, \frac{4}{x-1} - \frac{1}{y-2} = 3$	A	1	
b)	Resolve into partial fractions : $\frac{x^4 - x^5 + 1}{x^3(1-x)}$	A	2	
c)	By using Binomial theorem expand $\left(\frac{4}{3x} + \frac{y^2}{2}\right)^6$	A	4	
d)	If $A = \begin{pmatrix} 1 & -2 \\ -3 & 1 \end{pmatrix}, B = \begin{pmatrix} 4 & 2 & -5 \\ 1 & 0 & 3 \end{pmatrix}$ and $C = \begin{bmatrix} 6 & -7 & 0 \\ -1 & 2 & 5 \\ 1 & 0 & 3 \end{bmatrix}$ verify that $A(BC) = (AB)C$	U	3	
e)	If $A = \begin{bmatrix} -1 & -2 & -2 \\ 2 & 1 & -2 \\ 2 & -2 & 1 \end{bmatrix}$ show that $\text{adj } A = 3A^T$	U	3	
f)	Solve by matrix method $x + y + z = 3$ $x + 2y + 3z = 4$ $x + 4y + 9z = 6$	A	3	
Q.4	Attempt any FOUR			(08)
a)	Prove that $\cos ec^2 \theta - \cos^2 \theta \cos ec^2 \theta = 1$	U	5	
b)	Without using calculator, find the value of $\sec(3660^\circ)$	A	5	
c)	Prove that $\cos 2\theta = 1 - 2\sin^2 \theta$	U	5	
d)	Without using calculator find $\sin(15^\circ)$	A	5	
e)	If $2\sin 40^\circ \cos 10^\circ = \sin A + \sin B$ find A and B	U	5	
f)	Find principal value of $\cos\left[\frac{\pi}{2} - \sin^{-1}\left(\frac{1}{2}\right)\right]$	U	5	
Q.5	Attempt any FOUR			(16)
a)	Prove that $\frac{1 + 2\sin^2 \theta}{1 + 3\tan^2 \theta} = \cos^2 \theta$	U	5	
b)	Without using calculator, find the value of $\frac{\sec^2(135^\circ)}{\cos(-240^\circ) - 2\sin(930^\circ)}$	U	5	
c)	If $\tan(x+y) = \frac{3}{4}$, and $\tan(x-y) = \frac{8}{15}$ then show that $\tan 2x = \frac{77}{36}$	A	5	
d)	Prove that $\frac{1 - \tan 2\theta \tan \theta}{1 + \tan 2\theta \tan \theta} = \frac{\cos 3\theta}{\cos \theta}$	A	5	
e)	Prove that $\cos 10^\circ \cos 50^\circ \cos 70^\circ = \frac{\sqrt{3}}{8}$	A	5	
f)	Prove that $\cos^{-1}\left(\frac{4}{5}\right) + \tan^{-1}\left(\frac{3}{5}\right) = \tan^{-1}\left(\frac{27}{11}\right)$	A	5	
Q.6	Attempt any FOUR			(16)
a)	Without using calculator find the value of $\sin 150^\circ - \tan 315^\circ + \cos 300^\circ + \sec^2 3660^\circ$	U	5	
b)	If A and B are obtuse angle such that $\sin A = \frac{5}{13}, \cos B = -\frac{4}{5}$ find $\tan(A+B)$	U	5	
c)	prove that $\frac{\cos 3A - \cos 7A}{\sin 9A + \sin A} = \cos 2A \tan 4A - \sin 2A$	A	5	
d)	Prove that $\cos C + \cos D = 2\cos\left(\frac{C+D}{2}\right)\cos\left(\frac{C-D}{2}\right)$	A	5	
e)	Prove that $\cos^{-1}\left(\frac{4}{5}\right) - \sin^{-1}\left(\frac{5}{13}\right) = \cos^{-1}\left(\frac{63}{65}\right)$	A	5	
f)	Prove that $2\tan^{-1}\left(\frac{1}{3}\right) + \tan^{-1}\left(\frac{4}{3}\right) = \frac{\pi}{2}$	A	5	

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EVEN TERM END EXAM MAY-2019**EXAM SEAT NO.**

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LEVEL :- THIRD**PROGRAM : METALLURGY****COURSE CODE :- MTF304/MT304/MTE305****COURSE NAME :- EXTRACTIVE METALLURGY****MAX. MARKS : 80 TIME : 3 HRS. DATE :- 14/05 / 2019****Instruction :-**

- 1) Answers must be written in the main answer book provided.(and supplements if required)
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S Q N	Question Text	R/ U/ A	Co EF 308	Ma rks
Q.1		Attempt any FOUR :			08
	a)	Define i) Minerals, ii) Concentrate.	R	1	
	b)	Write down the general steps for extraction of metal from its ore.	U	1	
	c)	Write down the raw materials required for blast furnace.	U	2	
	d)	What is meant by blast furnace efficiency?	U	3	
	e)	Write down types of steel making process.	R	4	
	f)	State the working principle of Bessemer process.	A	5	
Q.2		Attempt any FOUR :			16
	a)	Differentiate between pyrometallurgy and hydrometallurgy. (any four points)	U	1	
	b)	Explain (steps in) electrometallurgy.	R	1	
	c)	Describe the working of disc palletizer.	U	2	
	d)	State the role of coke and flux in blast furnace.	U	2	
	e)	Draw the neat sketch of blast furnace.	R	3	
	f)	State the roles of various parts of blast furnace. (any four)	U	3	
Q.3		Attempt any FOUR :			16
	a)	Describe the working of blast furnace in brief.	A	3	
	b)	Enlist modern trends in blast furnace practice. Describe any one out of them in brief.	R	3	
	c)	Explain the need of conversion of pig iron into steel.	A	4	
	d)	Describe the working of open hearth furnace.	U	5	
	e)	Draw the neat sketch of induction furnace..	U	5	
	f)	State the steps to get steel from electric arc furnace. State its advantages.	R	5	

P.T.O.

Q.4	Attempt any FOUR :			08
	a) Mention factors affecting Bayer's process.	R	9	
	b) Write down advantages of 'Hydrometallurgy of copper'.	R	10	
	c) Write down advantages of AOD (Argon Oxygen Degassing) <i>Decarboxization</i> .	R	6	
	d) Mention types of steel making process.	R	6	
	e) What is Blister copper?	R	7	
	f) State advantages of vacuum Arc Remelting process'.	R	8	
Q.5	Attempt any FOUR :			16
	a) With labeled diagram, explain Argon-oxygen degassing process.	U	6	
	b) Explain Vacuum Oxygen Degassing (VOD) process'. <i>Decarboxization</i>	U	6	
	c) Write a note on D-H process of degassing.	U	7	
	d) Write a short note on ladle degassing process	U	7	
	e) Draw flow sheet for manufacturing of carbon electrodes used in Hall-Herault process.	A	9	
	f) Mention any four ores of copper with their formula.	R	10	
Q.6	Attempt any TWO :			16
	a) Write a detailed note on 'electrolytic refining of Aluminium' with schematic drawing of electrolytic cell and its construction and working.	A	9	
	b) Explain 'Hydrometallurgical route of extraction of copper'.	U	10	
	c) Explain with schematic drawing vertical type of continuous casting machine <i>process</i> .	U	8	

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EVEN TERM END EXAM MAY -2019

EXAM SEAT NO.

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LEVEL: THIRD

PROGRAM: METALLURGY

COURSE CODE: MTF305/MTE306

COURSE NAME: FOUNDRY TECHNOLOGY -I

MAX. MARKS: 80

TIME: 3 HRS.

DATE: 17/05/2019

Instruction:-

- 1) Answers must be written in the main answer book provided. (and supplements if required)
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) **QN>Question No, SQN>Sub-Question No, R> Remembering, U>Understanding, A>Application CO>Course outcome**

S QN	S Q N	Question Text	R U A	CO MTF A 305	Marks
Q.1	Attempt any FOUR				(08)
	a)	What is foundry?	R	1	
	b)	State function of a pattern.	R	2	
	c)	Enlist any four pattern materials.	R	2	
	d)	What is the role of moisture in green sand?	R	3	
	e)	Why sand reclamation is necessary?	R	3	
	f)	What is meant by 'Shell' in shell molding?	R	4	
Q.2	Attempt any FOUR				(16)
	a)	State advantages of foundry over other manufacturing processes.	R	1	
	b)	Compare wood and metal as pattern materials.	U	2	
	c)	Explain the use of match plate pattern.	U	2	
	d)	How alkyd-no-bake sand is prepared for core?	R	3	
	e)	State and explain the principle of loam sand molding.	R	4	
	f)	Explain the significance of day binder in Green sand molding.	R	4	
Q.3	Attempt any TWO				(16)
	a)	Why pattern allowances are necessary? Describe shrinkage allowance and taper allowance.	U	2	

P.T.O

	b)	With a neat labeled diagram of set-up for permeability test explain the procedure for determination of permeability of molding sand.	U	3	
	c)	Describe CO ₂ sand molding with respect to its principle, ingredients, process of mold making and applications.	U / R	4	
Q.4		Attempt any FOUR			(08)
	a)	Why Gravity die casting is called as pressure less casting.	U	5	
	b)	State types of centrifugal casting process. Which process is used to produce Cu- Bushing/ Electric motor body?	A	5	
	c)	State principle of continuous castings process.	R	6	
	d)	What is dewaxing in investment casting?	U	6	
	e)	State fuel and Refractory used in cupola furnace. Write the role of flux.	U	7	
	f)	State importance of finishing operations on casting.	R	5	
Q.5		Attempt any FOUR			(16)
	a)	Explain procedure & principle of pressure die casting.	R		
	b)	Explain with neat sketch continuous casting process.	U		
	c)	Explain with neat sketch true centrifugal casting process.	U		
	d)	Describe slush casting process.	U	6	
	e)	Explain stepwise shell investment process.	R	6	
	f)	Comment on pit molding process.	R	6	
Q.6		Attempt any FOUR			(16)
	a)	Draw a neat sketch of cupola furnace. Write down reactions at melting zone.	U	7	
	b)	State various types of cupola furnaces. Explain sequence of charging in cupola furnace.	R	7	
	c)	Write the properties required in wax used as pattern material.	A	7	
	d)	Suggest suitable molding process for casting. Justify your selection.	U	8	
	e)	Differentiate between Shot blasting & sand blasting. Comment on charge calculation in cupola furnace.	R	8	
	f)	Explain plaster molding process.	A	9	

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EVEN TERM END EXAM MAY -2019

EXAM SEAT NO.

LEVEL: FIRST

PROGRAM: COMMON

COURSE CODE: CCF110/X111/CCE110

COURSE NAME: APPLIED MECHANICS

MAX. MARKS: 80

TIME: 3 HRS.

DATE: 20/05/2019

Instruction:-

- 1) Answers must be written in the main answer book provided. (and supplements if required)
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
- 6) Use of Mobile is strictly prohibited.

QN>Question No, SQN>Sub-Question No, R> Remembering, U>Understanding, A>Application CO>Course outcome

QN	S	Q	N	Question Text	R	CO	CCF	Marks
Q.1				Attempt any FOUR				(08)
	a)			Different between particle & body. (any two)	U	1	1	
	b)			State principle of transmissibility.	R	1	1	
	c)			Give field examples of i) Concurrent force system. ii) Parallel force system.	R	1	1	
	d)			Define equilibrant & state its effect on body.	R	2	2	
	e)			Define i) Angle of friction ii) Angle of Repose.	R	2	2	
	f)			State laws of friction. (any two)	R	2	2	
Q.2				Attempt any FOUR				(16)
	a)			Determine the components of the force 500KN at 20° & 30° at either side of it.	A	1	1	
	b)			Two forces acts at an angle 120° , The bigger force is 50 N and resultant of both is perpendicular to smaller force. Find smaller force.	A	1	1	
	c)			Determine the magnitude & direction of resultant force of forces away from point 8 N, 10 N, 20 N and 12 N making an angle 30° , 120° , 200° & 310° with the x-axis measured in clockwise direction respectively. (solve by Analytical method)	A	1	1	
	d)			Three forces of 20 N, 40 N, & 60 N along the sides of equilateral triangle of side 30 cm respectively in order. Calculate the magnitude & position of resultant of force system from apex point.	A	1	1	
	e)			A light string ABCDE whose extremity 'A' is fixed, has 'W ₁ ' and 'W ₂ ' attached at 'B' & 'C'. It passes frictionless pulley at 'D' carrying a weight of 200 N at free end 'E'. If in equilibrium position BC is horizontal & AB & CD makes an angle 150° & 100° respectively with BC, Determine magnitudes 'W ₁ ' & 'W ₂ '	A	2	2	
	f)			Solve Q.No.2(C) by Graphical method.	U	3	3	
Q.3				Attempt any FOUR				(16)
	a)			Simply supported beam of 5m span carries UDL of 12 KN/m over half span from left side support & vertically downward point load of 27KN acting 1 m from right side support. Determine support reaction by analytical method.	A	2	2	
	b)			Solve Q. No 3(a) by graphical method.	U	3	3	
	c)			State advantages & limitations of graphical method over analytical method.	R	3	3	
	d)			A heavy stone of mass 400 kg is on hill of 45° inclined with horizontal. If coefficient of friction between stone & hill is 0.50, is stone stable?	A	2	2	

e)	A block weighing 40KN resting on rough horizontal plane can be moved by a force of 22 KN applied at an angle 35° with the horizontal. Determine coefficient of friction.	A	2	
f)	A ladder of 3 m weighing 100 N is kept 30° inclined with smooth horizontal ground and rough wall. If the man weighing 700 N is standing on mid of ladder, what is the force 'P', horizontal to ground contact surface, required to keep the ladder in rest. Take μ for ladder & wall is 0.3.	A	2	
Q.4	Attempt any FOUR			(08)
a)	Define Kinematics.	R	5	
b)	Define momentum.	R	5	
c)	Define angular acceleration.	R	5	
d)	State law of conservation of energy.	R	5	
e)	Define work & power.	R	5	
f)	Define velocity ratio.	R	6	
Q.5	Attempt any FOUR			(16)
a)	Determine the co-ordinates of the centroid of the shaded area with respect to the axes shown in figure. no.1 in which a quarter circle of radius 80 mm is cut-off from a rectangle of size 120 mm x 80 mm.	A	4	
b)	Determine the centroid of an unequal angle from the reference axes X & Y as shown in figure No.2.	A	4	
c)	A ball is dropped from the top of a tower 30 m high. At the same instant a second ball is thrown upward from the ground with an initial velocity 15 m/sec when & where they cross?	A	5	
d)	Power supply was cut off to a power driven wheel when it was rotating at a speed of 900 rpm. It was observed to come to rest after making 360 revolutions. Determine its angular retardation & time it took to come to rest after power supply cut-off.	A	5	
e)	A stone is released from a height 30 m. Calculate velocity of stone when it strikes to the ground using law of conservation of energy.	A	5	
f)	In a lifting machine an effort of 500 N is to be raise a load 10,000 N, velocity ratio of machine is 25. Determine efficiency of machine, ideal effort, effort lost in friction & load lost in friction,	A	6	
Q.6	Attempt any FOUR			(16)
a)	A solid right circular cone of height 40 cm & diameter 20 cm is placed on a cylinder of diameter 20 cm & height 30 cm. Locate the position of center of gravity from the base of the cone.	A	4	
b)	A railway wagon is moving at 108 kmph. The driver observes the red signal & applies brakes to stop the train & it covers a distance of 300 meter before coming to rest. Calculate the retardation produced & time taken to rest.	A	5	
c)	A wheel starts from the rest & accelerates at 12 rad/sec^2 until it reaches a speed of 200 rpm. With this speed it rotates for 2 minutes & then retards uniformly for 150 seconds & stops. Determine total number of revolutions made, Acceleration time & angular retardation.	A	5	
d)	Determine the power required to raise a lift containing 15 persons to a height of 150 m in 10 minutes. The average weight of each person may be taken as 650 N. The weight of lift is 2.5 KN.	A	5	
e)	In a machine an effort of 15 N can lift a load of 300 N & an effort of 25 N can lift a load of 500N. Determine the law of machine & also effort required to lift a load of 1000N.	A	6	
f)	In a lifting machine law of machine is $P = (0.025 W + 0.05) \text{ KN}$ & velocity ratio is 44.44. Calculate efficiency of machine at load 20 KN. and state machine is reversible or not at load 20 KN. Also determine maximum M.A & maximum efficiency of machine.	A	6	

Q.5) a) Figure No. 1

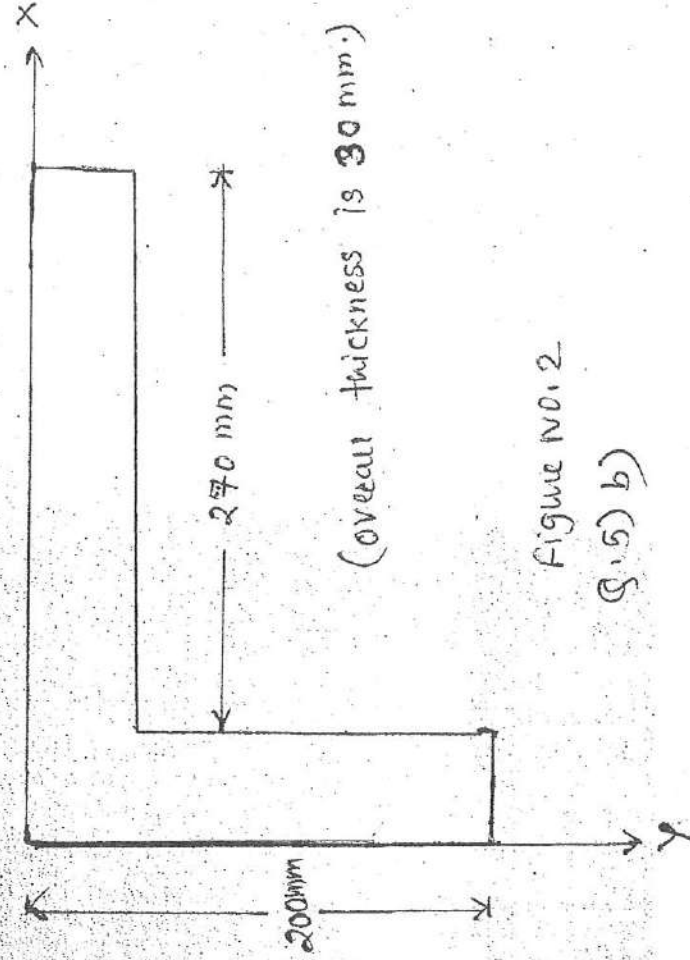
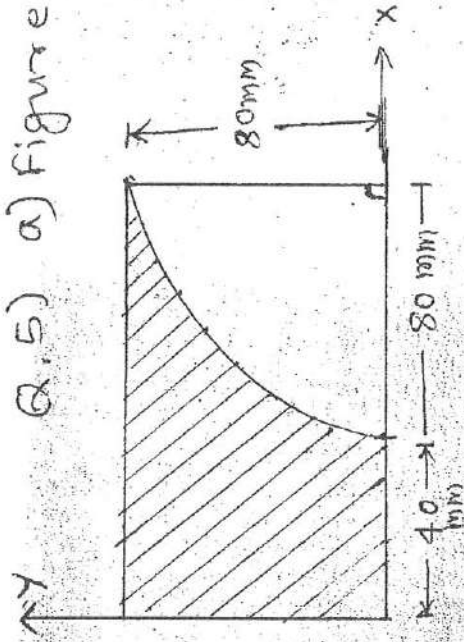


Figure No. 2

Q.5) b)

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EVEN TERM END EXAM MAY -2019**EXAM SEAT NO.**

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LEVEL: THIRD**PROGRAM: METALLURGY****COURSE CODE: MTF303/MTE303****COURSE NAME: METALLURGICAL ANALYSIS****MAX. MARKS: 80****TIME: 3 HRS.****DATE: 15/05/2019****Instruction:-**

- 1) Answers must be written in the main answer book provided. (and supplements if required)
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN>Question No, SQN>Sub-Question No, R> Remembering, U>Understanding, A>Application CO>Course outcome

QN	S Q N	Question Text	R U A	CO MTF A 303	Marks
Q.1		Attempt any FOUR			(08)
	a)	Define 'sampling' of a material solution.	R	1	
	b)	List down types of errors in chemical analysis.	R	1	
	c)	State various methods of chemical analysis.	U	1	
	d)	Define i) Precision ii) Accuracy	R	2	
	e)	Enlist step in Gravimetric analysis.	U	2	
	f)	Define PH of a solution in the form of an equation. Also state relation between PH & POH	A	2	
Q.2		Attempt any TWO			(16)
	a)	Compare / differentiate between qualitative analysis & quantitative analysis.	U	1	
	b)	Calculate PH of a solution if i) $P^{OH}=3$ ii) $[H^+]=10^{-8}$ iii) $[OH^-]=10^{-2}$ iv) $[H^+]=10^{-2}$	A	2	
	c)	Define the following: Accuracy, precision, error & ii) Define any four types of errors.	R	1	
Q.3		Attempt any TWO			(16)
	a)	i) Differentiate between classical methods and instrumental methods of analysis & ii) Describe types of sampling methods.	U	1	
	b)	For an experiment, calculate i) Mean ii) Deviation iii) Mean deviation & iii) Relative mean deviation. if the experiment reads following readings 2,4,6,8.	A	2	
	c)	Explain in details steps involved in Gravimetric analysis.	U	2	

P.T.O

Q.4	Attempt any FOUR		(08)
a)	Enlist instruments used for analysis in industry.	A	4
b)	Define two coloured indicator. Give one example.	U	3
c)	Define "titre" of solution.	R	3
d)	Define equivalence point.	U	3
e)	State two uses of Instrumental Analysis.	A	4
f)	State principle of colorimeter.	U	4
Q.5	Attempt any FOUR		(16)
a)	Explain the requirements of volumetric reaction.	R	3
b)	State two advantages & two uses of volumetric Analysis.	U	3
c)	Draw a titration curve of weak acid (CH_3COOH) with strong base (NaOH). State PH at eq.pt, Best Indicator & suitable indicator.	A	3
d)	Explain photocalorimeter analysis.	U	4
e)	Explain electro gravimetric analysis.	A	4
f)	Explain procedure for determination of Ferro Silicon.	A	5
Q.6	Attempt any FOUR		(16)
a)	Explain oxidation & Reduction reaction. State there role in Redox titration.	U	3
b)	Define Indicator. State there classification.	R	3
c)	Why Volumetric Analysis is more advantageous than Gravimetric Analysis.	A	3
d)	Write principle of emission spectrometer. State its uses.	U	4
e)	Explain colorimetry method.	A	4
f)	Write procedure for determination of Mg in S.G iron.	U	5

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EVEN TERM END EXAM MAY -2019**EXAM SEAT NO.**

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LEVEL: THIRD**PROGRAM: METALLURGY****COURSE CODE: MTF306/MTE307/MG207 COURSE NAME: ELECTRICAL ENGINEERING AND****ELECTRONICS****MAX. MARKS: 80****TIME: 3 HRS.****DATE: 16/05/2019****Instruction:-**

- 1) Answers must be written in the main answer book provided. (and supplements if required)
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN>Question No, SQN>Sub-Question No, R> Remembering, U>Understanding, A>Application CO>Course outcome

QN	S Q N	Question Text	R U A	CO MTF A 306	Marks
Q.1		Attempt any FOUR			(08)
	a)	Define i) Work ii) Power	R	1	
	b)	State the types of the electrical heating.	R	3	
	c)	State the Fleming's right hand rule.	R	1	
	d)	Write the advantages of the welding.	R	4	
	e)	State the principle of PMMC type instrument.	R	2	
	f)	Give the safety precautions used for electrical installation. (any two)	R	5	
Q.2		Attempt any FOUR			(16)
	a)	Explain with neat sketch pipe earthing.	U	5	
	b)	Compare series and parallel resistance.	R	1	
	c)	Explain with neat sketch the attraction type moving iron.	U	2	
	d)	Explain in detail metal arc welding and write its applications.	U	4	
	e)	State the types of arc furnace and explain one in detail.	R	3	
	f)	Explain with neat sketch dielectric heating and give its applications.	U	3	
Q.3		Attempt any FOUR			(16)
	a)	Describe in detail any two effects of electric current.	U	1	
	b)	Explain with neat sketch dynamometer type instrument.	U	2	
	c)	Describe in detail indirect arc furnace.	R	3	
	d)	Explain with neat diagram the construction of induction type single phase energy meter.	R	2	
	e)	Explain with neat diagram resistance oven also state its applications.	A	3	
P.T.O					

	Explain in detail the power factor improvement by using static capacitor.	U	3	
Q.4	Attempt any FOUR			(08)
a)	Define the terms: i) Intrinsic semiconductor ii) Extrinsic semiconductor.	R	6	
b)	List the types of electronic measuring instruments.	R	7	
c)	Enlist various electric transducers.	R	8	
d)	Convert (1101) ₁ into hexadecimal.	A	9	
e)	Draw symbol for NPN transistor and PN junction diode.	R	6	
f)	Draw symbol and truth table for NOR gate.	R	9	
Q.5	Attempt any FOUR			(16)
a)	Explain digital frequency meter with its block diagram.	U	7	
b)	Give criteria to select transducers in metallurgical engineering.	U	8	
c)	Compare analog instruments and digital instruments. (any 4 points)	U	7	
d)	State the principle of operation of thermister, Mention advantages of thermister.	U	8	
e)	Perform addition of followings: i) 110011+01111 ii) 11010+11010 iii) 11000+00011 iv) 00001+00001	A	9	
f)	Draw and explain working principle of JEFT in detail.	U	6	
Q.6	Attempt any FOUR			(16)
a)	Explain the concept of active and passive transducers with example.	U	8	
b)	Enlist various advantages of electronic measuring instruments.	R	7	
c)	With neat diagram explain any one type of pressure transducer.	U	8	
d)	Draw and explain the digital ammeter.	U	7	
e)	Draw symbol and truth table for following gates: i) X-OR gate ii) NAND gate	U	9	
f)	Draw and explain construction of P-N Junction diode.	U	6	

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EVEN TERM END EXAM MAY-2019**EXAM SEAT NO.**

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LEVEL :- FIRST PROGRAM : COMMON**COURSE CODE :- CCF107/CCE107/X105****COURSE NAME :- ENGINEERING DRAWING - I****MAX. MARKS : 80 TIME : 4 HRS. DATE :- 16/05/2019****Instruction :-**

- 1) Answers must be written in the main answer book provided.(and supplements if required)
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.

7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S Q N	Question Text	R/ U/ A	Co CCF 107	Ma rks
Q.1		Attempt any FOUR :			08
	a)	Draw the convention of short break line and cutting plane line.	U	1	
	b)	Define “Representative fraction”.	R	1	
	c)	Draw the projection of point P which is in VP and 30mm above HP.	U	3	
	d)	A peg is rammed in a wall having length 30cm and 150cm above the floor. Draw its projections.	U	3	
	e)	Draw the projection of point R, 25mm above HP and 20mm in front of VP.	U	3	
	f)	Write the applications of parabolic curve in practice.	A	2	
Q.2		Attempt any FOUR :			16
	a)	A distance of 10cm on the machine part has to be represented by a line of 30cm on the drawing. Draw a diagonal scale capable of measure upto 5 cm. Mark on it 3.75cm.	U	1	
	b)	Distance between Delhi and Madras is 1800km; on a railway map it is represented by 36cm. Calculate RF and draw diagonal scale to read upto a single kilometer. Mark on it the distance of 337km.	U	1	
	c)	Draw the parabola by rectangle method having base 50mm and axis 70mm.	U	2	
	d)	The foci of an ellipse are 90mm apart and minor axis is 65mm long. Determine the length of major axis and draw ellipse by concentric circle method.	U	2	
	e)	A line PQ, 70mm long is inclined to 45° to VP and parallel to HP. The nearest point P of the line is 30mm above HP and 20mm in front of VP. Draw its projections.	U	3	

P.T.O.

	f)	A line RS, 60mm long is in HP. Point R is 20mm in front of VP and point S, 50mm in front of VP. Draw the projections of line and measure the inclination of line with VP.	U	3	
Q.3		Attempt any TWO :			16
	a)	A circle of 40mm diameter rolls on another circle of 160mm diameter with internal contact. Draw the locus of a point P on the circumference of the rolling circle for one revolution and name the curve.	U	2	
	b)	A thin rod PR of 120mm length revolves about point Q on it, 20mm from end P. A point 'S' located on PR at 20mm distance from end R moves along the rod and reaches point P during the period, the rod completes one revolution. Draw the locus of point S if both motions are uniform. Name the curve.	U	2	
	c)	i) The distance between the end projections of line AB is 50mm. Its end A is 20mm above HP & 15mm in front of VP. The line is parallel to VP and true length of line is 70mm. Draw its three views and determine its inclination with HP. ii) The end 'R' of line RS, 70mm long, is in both planes. Draw its projections when the line is in V.P. and inclined at 60° to H.P. Find the distance of end 'S' from H.P. Assume the line is in first quadrant.	U U	3 3	
Q.4		Attempt any TWO :			08
	a)	A hexagonal lamina of 30mm side, is resting on one of its corner in the H.P. Its plane is inclined at an angle of 30° to HP and perpendicular to V.P. Draw its projection.	U	4	
	b)	Draw the projections of a rhombus having diagonals 60mm and 40mm long. The bigger diagonal is inclined at 40° to H.P. with one of the end point in H.P. and the smaller diagonal is parallel to both the planes.	U	4	
	c)	A circular plate of diameter 50mm is resting on one point on circumference on H.P. The plate is inclined at 45° with V.P. and perpendicular to H.P. The centre of plate is 40mm in front of V.P. Draw its projections.	U	4	

Q.5	Attempt any TWO :			16
a)	A pentagonal prism, side of base 30mm and axis length 65mm, is kept on one of its base edge on V.P. such that the rectangular face containing that edge makes an angle of 30° with V.P. Draw the projection of prism when its axis is parallel to H.P.	U	5	
b)	A tetrahedron of 60mm long edge is resting on one of its edge on H.P. and face containing that edge is perpendicular to H.P. Draw the projection of tetrahedron when axis is parallel to V.P.	U	5	
c)	A cone, base 60mm diameter and axis 80mm long is resting on a point on the circumference of its base in H.P., with its base inclined at 45° to H.P. Draw its projections when its axis is parallel to V.P.	U	5	
Q.6	Attempt any TWO :			16
a)	A square pyramid, side of base 30mm and height 50mm is resting on its base with one of the side of the base perpendicular to the V.P. It is cut by cutting plane, inclined at 45° to the H.P. in such a way that it bisects the axis. Draw front view, sectional top view, sectional left hand side view and true shape of the section.	U	6	
b)	A cube of 60mm long edges is kept on the H.P. on one of its faces with all sides of that face equally inclined to V.P. It is cut by an auxiliary inclined plane in such a way that true shape of the section is regular hexagon. Draw front view, sectional top view and true shape of the section.	U	6	
c)	A cone, base 60mm diameter and height 70mm, is resting on the base on H.P. It is cut by a vertical section plane, inclined at 30° to V.P. and 12 mm in front of the axis. Draw top view, sectional front view, sectional side view and true shape of the section.	U	6	

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EXAM SEAT NO.

LEVEL: First

COURSE CODE:CCF 102/CCE 102

MAX. MARKS: 80

PROGRAM: EE/IE/IT/ET

COURSE NAME: Engineering Physics

TIME: 3 HRS.

DATE: 09/05/2019

Instruction:-

- 1) Answers must be written in the main answer book provided. (and supplements if required)
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN>Question No, SQN>Sub-Question No, R> Remembering, U>Understanding, A>Application

QN	S. Q. N	Question Text	Cognition Level	Co Code	Marks
Q.1		Attempt any FOUR	R/U/A	102	(08)
	a)	Define specific mass and give its SI unit.	R	01	
	b)	Shape of a liquid drop is spherical. Explain.	U	01	
	c)	Define coefficient of viscosity & give its SI unit.	R	01	
	d)	State any two applications of nanotechnology in the field of automobile.	R	03	
	e)	Define surface tension. Give its SI unit.	R	01	
	f)	Define 1) Nanotechnology 2) Nanoparticle	R	03	
Q.2		Attempt any FOUR			(16)
	a)	Explain the behavior of wire under continuously increasing load.	U	01	
	b)	Derive an expression for coefficient of viscosity using Stoke's method.	A	01	
	c)	Define capillary action. Give any three examples of capillary action.	R	01	
	d)	State any four points of distinction between longitudinal and transverse waves.	U	02	
	e)	Mention any two applications each of nanotechnology in the field of textile and environment.	R	03	
	f)	A wire of diameter 2mm and length 2.5m extends by 1.5mm when a force of 15N is applied to it. Find the Young's modulus of the wire.	A	01	
Q.3		Attempt any FOUR			(16)
	a)	Explain the molecular theory of surface tension.	U	01	
	b)	Define 1) Amplitude 2) Period 3) Frequency 4) Wavelength of a wave.	R	02	
	c)	Derive expression $h_1 r_1 = h_2 r_2$ for capillary action.	A	01	
	d)	Define stress and explain the three types of stress.	R	01	
	e)	State any four applications of viscosity.	R	01	
	f)	Define resonance. Give any three examples of resonance.	R	02	

P.T.O.

Q.4	Attempt any FOUR			(08)
a)	Define refraction of light.	R	04	
b)	State Ohm's law for electricity.	R	04	
c)	Define photoelectric effect.	R	05	
d)	State two properties of laser.	R	05	
e)	State the principle of production of X-rays.	R	05	
f)	Define critical angle.	R	06	
Q.5	Attempt any FOUR			(16)
a)	Derive prism formula to calculate refractive index of given prism.	A	04	
b)	A 6 m long copper wire has diameter 0.45 mm. If its resistance is $18\ \Omega$, calculate its resistivity.	A	04	
c)	State any four characteristics of photoelectric effect.	R	05	
d)	Distinguish between spontaneous and stimulated emission. (any four points.)	U	05	
e)	State any four applications of X-rays.	R	05	
f)	State any four applications of optical fibre.	R	06	
Q.6	Attempt any FOUR			(16)
a)	How long will light take in travelling a distance 500 m in water ? R.I. of water is $\frac{4}{3}$ and velocity of light in vacuum is 3×10^8 m/s.	A	04	
b)	Derive equation of equivalent resistance for parallel combination of three resistors.	A	04	
c)	Explain construction and working of photoelectric cell.	U	05	
d)	Describe the term population inversion.	U	05	
e)	Explain the term total internal reflection.	U	06	
f)	Obtain balancing condition for Wheatstone's network.	A	04	

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EVEN TERM END EXAM MAY-2019**EXAM SEAT NO.**

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LEVEL :- FIRST**PROGRAM : CE/ME/SM/MT****COURSE CODE :- CCF103/X103/X109/CCE103****COURSE NAME :- CHEMISTRY OF ENGINEERING MATERIALS /
ENGINEERING CHEMISTRY****MAX. MARKS : 80 TIME : 3 HRS. DATE :- 09/05 / 2019****Instruction :-**

- 1) Answers must be written in the main answer book provided.(and supplements if required)
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S Q N	Question Text	R/ U/ A	Co CCF 103	Ma rks
Q.1		Attempt any FOUR :			08
	a)	Write electronic configuration of 20Ca^{40} , 7N^{14}	U	1	
	b)	State Aufbau principle.	R	1	
	c)	Define electroplating.	R	2	
	d)	State Faraday's first law of electrolysis.	R	2	
	e)	What is corrosion?	R	3	
	f)	Mention factors affecting Wet corrosion.	R	3	
Q.2		Attempt any FOUR :			16
	a)	Explain Bohr's theory of atom.	U	1	
	b)	On the basis of electrovalency explain the formation of NaCl molecule.	A	1	
	c)	Distinguish between atom and ion.	U	2	
	d)	What is degree of ionization? Explain any three factors affecting on it	U	2	
	e)	With neat labelled diagram explain the process of galvanizing.	U	2	
	f)	Name and explain the process used to protect the large sized and irregular shaped articles.	U	3	
Q.3		Attempt any FOUR :			16
	a)	Distinguish between i) Soft water and Hard water ii) Temporary Hardness and permanent hardness.	U	4	
	b)	Write any four reactions of hard water with soap.	A	4	
	c)	If hard water is used for drinking and cooking purpose then write its disadvantages.	U	4	
	d)	What is meant by scale formation in boilers? Explain its causes.	U	4	
	e)	How will you sterilize impure water by using bleaching powder? Explain with the help of chemical reactions.	U	4	
	f)	With the help of chemical reactions explain the regeneration of both the types of resins.	A	4	

P.T.O.

Q.4	Attempt any FOUR :			08
	a) Distinguish between mineral and ore (any two points)	U	6	
	b) Define alloy and Gangue.	R	6	
	c) Select lubricants for sewing machine and state its properties.	A	7	
	d) State functions of Drying oil and pigment. (Each two functions)	R	7	
	e) Define Adhesive and composite materials.	R	7	
	f) Write preparation of Glass Wool.	R	7	
Q.5	Attempt any FOUR :			16
	a) With example state four purposes of making alloy.	R	6	
	b) With diagram explain extreme pressure lubrication.	U	7	
	c) Distinguish between paint and varnish (any four points)	U	7	
	d) State four engineering properties and their related applications of plastic	U	7	
	e) Explain with chemical reactions vulcanization of rubber.	U	7	
	f) Classify composite materials and state its applications.	U	7	
Q.6	Attempt any FOUR :			16
	a) Distinguish between calcination and roasting (any four points)	U	6	
	b) With diagram explain Electromagnetic separation method.	U	6	
	c) Define lubricant. Write functions of lubricants.	U	7	
	d) Write characteristics of oil paint. Write functions of plasticizer and Thinner (two each)	R	7	
	e) With example explain condensation polymerization.	U	7	
	f) Define i) Tack ii) Elasticity iii) Rebound iv) Abrasion resistance.	R	5	

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EVEN TERM END EXAM MAY -2019**EXAM SEAT NO.**

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LEVEL: FIRST**PROGRAM: COMMON****COURSE CODE: CCF106/0108/X110/CCE106/R108 COURSE NAME: ENGINEERING MATHEMATICS****MAX. MARKS: 80****TIME: 3 HRS.****DATE: 13/05/2019**

Instruction:-

- 1) Answers must be written in the main answer book provided. (and supplements if required)
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) **QN**>Question No, **SQN**>Sub-Question No, **R**> Remembering, **U**>Understanding, **A**>Application **CO**>Course outcome

QN	S	Q	Question Text	R	CO	Marks
	N			U	CF106	
				A		(08)
Q.1			Attempt any FOUR			
	a)		Find centroid of a triangle whose vertices are (-1, 2), (3, 2), (4, 5)	R	1	
	b)		Find the distance between parallel lines $3x+2y-6=0$ and $3x+2y-12=0$	U	1	
	c)		Find equation of line passing through (-4, 6) and (8, -3)	R	1	
	d)		Find center and radius of circle $2x^2+2y^2+5x-6y+4=0$	U	1	
	e)		Find equation of circle having center (-1, -2) and radius $\sqrt{15}$	R	1	
	f)		Show that the root of equation $x^3 - 2x - 5 = 0$ lies between 2 and 3	R	2	
Q.2			Attempt any FOUR			(16)
	a)		Find area of quadrilateral whose vertices are (4, 1), (-3, 0), (-2, 3) and (3, 4)	A	1	
	b)		Find the equation of straight line passing through (4, 5) and perpendicular to the line $7x - 5y = 420$	U	1	
	c)		Find the equation of circle whose center is at point of intersection of lines $2x+3y=13$, $5x-y=7$ and passing through the point (1, -1).	A	1	
	d)		Using Bisection method, find the approximate root of $x^2 + x - 3 = 0$ (Three iteration only)	A	2	
	e)		Using Regula falsi method find real root of the equation $xe^x = 3$ (Two iteration)	A	2	
	f)		Using Bisection method find value of $\sqrt{10}$ by performing three iteration	A	2	
Q.3			Attempt any FOUR			(16)
	a)		Find the angle between the lines $y = 5x + 6$, $y = x$	A	1	
	b)		Find the equation of circle whose center is at (-1, 3) and which touches the line $2x+y=4$	U	1	
	c)		Solve the following equation by Jacobi's method $20x + y - 2z = 17$, $3x + 20y - z = -18$, $2x - 3y + 20z = 25$	A	2	
	d)		Solve the equation by using Gauss-seidal method, $4x + y + 2z = 12$, $-x + 11y + 4z = 33$, $2x - 3y + 8z = 20$	A	2	

P.T.O

	e)	Solve the following equations by Gauss –seidal method $5x - y = 9$, $x - 5y + z = -4$, $y - 5z = 6$	A	2	
	f)	Solve the following equations by Jacobis method $10x + y + z = 12$, $x + 10y + z = 12$, $x + y + 10z = 12$	A	2	
Q.4		Attempt any FOUR			(08)
	a)	If $f(x) = \frac{x^2 + 2x + 5}{x^3 + 8}$ find $f(1) + f(-1)$	U	3	
	b)	Define odd and even functions	R	3	
	c)	Evaluate $\lim_{x \rightarrow 1} \frac{x^3 - 1}{x - 1}$	U / A	3	
	d)	Evaluate $\lim_{x \rightarrow 0} \frac{3 \sin x + 4x}{7x - 2 \tan x}$	U / A	3	
	e)	State the Quotient Rule of the Derivative.	U	4	
	f)	Find the slope of the tangent to the circle $x^2 + y^2 = 25$ at $(-3, 4)$	A	4	
Q.5		Attempt any FOUR			(16)
	a)	If $f(x) = \frac{1}{1-x}$ then show that $f(f(f(x))) = x$	U	3	
	b)	Evaluate $\lim_{x \rightarrow \infty} \left(\sqrt{x^2 + 3x + 2} - \sqrt{x^2 + x + 1} \right)$	A	3	
	c)	If $x\sqrt{1+y} + y\sqrt{1+x} = 0$ then show that $\frac{dy}{dx} = -\frac{1}{(1+x)^2}$	U	4	
	d)	Find $\frac{dy}{dx}$ if $y = \tan^{-1} \sqrt{\frac{1-x}{1+x}}$	A	4	
	e)	Find $\frac{dy}{dx}$ if $y = (x)^{\sin x} + (\sin x)^x$	A	4	
	f)	Find the equations of the tangents to the curve $y = x^2 - 2x - 3$ where it meets the x-axis	A	4	
Q.6		Attempt any FOUR			(16)
	a)	Evaluate $\lim_{x \rightarrow \frac{\pi}{4}} \frac{\sin x - \cos x}{x - \frac{\pi}{4}}$	A	3	
	b)	Find $\frac{dy}{dx}$ if $\sin y = \log(x+y)$	A	4	
	c)	If $y = \cos^{-1} \left(\frac{\cos x + \sqrt{3} \sin x}{2} \right)$ show that $\frac{dy}{dx} = -1$	U	4	
	d)	If $x = 3 \cos \theta - 2 \cos^3 \theta$ and $y = 3 \sin \theta - 2 \sin^3 \theta$ find $\frac{dy}{dx}$ at $\theta = \frac{\pi}{4}$	A	4	
	e)	If $y = (\sin^{-1} x)^2$ prove that $(1-x^2) \frac{d^2 y}{dx^2} - x \frac{dy}{dx} - 2 = 0$	U	4	
	f)	A metal wire 36 cm long is bent to form a rectangle. Find its dimensions when its area is maximum.	A	4	

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EVEN TERM END EXAM MAY-2019**EXAM SEAT NO.**

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LEVEL :- FOURTH**PROGRAM : METALLURGY****COURSE CODE :- MTF403/MTE405****COURSE NAME FAILURE ANALYSIS AND SELECTION OF MATERIAL****MAX. MARKS : 80 TIME : 3 HRS. DATE :- 10/05/2019****Instruction :-**

- 1) Answers of two sections must be written in separate section answer book provided.
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S Q N	Section- I	R/ U/ A	Co MTF 403	Mar ks
Q.1		Attempt any FOUR :			08
	a)	Enlist different categories a of stressor in failure analysis	R	2	
	b)	Define Fracture and write its mode.	R	2	
	c)	Enlist two types of Fracture and write their physical appearance.	R	2	
	d)	Define Fracture toughness of material.	R	2	
	e)	Define critical crack size and crack growth under fatigue loading.	R	2	
	f)	Define stress corrosion cracking in material	R	3	
Q.2		Attempt any FOUR :			16
	a)	Explain the components of failure analysis report.	U	1	
	b)	Discuss different types of loading in engineering components.	U	4	
	c)	Discuss the effect of fracture toughness i) Increasing temperature ii) Increasing strain rate iii) Increasing yield strength iv) Increase in grain size.	U	3	
	d)	$K = Y\sqrt{\pi a}$ Explain the relationship in fracture mechanics.	U	3	
	e)	Discuss different mode of Wears failure in bearing and steps to prevent failure.	A	1	
	f)	State different types of corrosion failure and describe inter granular corrosion for underground pipe.	A	3	
Q.3		Attempt any FOUR :			16
	a)	During forging operation for making shell it was observed that punch got fractured after twenty seven operation. The material of punch is H 13 (tool steel) . Write procedural steps for carrying out metallurgical failure investigation.	U	1	
	b)	Discuss the effect of residual stresses during failure of die and punch.	U	4	
	c)	Discuss the factors influence in brittle to ductile transition state.	A	2	
	d)	Describe radiographic testing for detection of flow in Welded V joint of steel.	U	2	

P.T.O.

	e)	Explain three types of fatigue loading conditions with neat sketches.	U	3	
	f)	Discuss the dealloying corrosion in failure analysis. Write example of dealloying.	U	4	
QN	S Q N	Section- II	R/ U/ A	Co MTF 403	Mar ks
Q.4		Attempt any FOUR :			08
	a)	What is formability? Write its significance.	R	6	
	b)	Define paramagnetism. Give examples of paramagnetic materials.	R	6	
	c)	Write effect of carbon percentage on machinability of steel.	U	6	
	d)	Write chemical composition, properties and applications of martensitic steel.	R	7	
	e)	Write chemical composition, properties and applications of Haste alloy.	R	6	
	f)	What is mean by non-deforming tool steel?	R	7	
Q.5		Attempt any FOUR :			16
	a)	Explain the classification of tool steel on the basis of their applications.	R	7	
	b)	Explain steps to be followed in material substitution for an existing design.	U	5	
	c)	Describe three stages of creep.	R	6	
	d)	Define weldability. Explain factors that control weldability.	U	5	
	e)	Explain sensitization of 18-8 stainless steels.	U	7	
	f)	Write chemical composition, properties and applications of following alloys (any two) i) Duralumin ii) Alnico iii) Hadfield steels.	R	6	
Q.6		Attempt any FOUR :			16
	a)	What three general types of damages may occur to metals & alloys resulting in loss of strength at high temp.	U	6	
	b)	Explain factors in brief influencing machinability.	U	6	
	c)	Differentiate between Hard magnets and Soft magnets.	U	6	
	d)	Write chemical composition, properties and applications of following alloys i) Y alloy ii) S. G. Iron iii) High carbon steel.	R	8	
	e)	Differentiate between cold work tool steel and hot work tool steel.	U	7	
	f)	Suggest suitable materials for following applications i) Cylinder block ii) Crank shaft iii) Surgical tools.	A	8	

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EVEN TERM END EXAM MAY-2019**EXAM SEAT NO.**

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LEVEL :- THIRD**PROGRAM : METALLURGY****COURSE CODE :- MTF301****COURSE NAME :- METALLURGICAL THERMODYNAMICS****MAX. MARKS : 80 TIME : 3 HRS. DATE :- 10/05/2019****Instruction :-**

- 1) Answers must be written in the main answer book provided.(and supplements if required)
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S Q N	Question Text	R/ U/ A	Co MTF 301	Ma rks
Q.1		Attempt any FOUR :			08
	a)	Write definition of Extensive property and intensive property.	R	1	
	b)	What is heat capacity?	U	2	
	c)	Draw on P-V diagram i) Isochoric process ii) Adiabatic process.	R	1	
	d)	Write statement of Hess's law.	R	2	
	e)	Define Energy and Enlist the sources of energy.	U	1	
	f)	What are exothermic and Endothermic reactions?	U	2	
Q.2		Attempt any FOUR :			16
	a)	Describe state function and path function.	U	1	
	b)	Write and explain mathematical expression of 1 st law of Thermodynamic.	R	2	
	c)	Define thermodynamic system and give its classification in brief.	R	2	
	d)	Prove $C_p = \frac{dH}{dT}$ at constant pressure.	R	2	
	e)	Write short note on scope of metallurgical thermodynamics.	U	1	
	f)	Write importance of Enthalpy in thermodynamics.	U	2	
Q.3		Attempt any FOUR :			16
	a)	Write difference between reversible process and irreversible process.	U	1	
	b)	What is significance of Hess's law in thermodynamics.	R	2	
	c)	Explain system, surrounding and boundary with suitable example.	U	1	
	d)	Write mathematical expression of enthalpy and explain it.	R	2	
	e)	Explain isobaric and Polytropic process.	U	1	
	f)	Describe endothermic reactions.	R	2	

P.T.O.

Q.4	Attempt any FOUR :			08
	a) Define Thermal Equilibrium.		R	3
	b) Define entropy.		R	3
	c) State meaning of ideal solution.		U	4
	d) Types of Ellingham diagram.		R	5
	e) State significance of Ellingham diagram.		R	5
	f) Define free energy.		R	3
Q.5	Attempt any FOUR :			16
	a) State and explain Kelvin Plank's and Clausious statement.		U	3
	b) Derive the relation $C_p - C_v = R$.		A	4
	c) Explain Sievert law and its significance.		I	4
	d) State and explain Zeroth law of thermodynamics.		U	3
	e) Explain with neat sketch oxide Ellingham's diagram,		A	5
	f) Give significance of Ellingham's diagram.		U	5
Q.6	Attempt any TWO :			16
	a) State and explain mathematical expression of second law of thermodynamics.		U	3
	b) Explain free energy and derive expression for Helmezt free energy and Gibbs free energy.		U	4
	c) i) Explain significance of Entropy. ii) State and explain Roult's law and Henry's Law.		U U	3 4

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EXAM SEAT NO.

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LEVEL: FIRST

PROGRAM: CE/ME/SM/MT

COURSE CODE: CCF101/X102/CCE101/0104

COURSE NAME: ENGINEERING PHYSICS

MAX. MARKS: 80

TIME: 3 HRS.

DATE: 08/05/2019

Instruction:-

- 1) Answers must be written in the main answer book provided. (and supplements if required)
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN>Question No, SQN>Sub-Question No, R> Remembering, U>Understanding, A>Application CO>Course outcome

S QN	S Q N	Question Text	R U A	CO CCF101	Marks
Q.1		Attempt any FOUR			(08)
	a)	Define factor of safety.	R	1	
	b)	State any two applications of elasticity.	R	1	
	c)	Define specific volume & specific weight.	R	1	
	d)	State Stoke's law of viscosity.	R	1	
	e)	Define Cohesive force and Adhesive force.	R	1	
Q.2	f)	State the effect of temperature & impurity on surface tension.	U	1	
		Attempt any FOUR			(16)
	a)	Define stress. Explain its types.	U	1	
	b)	State and explain Newton's law of viscosity. Define coefficient of viscosity.	U	1	
	c)	Explain Laplace molecular theory of surface tension.	U	1	
	d)	Define capillary action. Give its any three examples.	R	1	
Q.3	e)	Differentiate between longitudinal wave and transverse wave (any four points).	U	2	
	f)	Define Nanostructured material. Give its any two examples.	R	3	
		Attempt any FOUR			(16)
	a)	A wire of diameter 2mm and length 2.5m extends by 1.5mm by applying a force of 15N. Find Young's modulus of wire.	A	1	
	b)	Derive the expression for coefficient of viscosity of liquid by Stokes method.	A	1	
	c)	Define Resonance. Give its any two applications.	R	2	
	d)	State any four applications of surface tension.	R	1	
	e)	Explain free and forced oscillations with one example each.	U	2	
	f)	State any four applications of Nanotechnology.	R	3	
P.T.O					

Q.4	Attempt any FOUR			(08)
a)	Define i) Refraction ii) Dispersion	R	4	
b)	State any two properties of photons.	R	5	
c)	Define i) Photoelectric effect ii) Threshold frequency	R	5	
d)	Mention any two properties of x-ray.	R	5	
e)	Define i) Echo ii) Reverberation	R	6	
f)	Define ultrasonic waves.	R	6	
Q.5	Attempt any FOUR			(16)
a)	For refraction of light through a prism show that $A + \delta = i + e$	A	4	
b)	With the help of a neat circuit diagram of meter-bridge, derive an expression for unknown resistance.	A	4	
c)	Explain the concept of population inversion with the help of neat diagrams.	U	5	
d)	Find the refractive index of a prism, if its refracting angle is 60° and the angle of minimum deviation is $48^\circ 36'$	A	4	
e)	With the help of a neat diagram explain the construction of a photo-cell.	U	5	
f)	When two resistances are connected in series their effective resistance is 100Ω but when they are connected in parallel the effective resistance is 24Ω . Calculate the two resistances.	A	4	
Q.6	Attempt any FOUR			(16)
a)	i) State and explain Ohms law. ii) Define specific resistance and give its SI unit.	R	4	
b)	State and explain four properties of laser.	U	5	
c)	Mention any four applications of x-rays.	R	5	
d)	Explain any one method of production of ultrasonic waves.	U	6	
e)	Mention the requirements of good acoustics for an auditorium (any four points)	R	6	
f)	Calculate kinetic energy of ejected photoelectrons, if light of frequency 1.39×10^{15} Hz is made incident on a metal plate of threshold frequency 1.12×10^{15} Hz. Given $h = 6.63 \times 10^{-34}$ Js.	A	5	

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LEVEL :- **THIRD**

PROGRAM : **METALLURGY**

COURSE CODE :- **MTF309/MTE101/MTE409**

COURSE NAME :- **FURNACES REFRACTORIES AND PYROMETRY**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **08/05 / 2019**

Instruction :-

- 1) Answers must be written in the main answer book provided.(and supplements if required)
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S Q N	Question Text	R/ U/ A	Co MEF 309	Ma rks
Q.1		Attempt any FOUR :			08
	a)	Enlist types of refractory.	R	1	
	b)	State any two properties of refractory.	R	1	
	c)	Define Heat treatment.	R	2	
	d)	Enlist any four names of Heat treatment furnaces.	R	2	
	e)	State functions of control value in furnace.	U	2	
	f)	Give two advantages of electric arc furnace.	R	3	
Q.2		Attempt any FOUR :			16
	a)	Describe acidic refractories with composition and applications.	U	1	
	b)	Describe basic refractories with properties and advantages.	U	1	
	c)	Enlist furnace auxiliaries used in furnace and write their functions.	U	2	
	d)	Explain construction of cupola furnace with diagram.	U	2	
	e)	Explain construction of Muffle bell furnace with diagram.	U	3	
	f)	Explain working of pit furnace with diagram.	U	3	
Q.3		Attempt any FOUR :			16
	a)	Explain PCE Testing of refractory.	U	1	
	b)	Give reasons for refractory failure.	A	1	
	c)	Describe working of indirect arc furnace.	U	2	
	d)	Explain rotary furnace with diagram.	U	2	
	e)	Describe construction of open hearth furnace.	U	3	
	f)	Explain working of Reverberatory furnace. Give its applications.	U	3	

P.T.O.

Q.4	Attempt any FOUR :			08
	a)	Write two uses of direct arc steel melting furnace.	A	4
	b)	State advantages of main frequency in induction furnace.	U	4
	c)	Which refractory used in bottom side and roof of Arc furnace.	R	4
	d)	State principle of Arc melting.	U	4
	e)	Enlist various melting furnaces for non-ferrous melting.	R	5
	f)	State advantages of gas fired melting furnace.	A	5
Q.5	Attempt any FOUR :			16
	a)	Explain construction and working of medium frequency coreless induction furnace.	U	4
	b)	Explain advantages and disadvantages of indirect arc steel melting furnaces.	R	4
	c)	Why it is necessary to keep liquid heat in core induction furnace. State its advantages.	A	5
	d)	Explain capacity (melt size) power limit and ,imitation of induction furnace.	U	4
	e)	Explain advantages and uses of lift out type Al melt furnace.	R	5
	f)	Explain working of tilting furnaces.	U	5
Q.6	Attempt any FOUR :			16
	a)	Enlist various Thermometers. Explain principle of metal expansion type thermometer.	U	6
	b)	Explain temperature measurement by colour. Wheather it is exact or approximate?	R	6
	c)	Explain “ See back” effect.	U	6
	d)	Explain working of thermocouple with suitable example.	A	6
	e)	List various Non contact type temperature measuring device. Write principle of optical pyrometer.	R	6
	f)	State classification of thermocouple. State advantages of thermocouple over other temperature measuring device.	A	6

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EXAM SEAT NO.

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LEVEL :- THIRD

PROGRAM : METALLURGY

COURSE CODE :- MTF302/MG203/MTE302

COURSE NAME :- MATERIAL TESTING

MAX. MARKS : 80 TIME : 3 HRS. DATE :- 09/05 / 2019

Instruction :-

- 1) Answers must be written in the main answer book provided. (and supplements if required)
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S Q N	Question Text	R/ U/ A	Co MTF 302	Ma rks
Q.1		Attempt any FOUR :			08
	a)	Give different methods of hardness tests.	R	3	
	b)	Define Poisson's ratio.	A	1	
	c)	State the relation between Young's Modulus and Bulk Modulus.	A	2	
	d)	Explain superficial hardness test.	A	3	
	e)	State Engg. properties of materials.	R	1	
	f)	State four different mechanical loads.	R	1	
Q.2		Attempt any TWO :			16
	a)	Show toughness, resilience, modulus of elasticity, and yield point on a typical stress strain curve.	A	1	
	b)	Give four specifications of a UTM and state its importance.	R	2	
	c)	Draw a neat sketch and explain evaluation of properties. <i>Draw stress-strain curve of low carbon steel & explain stages in plastic deformation, from elastic limit upto breaking point of specimen.</i>	A	2	
Q.3		Attempt any FOUR :			16
	a)	Explain the principle of load application in Brinell Hardness machine.	R	3	
	b)	Classify types of stresses. (explain any two)	R	1	
	c)	Describe stress concentration with diagram.	A	1	
	d)	Explain Vicker Hardness Test.	R	3	
	e)	What is proof stress? When is it required? How is it expressed?	A	2	
	f)	Explain calculation of BHN	A	3	

P.T.O.

Q.4	Attempt any FOUR :			08
a)	Draw Charpy U-notch specimen with dimensions.	R	4	
b)	Give examples of components prone to fatigue failure. (any two)	R	5	
c)	How is fatigue strength of material improved?	U	5	
d)	What is stress rupture?	U	6	
e)	State the role of developer in Dye penetrant test.	R	7	
f)	State precautions to be taken while conducting radiography test.	R	7	
Q.5	Attempt any FOUR :			16
a)	Compare Izod test with Charpy with respect to following points. i) Notch used ii) Position of specimen iii) Striking point iv) Specimen Dimensions.	U	4	
b)	i) State purposes of impact test. ii) What does an impact test measure? iii) Define impact toughness.	R/ U	4	
c)	Draw neat sketch of fatigue testing machine. State functions of different parts.	U	5	
d)	Illustrate S-N curve with the help of neat sketch. What is endurance limit?	U	5	
e)	Describe important variables affecting fatigue test.	U	5	
f)	Describe three stages of creep with neat sketch.	U	6	
Q.6	Attempt any FOUR :			16
a)	Suggest and describe the test to find out material performance subjected to tensile loading at high temperature.	A	6	
b)	Describe factors affecting creep properties of metal.	U	6	
c)	What is the principle of ultrasonic testing? State advantages and disadvantages of ultrasonic test.	U	7	
d)	List NDT. Compare NDT with destructive test.	U	7	
e)	Recommend test to reveal depth and type of defects present in casting. Describe the procedure.	A	7	
f)	Describe the Eddy current test to find out defects in metals.	U	7	

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LEVEL: FOURTH**PROGRAM: METALLURGY****COURSE CODE: MTF402/MG303/MTE403 COURSE NAME: FOUNDRY TECHNOLOGY -II****TIME: 3 HRS.****DATE: 30/05/2019****MAX. MARKS: 80**

Instruction:-

1) Answer to two sections must be written in separate section answer book provided

2) Illustrate your answers with sketches where ever necessary.

3) Use of non-programmable pocket calculator is permissible.

4) Mathematical and other tables will be made available on request.

5) Assume and mention suitable additional data necessary.

6) Use of Mobile is strictly prohibited.

7) QN>Question No, SQN>Sub-Question No, R> Remembering, U>Understanding, A>Application CO>Course outcome

S Q N		Question Text	R U A	CO MTF 402	Marks
Section -I					
Q.1		Attempt any FOUR			(08)
	a)	State equation of continuity with significance.	R	1	
	b)	Enlist various component of Gating system.	U	1	
	c)	State two advantages of Gating system.	A	1	
	d)	State importance of chock Area.	A	1	
	e)	State function of chills.	A	2	
	f)	State residual Mg level necessary to produce S.G iron.	R / U	3	
Q.2		Attempt any FOUR			(16)
	a)	Define term 'pouring time'. State various factors associates with pouring time. Write formula for CI casting whose mass less than 450 kgs.	U	1	
	b)	Define term 'Gating Ratio' Distinguish between pressurized and non pressurized Gating ratio.	A	1	
	c)	Explain Inscribe circle method for Riser calculation.	U	2	
	d)	Enlist various functions of Riser. State types of Riser.	R	2	
	e)	Explain Caine's methods used for riser determination.	U	2	
	f)	Write two properties and uses of Grey cast iron.	A	3	
Q.3		Attempt any FOUR			(16)
	a)	Explain various difficulties to Mg treatment for production of S.G iron.	U	3	
	b)	Explain convertor method of S.G iron making.	R	3	
	c)	What is mean by 'Carbon Equivalent' State its importance?	A	3	
	d)	Explain characteristics of steel casting.	U / R	4	
P.T.O					

	e)	Enlist various Alloying elements used in steel casting. Explain the role of Ni & Cr in stainless steel.	R	4	
	f)	Explain any one molding practice used in steel casting production.	A	4	
Section-II					
Q.4		Attempt any FOUR			(08)
	a)	Write the advantages of Al alloy.	R	5	
	b)	Give the properties of LMS & LM11 series of Al alloy.	U	5	
	c)	What is leaded tin bronze?	R	5	
	d)	Give the applications of copper alloy.	A	5	
	e)	Write the name of defect occurring during melting.	U	6	
	f)	Enlist the name of various surface defects.	U	6	
Q.5		Attempt any FOUR			(16)
	a)	Describe with sketch modification of Al-Si alloy.	U	5	
	b)	Mention some important alloy of Aluminum, their composition and applications.	R	5	
	c)	What are the various types of furnace used for copper alloy & discuss the melting practices of copper alloy.	R	5	
	d)	Explain the causes & prevention of the following casting defects. i) Slag inclusions ii) Pinholes iii) Core shift	A	6	
	e)	Describe in detail the defects that generally occur in casting due to molding & faulty Gating system.	R	6	
	f)	Mention the major casting defect that can occur due to improper pattern equipment.	U	6	
Q.6		Attempt any FOUR			(16)
	a)	Discuss the practice adopted for melting Aluminum alloy with special reference to following. i) Drossing of alloy Al alloy. ii) Melting of Al alloy.	U	5	
	b)	Enlist the various properties and advantages of Aluminum alloys.	U	5	
	c)	Explain the functions of deoxidisers added to copper melt.	A	5	
	d)	What are the causes for sand inclusion? How these can be prevented?	R	6	
	e)	Name the typical defect that occurs in casting of following metals i) Steel ii) Copper alloy iii) Cast iron	U	6	
	f)	Give reasons & remedies for surface defects i) Metal penetration ii) Sand Fusion iii) <i>Scab</i>	U	6	

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LEVEL :- THIRD**PROGRAM : METALLURGY****COURSE CODE :- MTF310/MTE401****COURSE NAME :- METAL WORKING PROCESSES****MAX. MARKS : 80 TIME : 3 HRS. DATE :- 21/05 / 2019****Instruction :-**

- 1) Answers must be written in the main answer book provided.(and supplements if required)
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S Q N	Question Text	R/ U/ A	Co CEF 308	Ma rks
Q.1		Attempt any FOUR :			08
	a)	Define cold working of metals.	R	1	
	b)	Enlist different types of stress systems in metals.	R	1	
	c)	Write the types of rolling mills, based on working stand design.	R	2	
	d)	Define Rolling Process.	R	2	
	e)	Give the size ranges of starting material of wire drawing.	R	3	
	f)	State the purposes of coating the wire.	R	3	
Q.2		Attempt any FOUR :			16
	a)	Explain elastic and plastic deformation in metals.	U	1	
	b)	Describe direct compression type and indirect compression type processes.	R	1	
	c)	Draw a neat labeled roll geometry and explain the terms i) Zone of deformation ii) angle of bite.	U	2	
	d)	Explain any two defects in rolling with causes and remedies.	U	2	
	e)	Give the causes of formation of mean scale on wire. Explain chemical method of cleaning of wire.	U	3	
	f)	With a neat labeled diagram, describe working and applications of draw bench.	A	3	
Q.3		Attempt any FOUR :			16
	a)	Explain the effect of plastic deformation on the structure and properties of metal.	U	1	
	b)	Define coefficient of draught in rolling. How it is determined?	U	2	
	c)	Enlist any four rolled products and give their size/cross sectional area specifications.	U	2	
	d)	Describe working of a three high rolling mill, with a neat diagram.	U	3	

P.T.O.

	e)	Define tube drawing. Explain the use of plug mandrel in tube drawing.	A	4	
	f)	Draw a neat labeled diagram of wire drawing die. Explain the role of each zone of die.	U	3	
Q.4		Attempt any FOUR :			08
	a)	List out different types of forging operation.	R	4	
	b)	Enlist different hand tools for forging operation.	R	4	
	c)	“The process in which the cross section of metal is reduced by forcing it to flow, through die under high pressure”. Name the process with diagram.	U	5	
	d)	In which extrusion process the direction of flow of metal is in same direction as that of ram?	R	4	
	e)	Which lubricants are used to reduce friction in direct extrusion process?	R	R	5
	f)	Define shearing and slitting operation.	R	5	
Q.5		Attempt any FOUR :			16
	a)	Describe upsetting in forging operation with neat sketch.	U	5	
	b)	Classify various forging equipment and describe hydraulic press.	U	4	
	c)	Describe pneumatic hammer with neat sketch and name lubricant use.	U	5	
	d)	Describe hydro static extrusion with neat sketch. State its advantages.	U	5	
	e)	Describe spring back in bending operation and method to eliminate it.	U/ A	5	
	f)	Discuss clearance between die and punch in shearing with neat sketch.	U	6	
Q.6		Attempt any FOUR :			16
	a)	Describe board drop hammer with neat sketch.	U	5	
	b)	Illustrate different forging defects due to process and structure of metal.	A	4	
	c)	Describe tube extrusion with neat sketch.	U	4	
	d)	Illustrate different extrusion defect with neat sketch.	A	5	
	e)	Describe deep drawing operation with neat sketch.	U	6	
	f)	Differentiate between ‘blanking and punching’. Write applications of sheet metal working.	A/ U	6	

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LEVEL :- **FOURTH**

PROGRAM : **METALLURGY**

COURSE CODE :- **MTF406/MG401/MTF310**

COURSE NAME **METAL JOINING & SPECIAL FORMING PROCESSES**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **21/05 /2019**

Instruction :-

- 1) Answers of two sections must be written in separate section answer book provided.
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S	Section- I	R/ U/ A	Co MTF 406	Mar ks
Q.1		Attempt any FOUR :			08
	a)	State general steps involved in welding process.	R	1	
	b)	Give four fuel gases used in gas welding along with oxygen.	U	2	
	c)	Draw neat sketch of gas welding torch.	U	2	
	d)	Classify arc welding processes.	U	3	
	e)	Give the meaning of each digit in "E6010" Electrode.	U	3	
	f)	Write principle of thermit welding.	U	4	
Q.2		Attempt any FOUR :			16
	a)	Write advantages of welding over casting. Classify metal forming processes.	R	1	
	b)	Write characteristics of i) Reducing flame ii) Oxidising flame in oxy acetylene welding.	U	2	
	c)	Describe equal pressure torch with neat diagram.	U	2	
	d)	Compare leftward technique and rightward technique of gas welding.	U	2	
	e)	Describe "hoses" for oxy acetylene welding process.	U	2	
	f)	Differentiate between acetylene regulator and oxygen regulator.	U	2	
Q.3		Attempt any FOUR :			16
	a)	Draw neat labelled sketch of TIG welding set. State its applications.	U	3	
	b)	A thin plate of steel is to be welded by arc welding. Suggest a suitable polarity and describe it with neat sketch.	A	3	
	c)	Sketch four welding position used in arc welding.	U	3	
	d)	Write principle, advantages and applications of Laser beam welding.	U/ A	4	
	e)	Write the principle of resistance welding. Compare Seam welding with spot welding.	U	4	
	f)	Draw neat sketch of Electroslag welding process. Comment on weld structure obtained by this process.	U	4	

P.T.O.

QN	S Q N	Section- II	R/ U/ A	Co MTF 406	Mar ks
Q.4		Attempt any FOUR :			08
	a)	Define weldability. State its significance.	U	5	
	b)	List various region in HAZ of low carbon steel with their temperature ranges.	R	5	
	c)	State principle of ECM.	R	8	
	d)	Classify modern machining processes.	U	8	
	e)	Draw AWS weld symbol and label it.	R	5	
	f)	State significance of 'Nick Bend Test'	U	7	
Q.5		Attempt any FOUR :			16
	a)	List various post treatment done On weldment. Explain any one in brief.	U	5	
	b)	List various methods of soldering. Explain composition and advantages of two soldering alloys	A	6	
	c)	Define term solders. Write composition and uses of Tinmann's solders.	A	6	
	d)	Distinguish between Brazing and soldering.	R	6	
	e)	Define term 'Brazing'. Explain mechanism of joint formation in Brazing.	R	6	
	f)	List various welding defect. State causes and remedial action for porous weld.	A	7	
Q.6		Attempt any FOUR :			16
	a)	List various NDT used for testing of weld. Explain principle of Eddy current.	U	7	
	b)	List various destructive testing used to examine soundness of weld. What is outcome of tensile test?	U	5	
	c)	Explain role of electrode and electrolyte in electrochemical machining.	R	8	
	d)	Explain working and uses of electro discharge machining(EDM)	U	8	
	e)	Explain advantage and disadvantages of cold forging.	R	8	
	f)	State four advantages of modern forging over conventional forging.	A	8	

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LEVEL: FIFTH

PROGRAM: METALLURGY

COURSE CODE: MTE505/MG210

COURSE NAME: INDUSTRIAL ENGINEERING

MAX. MARKS: 80

TIME: 3 HRS.

DATE: 27/05/2019

Instruction:-

- 1) Answer to two sections must be written in separate section answer book provided.
- 2) Figure to the right indicates marks.
- 3) Illustrate your answers with sketches wherever necessary.
- 4) Use of non-programmable pocket calculator is permissible.
- 5) Mathematical and other tables shall be made available on request.
- 6) Assume additional suitable data necessary.
- 7) Use of Mobile is strictly prohibited.

Section – I

Marks

Q.1 Attempt any **FOUR**

(08)

- a) Write down the measurement of productivity.
- b) Difference between production & productivity (4 points)
- c) Write the importance of site selections.
- d) Define Assembly. What are the types of assembly?
- e) Define production planning & control.
- f) What are the objectives of PPC?

Q.2 Attempt any **FOUR**

(16)

- a) Write down the techniques of improving productivity.
- b) Explain the factors affecting plant location.
- c) What are the types of plant layout? Explain any one.
- d) Explain the processes planning from raw material to finished production.
- e) Explain the factors affecting process planning.
- f) Explain the meaning of control in PPC.

Q.3 Attempt any **FOUR**

(16)

- a) Explain in details 'Elements of cost'.
- b) Explain the design principles of plant layout.
- c) Explain principles of material handling.
- d) What is operation sheet? Explain in brief.

- e) Define plant efficiency. Define plant efficiency factor & scrap factor.
- f) Explain the concept of line balancing.

Section – II

Marks

Q.4 Attempt any **FOUR**

(08)

- a) What is flow diagram?
- b) Enlist equipment required for time study.
- c) Define inventory control.
- d) Enlist two advantages of fixtures.
- e) What is rapid prototyping?
- f) What are 5'S'?

Q.5 Attempt any **FOUR**

(16)

- a) Explain two handed process chart and give its applications.
- b) How critical examination of activities is carried out?
- c) Describe ergonomics involved in work place layout design.
- d) What is PMTS? What are its advantages?
- e) Explain DMIAC cycle.
- f) Describe continuous improvement with KAIZEN.

Q.6 Attempt any **TWO**

(16)

- a) Define EOQ. How EOQ is calculated? How discounts affects EOQ?
- b) Explain concept of material requirement planning. Give its advantages & limitations.
- c) Explain 3-2-1 principle of location with neat sketch.

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LEVEL: THIRD

PROGRAM: CE/ME/SM/MT

COURSE CODE: CEF 313/MEF313/MEE313/ME214 COURSE NAME: HIGHER MATHEMATICS

MAX. MARKS: 80

TIME: 3 HRS.

DATE: 24/05/2019

Instruction:-

- 1) Answers must be written in the main answer book provided. (and supplements if required)
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) **QN>Question No, SQN>Sub-Question No, R> Remembering, U>Understanding, A>Application CO>Course outcome**

QN	S	Question Text	R	CO	Marks												
			U	CEF													
			A	313													
Q.1		Attempt any FOUR			(08)												
	a)	Define forward and backward difference operator.	R	1													
	b)	Prove that $EV = VE = \Delta$	U	1													
	c)	Find $\left(\frac{\Delta^2}{E}\right)x^3$	A	1													
	d)	If $z = 3^x \tan y$ find $\frac{\partial z}{\partial x}, \frac{\partial z}{\partial y}$	R	2													
	e)	If $u = e^{xyz}$ find $\frac{\partial^3 u}{\partial x \partial y \partial z}$	A	2													
	f)	If $u = \sin^{-1}\left(\frac{x}{y}\right)$ prove that $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = 0$	U	2													
Q.2		Attempt any FOUR			(16)												
	a)	Using Lagrange's interpolation formula estimate u_4 and u_6 with $u_0 = -18, u_1 = 0, u_5 = -248$	A	1													
	b)	Express $y = 3x^3 + x^2 + x + 1$ in the factorial notation. Hence find $\Delta^3 y$	A	1													
	c)	Find missing term in the following table <table><tr><td>x</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr><tr><td>y</td><td>2</td><td>5</td><td>7</td><td>-</td><td>32</td></tr></table>	x	1	2	3	4	5	y	2	5	7	-	32	A	1	
x	1	2	3	4	5												
y	2	5	7	-	32												
	d)	Using Newton's forward interpolation formula find $f(8)$ <table><tr><td>x</td><td>5</td><td>10</td><td>15</td><td>20</td></tr><tr><td>f(x)</td><td>50</td><td>70</td><td>100</td><td>145</td></tr></table>	x	5	10	15	20	f(x)	50	70	100	145	A	1			
x	5	10	15	20													
f(x)	50	70	100	145													
	e)	If $u = \log(\tan x + \tan y + \tan z)$ prove that $x^2 \frac{\partial^2 u}{\partial x^2} + 2xy \frac{\partial^2 u}{\partial x \partial y} + y^2 \frac{\partial^2 u}{\partial y^2} = 6u$	U	2													
	f)	If $u = \frac{x^3 y + y^3 x}{y - x}$ prove that $x^2 \frac{\partial^2 u}{\partial x^2} + 2xy \frac{\partial^2 u}{\partial x \partial y} + y^2 \frac{\partial^2 u}{\partial y^2} = 6u$	U	2													
Q.3		Attempt any FOUR			(16)												
	a)	Given <table><tr><td>x</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>y</td><td>7</td><td>17</td><td>45</td><td>103</td><td>203</td></tr></table> Find y when $x = 3.6$ using suitable interpolation. Using Newton's forward interpolation formula find $\sin 45^\circ$	x	0	1	2	3	4	y	7	17	45	103	203	A	1	
x	0	1	2	3	4												
y	7	17	45	103	203												
	b)	<table><tr><td>x</td><td>0</td><td>30</td><td>60</td><td>90</td></tr><tr><td>sine</td><td>0</td><td>0.5</td><td>0.87</td><td>1</td></tr></table>	x	0	30	60	90	sine	0	0.5	0.87	1	A	1			
x	0	30	60	90													
sine	0	0.5	0.87	1													

P.T.O

	c)	If $x = u \cos v$, $y = u \sin v$ prove that $JJ' = 1$	U	2	
	d)	if $u = \tan^{-1}(x^2 + 2y^2)$ prove that i) $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = \sin 2u$ ii) $x^2 \frac{\partial^2 u}{\partial x^2} + 2xy \frac{\partial^2 u}{\partial x \partial y} + y^2 \frac{\partial^2 u}{\partial y^2} = 2 \sin u \cos 3u$	U	2	
	e)	If $u = \log \left(\frac{x^3 + y^3}{x^2 + y^2} \right)$ prove that $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = 1$	U	2	
	f)	If $z^3 - xz - y = 0$ Find $\frac{\partial z}{\partial x}, \frac{\partial z}{\partial y}$	A	2	
Q.4		Attempt any FOUR			(08)
	a)	Define Laplace transform of $f(t)$	R	3	
	b)	Solve : $\frac{d^3 y}{dx^3} - \frac{5d^2 y}{dx^2} + \frac{8dy}{dx} - 4y = 0$	R	4	
	c)	Show that, the solution of differential equation : $\frac{d^3 y}{dx^3} - \frac{3d^2 y}{dx^2} + \frac{3dy}{dx} - y = 0$ is $y = (c_1 + c_2 x + c_3 x^2) e^x$	U	4	
	d)	State Convolution theorem for inverse Laplace transform.	R	3	
	e)	Prove that, $L\{\cos at\} = \frac{s}{s^2 + a^2}$	U	3	
	f)	Define linear differential equation of degree 'n' with constant coefficient.	R	4	
Q.5		Attempt any FOUR			(16)
	a)	Prove that, $L\left\{\frac{2 \sin t \sin 2t}{t}\right\} = \frac{1}{2} \log \left(\frac{s^2 + 9}{s^2 + 1} \right)$	U	3	
	b)	Solve : $\frac{d^3 y}{dx^3} + 27y = 0$	A	4	
	c)	Solve : $\frac{d^4 y}{dx^4} + \frac{2d^3 y}{dx^3} + \frac{3d^2 y}{dx^2} + \frac{2dy}{dx} = 0$	A	4	
	d)	Using the method of Partial fraction find $L^{-1} \left\{ \frac{s+29}{(s+4)(s^2+9)} \right\}$	A	3	
	e)	Show that, the solution of differential equation : $\frac{d^4 y}{dx^4} + \frac{8d^2 y}{dx^2} + 16y = 0$ is $y = (c_1 + c_2 x) \cos 2x + (c_3 + c_4 x) \sin 2x$	U	4	
	f)	Solve using Laplace transform : $\frac{dy}{dx} + y = e^{-3x}$; $y(0) = 1$	A	3	
Q.6		Attempt any FOUR			(16)
	a)	Find : $L\{t \cos 2t \cosh t\}$	A	3	
	b)	Using method of partial fraction prove that $L^{-1} \left\{ \frac{2s^2 - 4}{(s+1)(s-2)(s-3)} \right\} = \frac{-1}{6} e^{-t} - \frac{4}{3} e^{2t} + \frac{7}{2} e^{3t}$	U	3	
	c)	Using Convolution theorem for inverse Laplace transform. find : $L^{-1} \left\{ \frac{s^2}{(s^2+1)(s^2+4)} \right\}$	A	3	
	d)	Prove that solution of differential equation $\frac{d^4 y}{dx^4} + a^4 y = 0$ is $y = e^{\frac{a}{\sqrt{2}}x} \left[c_1 \cos \left(\frac{a}{\sqrt{2}}x \right) + c_2 \sin \left(\frac{a}{\sqrt{2}}x \right) \right] + e^{-\frac{a}{\sqrt{2}}x} \left[c_3 \cos \left(\frac{a}{\sqrt{2}}x \right) + c_4 \sin \left(\frac{a}{\sqrt{2}}x \right) \right]$	U	4	
	e)	Solve : $\frac{d^4 y}{dx^4} + \frac{18d^2 y}{dx^2} + 81y = 0$			
	f)	Solve : $\frac{d^3 y}{dx^3} + \frac{3d^2 y}{dx^2} + \frac{4dy}{dx} + 2y = 0$			

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EVEN TERM END EXAM MAY-2019**EXAM SEAT NO.**

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LEVEL :- THIRD**PROGRAM : METALLURGY****COURSE CODE :- MTF307/MG209/MTE308****COURSE NAME :- PHYSICAL METALLURGY-I****MAX. MARKS : 80 TIME : 3 HRS. DATE :- 27 / 05 / 2019****Instruction :-**

- 1) Answers must be written in the main answer book provided.(and supplements if required)
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S	Question Text	R/ U/ A	Co MTF 307	Ma rks
Q.1	N	Attempt any FOUR :			08
	a)	Show edge dislocation in a crystal.	R	1	
	b)	Show cooling curve for solidification of binary alloys.	R	1	
	c)	Define eutectic reaction. State eutectic reaction occurring in iron-carbon alloy system.	R	3	
	d)	Write properties of Fe ₃ C- cementite.	R	3	
	e)	Write allotropic transformation in pure iron.	R	3	
	f)	Define 'phase'.	R	1	
Q.2		Attempt any FOUR :			16
	a)	Differentiate between solid solution and intermetallic compound.	U	1	
	b)	Construct equilibrium diagram for binary alloy having complete solubility in liquid state and complete insolubility in solid state.	A	2	
	c)	Describe 'Etching' used in metallography. Write etching reagents used for steel and C.I. Why etching is essential?	A	5	
	d)	Explain effect of carbon percentage on the microstructure and properties of steels.	A	3	
	e)	Apply lever rule for finding out composition of phases at temperature and composition shown in Fig. No. 1	A	2	
	f)	Explain the procedure for determining miller indices of plane.	U	1	
Q.3		Attempt any FOUR :			16
	a)	Write steps in the preparation of metallurgical specimen.	R	5	
	b)	Explain nucleation and grain growth during solidification of liquid metal.	U	1	

P.T.O.

c)	Draw neat sketch of iron carbon equilibrium diagram. Show critical temperatures and critical compositions. Define steels and cast irons.	U	3
d)	Differentiate between FCC & BCC crystal structure with reference to atomic arrangements, properties, co-ordination no., and other parameters.	U	1
e)	Explain in brief i) Gibb's phase rule. ii) Hume Rotheries rules.	R	1
f)	Explain in brief i) Classification of steel. ii) Dendrite formation.	U	1
Q.4	Attempt any FOUR :		08
a)	List types of cast iron on basis of microstructure.	R	5
b)	Draw microstructure of S.G. Iron.	U	5
c)	Mention any two aluminium base alloys and their applications.	R & A	6
d)	Write composition and properties of gun metal.	R & U	6
e)	What are bearing materials?	U	6
f)	Write applications of lead based bearing materials.	A	6
Q.5	Attempt any FOUR :		16
a)	Explain composition properties and applications of tin based babbitt.	R & U	5
b)	What is equivalent carbon in cast irons? How this term is useful?	U	5
c)	Write composition, properties and uses of phosphor Bronze.	R & A	6
d)	What is season cracking of brasses? How it is avoided?	U & R	6
e)	Draw and explain Al-Si alloy equilibrium diagram in details.	R	6
f)	Explain LM-6 AND LM-2. Series composition and properties.	R	6
Q.6	Attempt any FOUR :		16
a)	Draw microstructure of various types of gray cast iron on the basis of graphite distribution. Which distribution is desirable?	A	5
b)	Describe the factors which control graphitization in cast iron (any two)	U	5
c)	Differentiate between α & α - β brasses.	R & U	6

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EVEN TERM END EXAM MAY-2019

EXAM SEAT NO.

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LEVEL :- FOURTH PROGRAM : METALLURGY

COURSE CODE :- MTF401/MTE402/MG302

COURSE NAME PHYSICAL METALLURGY - II

MAX. MARKS : 80 TIME : 3 HRS. DATE :- 28/05 / 2019

Instruction :-

- 1) Answers of two sections must be written in separate section answer book provided.
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN		S		Section-I		R/ U/ A	Co MTF 401	Mar ks
Q.1			N	Attempt any FOUR:				08
	a)			State critical points in steel as per Fe-Fe ₃ C diagram.		R	1	
	b)			What is CCR? Show it on TTT diagram.		U	1	
	c)			Explain why strength and hardness of normalized steel is more than annealed steel.		U	2	
	d)			State the objective of spheroidizing treatment of high carbon steel.		R	4	
	e)			Suggest approximate temperature and holding time for annealing 0.8% carbon steel of 10 cm size.		A	2	
	f)			Why oxidizing atmosphere should be avoided for heating steel for hardening?		U	3	
Q.2				Attempt any FOUR:				16
	a)			Write four characteristics of martensitic transformation.		R	2	
	b)			Compare following properties of coarse and fine grained steel i) Strength ii) Hardness iii) Creepresistance iv) Hardenability		A	2	
	c)			Draw TTT diagram for eutectoid steel and show rates of cooling for following heat treatment processes on it i) Hardening ii) Normalizing.		A	1	
	d)			Justify the need of sub zero treatment for increasing the hardness.		A	3	
	e)			What is the purpose of Annealing? State difference in full annealing and partial annealing.		U	2	
	f)			Describe structural changes during tempering.		U	4	
Q.3				Attempt any FOUR:				16
	a)			Describe any one method of finding grain size.		U	1	
	b)			Differentiate between Austenite- Pearlite and Austenite-Bainite transformation.		U	1	

P.T.O.

	c)	Explain what is temper brittleness. What is its effect on proportion of steel?	U	4	
	d)	List hardening methods. Describe direct quenching with advantages and disadvantages.	U	3	
	e)	Draw Fe Fe ₃ C equilibrium diagram and show range of temperature for annealing and normalizing on it.	A	2	
	f)	Explain the stages of heat removal when hot specimen quenched in water.	U	3	
QN	S	Section- II	R/	Co	Mar
	Q		U/	MTF	ks
	N		A	401	
Q.4		Attempt any FOUR :			08
	a)	State the temperature of carburising with justification.	R	5	
	b)	Why does grinding operation not possible after nitriding?	U	5	
	c)	“Composition of steel changes in flame hardening in order to increase surface hardness”. State True/False with justification.	R	6	
	d)	State applications of Flame hardening.	R	6	
	e)	Draw Ageing curve for Al-Cu alloy.	R	8	
	f)	What is supersaturated solid solution?	R	8	
Q.5		Attempt any FOUR :			16
	a)	State the composition of mixture used for solid carburising. State role of each constituent.	R	4	
	b)	Describe liquid carburizing with reactions	U	5	
	c)	“In a surface hardening process, the carbon & nitrogen is allowed to diffuse on surface to get 60 to 65 HRC”. Name this process and state its advantages.	A	5	
	d)	Study the Fig. No. 1 and answer i) Identify the process. ii) State required consumables for the process. iii) State advantages of process	A	6	
	e)	Describe laser beam hardening with its advantages and applications.	U	6	
	f)	Write principle of Induction hardening. State its advantages and limitations.	U	6	
Q.6		Attempt any FOUR :			16
	a)	Describe the changes taking place in first stage and second stage of graphitization.	U	7	
	b)	State different types of annealing process given to grey cast iron. Describe graphitizing annealing.	U	7	
	c)	Study Fig. No. 2 and answer i) If alloy X is heated to T ₁ and quenched, what microstructure will be found. ii) What microstructure will obtained if X composition alloy is slowly cooled from T ₁ . iii) Can alloy X be age hardened.	A	8	

d)	Write safety rules and precautions followed in heat treatment shop.	U	10	
e)	Describe the sequential stages in ageing of Al-4.5% Cu alloy.	U	8/9	
f)	State the objectives of post carburizing heat treatment. Give heat treatment for achieving max. case hardness and very fine grain size to carburized steel.	R/ A	5	

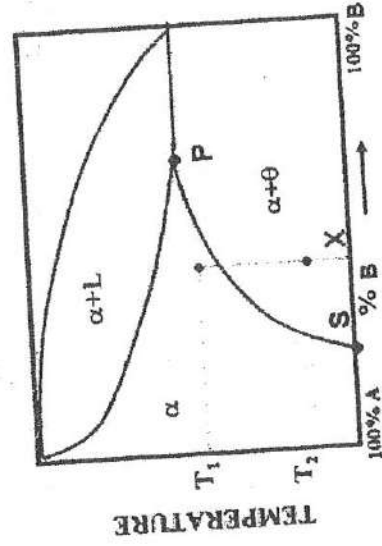


Fig. 2. Que 6 (c)

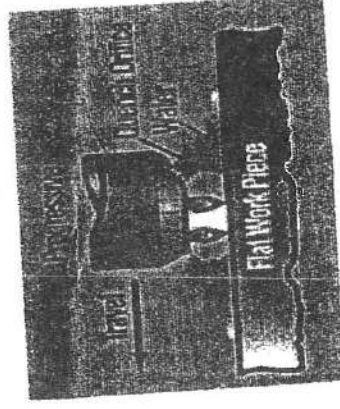


Fig 1. Que 5 (d)

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EVEN TERM END EXAM MAY -2019

EXAM SEAT NO.

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LEVEL: FIFTH

PROGRAM: METALLURGY

COURSE CODE: MTE508/MG407

COURSE NAME: ADVANCED PHYSICAL METALLURGY

MAX. MARKS: 80

TIME: 3 HRS.

DATE: 23/05/2019

Instruction:-

- 1) Answer to two sections must be written in separate section answer book provided.
- 2) Figure to the right indicates marks.
- 3) Illustrate your answers with sketches wherever necessary.
- 4) Use of non-programmable pocket calculator is permissible.
- 5) Mathematical and other tables shall be made available on request.
- 6) Assume additional suitable data necessary.
- 7) Use of Mobile is strictly prohibited.

Section – I

Marks

Q.1 Attempt any **FOUR**

(08)

- a) State and explain Bragg's law.
- b) Give composition of Alnico.
- c) Give the properties and uses of Hadfield's Mn steel.
- d) Explain Fick's first law of diffusion machinability index.
- e) Explain the effect of cobalt on important properties of steel.
- f) Write the principle of Electron microscope.

Q.2 Attempt any **TWO**

(16)

- a) Enlist the methods of X-ray diffraction. Explain any one of them.
- b) What are alloy steels? How are they classified? Explain effect of alloying elements on iron & carbon diagram.
- c) Differentiate between soft & Hard magnetic materials.

Q.3 Attempt any **TWO**

(16)

- a) Explain various types of wears with one example of each type.
- b) Define machinability? What are the factors which affect the machinability of steel?
- c) Explain i) Suitable materials for higher wear resistance. ii) Slurry erosion.

P.T.O

Section – II

Q.4 Attempt any **FOUR**

(08)

- a) What is mean by 18-8? List its properties.
- b) Give the classification of Tool steel.
- c) Define i) Diffusion flux ii) Concentration Gradient
- d) List the variable that influence the diffusion.
- e) List the properties & application of HSS.
- f) List the types of stainless steel & Give its uses.

Q.5 Attempt any **FOUR**

(16)

- a) State & explain stabilization treatment in 18-8 stainless steel & also explain sensitization.
- b) Write note on Austenitic stainless steel & Give its application.
- c) Discuss the roll of Cr in stainless steel.
- d) Why sub zero treatment (cold treatment) is necessary for H.S.S?
- e) List the advantages & disadvantages of PVD & explain Evaporation deposition techniques.
- f) Derive the Ficks first law with example.

Q.6 Attempt any **FOUR**

(16)

- a) Write note on order –disorder changes.
- b) Explain growth of oxide layer in diffusion process.
- c) Differentiate between PVD & CVD.
- d) Write note on heat treatment of machine part & measuring instrument.
- e) List the properties & application of stainless & explain Martensitic stainless steel.
- f) Write note on weld decay & discuss the techniques to avoid it.

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EVEN TERM END EXAM MAY-2019**EXAM SEAT NO.**

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LEVEL :- FIRST**PROGRAM : CE/EE/MT/SM****COURSE CODE :- CCF108/R107/X107/CCE108/R110****COURSE NAME :- ENGINEERING DRAWING - II****MAX. MARKS : 80 TIME : 4 HRS. DATE :- 29 / 05 / 2019****Instruction :-**

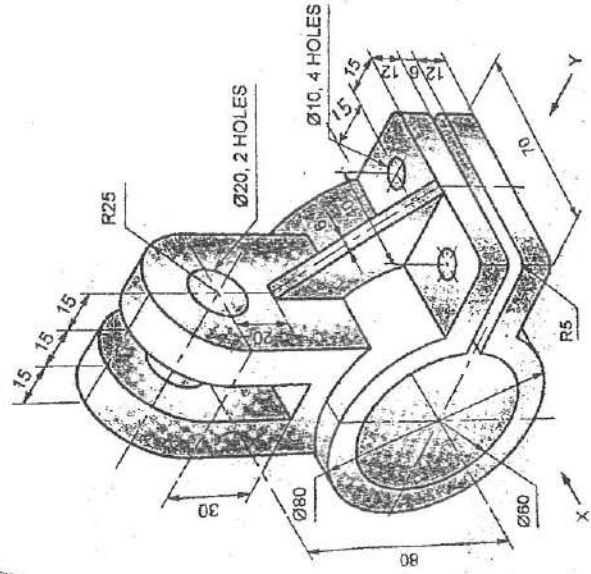
- 1) Answers must be written in the main answer book provided. (and supplements if required)
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S Q N	Question Text	R/ U/ A	Co CF 108	Ma rks
Q.1		Attempt any ONE: Fig. (1) shows pictorial view of an object. Draw following views. i) Front view looking in the direction X. ii) Side view looking in the direction Y. iii) Top view.	U	1	16
	b)	Fig. (2) shows pictorial view of an object. Draw following views. i) Front view looking in the direction X. ii) Side view looking in the direction Y. iii) Top view.	U	1	
Q.2		Attempt any ONE:			16
	a)	Fig. (3) shows isometric view of a machine component. Draw following views. i) Sectional F.V. looking in the direction X (section A-A) ii) Right hand side view. iii) Top view.	U	2	
	b)	Fig. (4) shows isometric view of a machine component. Draw following views i) Sectional F.V. looking in the direction X (section A-A) ii) Top view. iii) Left hand side view.	U	2	

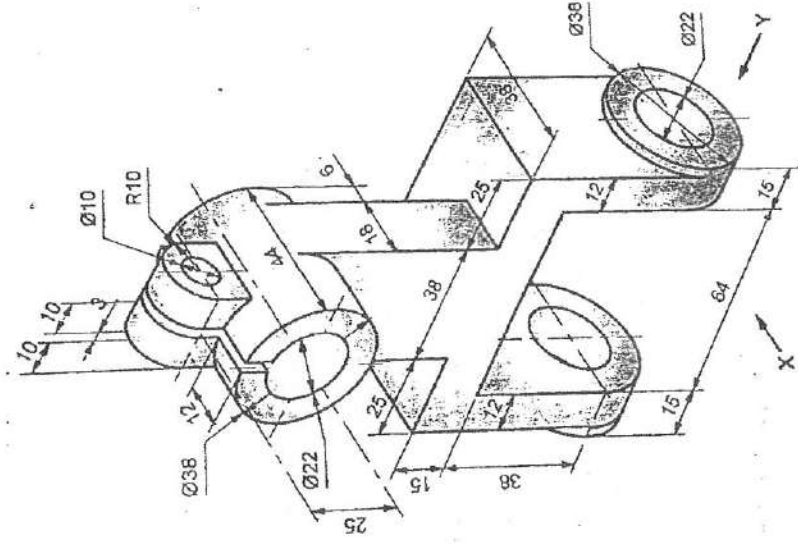
P/S

P.T.O.

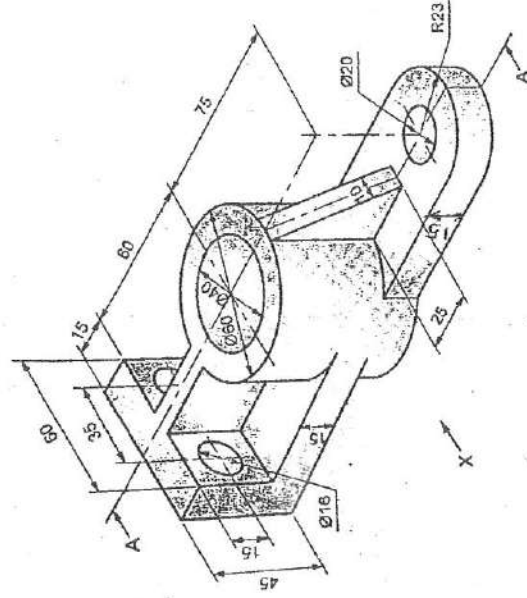
Q.3	Draw proportionate free hand sketches (any four) i) Internal thread (2 views) ii) Capstan Nut (2 views) iii) Eye Bolt (2 views) iv) Eye foundation Bolt. v) Double rivetted lap joint. vi) Looking by split pin (2 views)	U	3	08
Q.4	Attempt any ONE : a) Fig. 5 shows front view and top view of an object. By using 1 st angle method, draw i) Sectional F. V. section along B-B (02 Marks) ii) Top view (02 Marks) iii) Missing right hand side view. (04 Marks) b) Fig. 6 shows F.V. & T.V. of an object. Draw i) Missing left hand side view of an object use 1 st angle method. (04 Marks) ii) Top view. (02 Marks) iii) Sectional front view section along B-B. (02 Marks)	U	4	08
Q.5	Attempt any TWO : a) Fig No. 7 shows elbow joint of two pipes. Develop the lateral surfaces of two pipes. b) Fig. No. 8 shows F.V. of square prism 50mm side of base and 70mm height resting on its base on H.P. with all its rectangular faces equally inclined to V.P. A triangular hole is cut into it as shown. Develop the lateral surface with the hole in it. c) Fig. No. 9 shows F.V. of a square pyramid. Draw its development of lateral surface and also draw T.V.	U	6	16
Q.6	Attempt any ONE : a) Fig. No. 10 shows F.V. & T.V. of an object. Draw isometric view of an object consider 'O' as an origin. b) Fig No. 11 shows F.V. & T.V. of an object. Draw isometric projection of an object. Construct isometric scale. Consider 'O' as an origin.	U	5	16



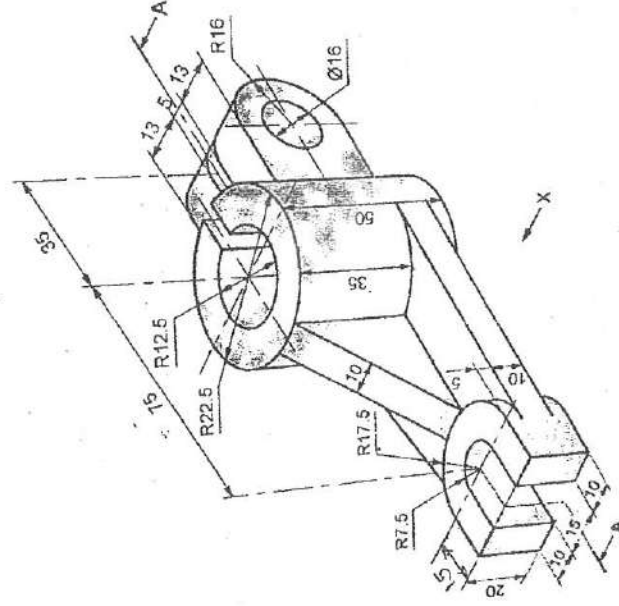
Q.1(a). Fig(1)



Q.1(b) Fig(2)

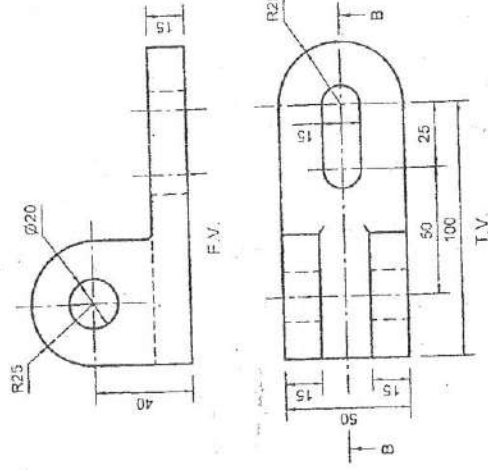


Q.2(a). Fig(3)

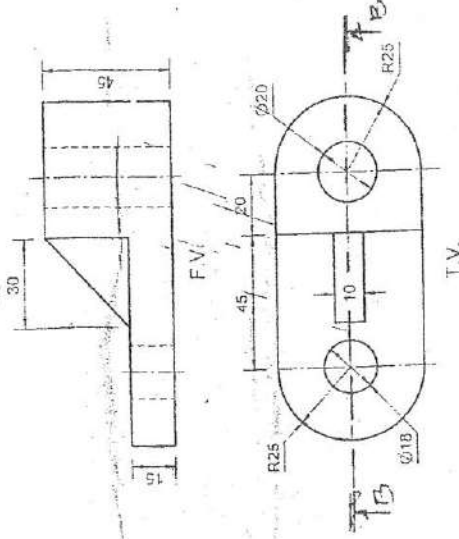


Q.2(b). Fig(4)

(P.T.O.) (3/5)



Q.4(a) Fig-5 ↑



Q.4(b) Fig-6 ↑

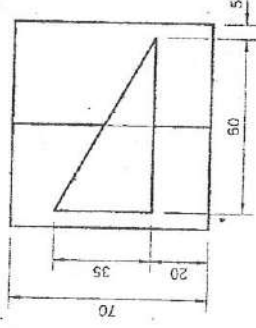
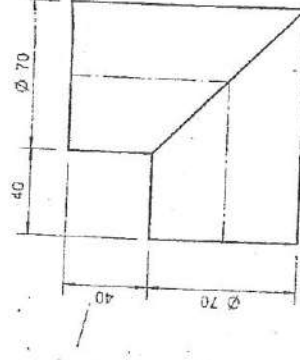


Fig-8
Q.5(b) ↑



Q.5(a) Fig-7 ↑

(P.T.O.)

4/5

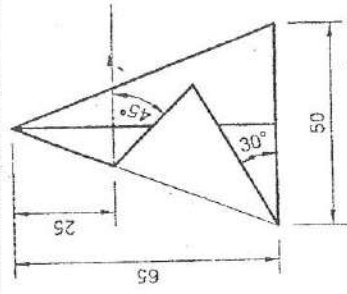
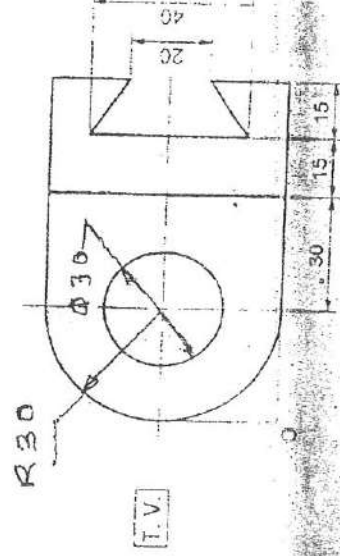
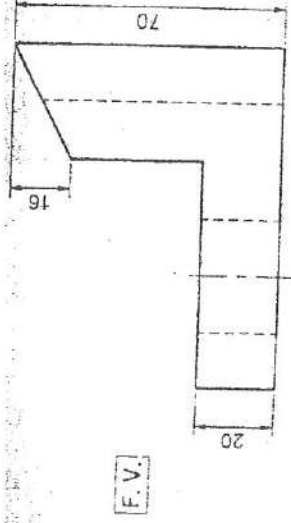
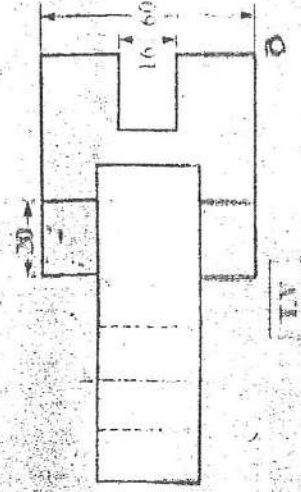
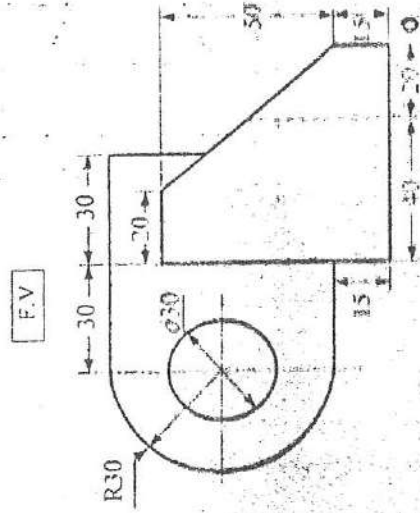


Fig-9
Q.5(c)



Q.6(a) Fig 10-10



Q.6(b)
Fig-11

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EVEN TERM END EXAM MAY-2019**EXAM SEAT NO.**

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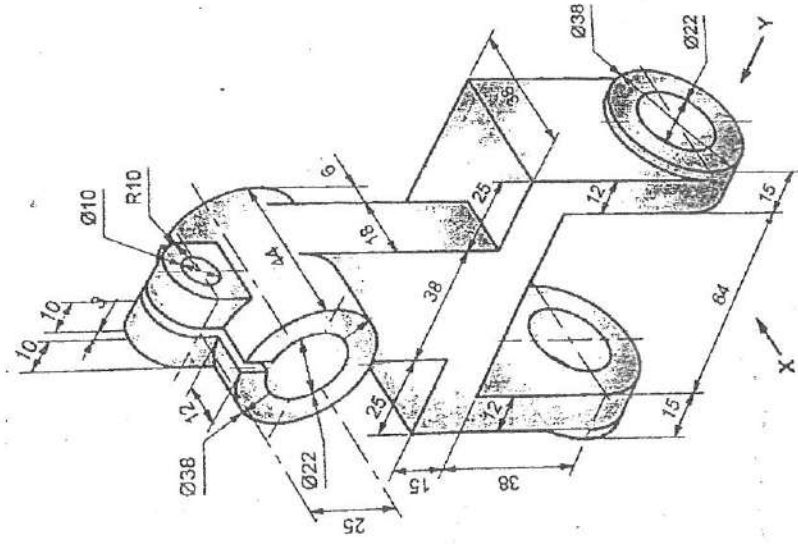
LEVEL :- FIRST**PROGRAM : CE/EE/MT/SM****COURSE CODE :- CCF108/R107/X107/CCE108/R110****COURSE NAME :- ENGINEERING DRAWING - II****MAX. MARKS : 80 TIME : 4 HRS. DATE :- 29 / 05 / 2019****Instruction :-**

- 1) Answers must be written in the main answer book provided.(and supplements if required)
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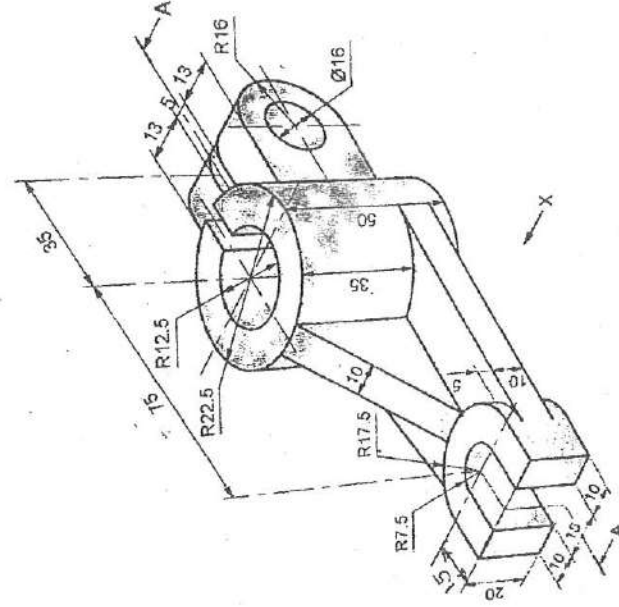
QN	S	Question Text	R/ U/ A	Co CF 108	Ma rks
Q.1		Attempt any ONE: a) Fig. (1) shows pictorial view of an object. Draw following views. i) Front view looking in the direction X. ii) Side view looking in the direction Y. iii) Top view.	U	1	16
	b)	Fig. (2) shows pictorial view of an object. Draw following views. i) Front view looking in the direction X. ii) Side view looking in the direction Y. iii) Top view.	U	1	
Q.2		Attempt any ONE: a) Fig. (3) shows isometric view of a machine component. Draw following views. i) Sectional F.V. looking in the direction X (section A-A) ii) Right hand side view. iii) Top view.	U	2	16
	b)	Fig. (4) shows isometric view of a machine component. Draw following views i) Sectional F.V. looking in the direction X (section A-A) ii) Top view. iii) Left hand side view.	U	2	

P.T.O.

Q.3	Draw proportionate free hand sketches (any four) i) Internal thread (2 views) ii) Capstan Nut (2 views) iii) Eye Bolt (2 views) iv) Eye foundation Bolt. v) Double rivetted lap joint. vi) Looking by split pin (2 views)	U	3	08
Q.4	Attempt any ONE : a) Fig. 5 shows front view and top view of an object. By using 1 st angle method, draw i) Sectional F.V. section along B-B (02 Marks) ii) Top view (02 Marks) iii) Missing right hand side view. (04 Marks) b) Fig. 6 shows F.V. & T.V. of an object. Draw i) Missing left hand side view of an object use 1 st angle method. (04 Marks) ii) Top view. (02 Marks) iii) Sectional front view section along B-B. (02 Marks)	U	4	08
Q.5	Attempt any TWO : a) Fig No. 7 shows elbow joint of two pipes. Develop the lateral surfaces of two pipes. b) Fig. No. 8 shows F.V. of square prism 50mm side of base and 70mm height resting on its base on H.P. with all its rectangular faces equally inclined to V.P. A triangular hole is cut into it as shown. Develop the lateral surface with the hole in it. c) Fig. No. 9 shows F.V. of a square pyramid. Draw its development of lateral surface and also draw T.V.	U	6	16
Q.6	Attempt any ONE : a) Fig. No. 10 shows F.V. & T.V. of an object. Draw isometric view of an object consider '0' as an origin. b) Fig No. 11 shows F.V. & T.V. of an object. Draw isometric projection of an object. Construct isometric scale. Consider '0' as an origin.	U	5	16

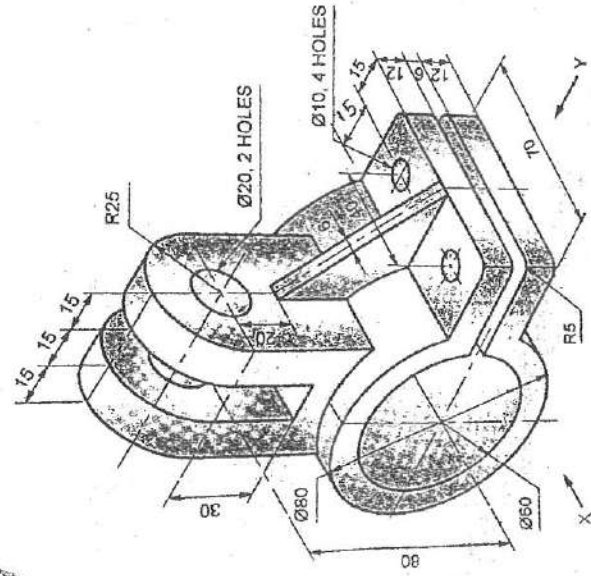


Q.1(b) Fig(2)

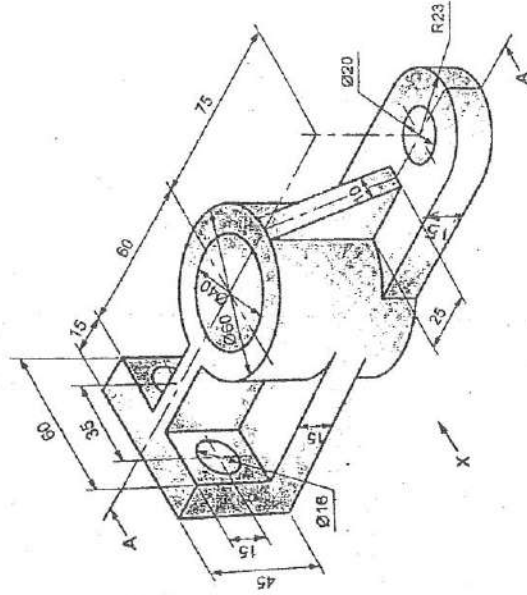


Q.2(b) Fig(4)

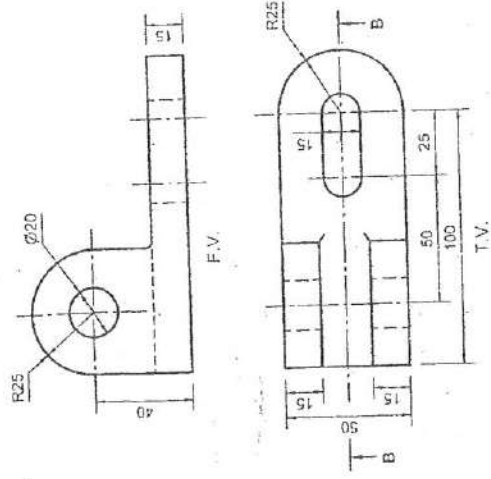
(P.T.O.) (3/5)



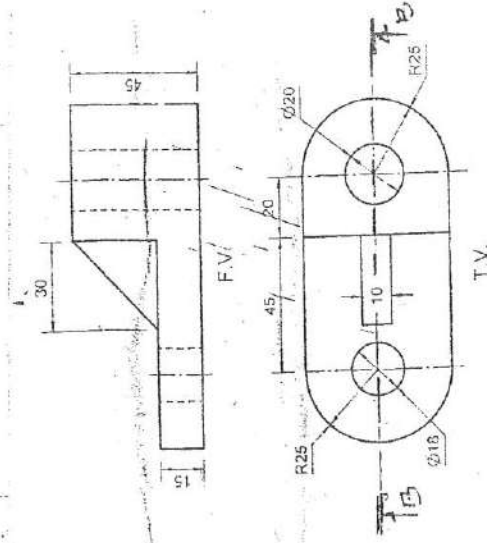
Q.1(a) Fig(1)



Q.2(a) Fig(3)



Q.4(a) Fig-5f



Q.4(b) Fig-6

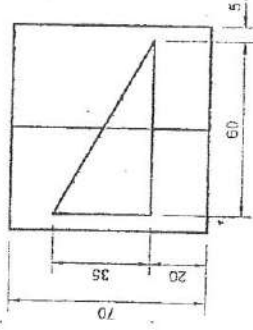
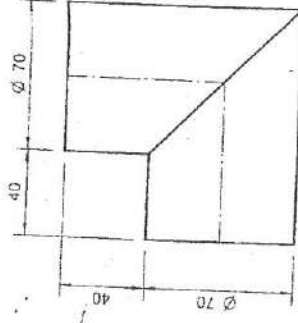


Fig 8
(9.5b)



9.5(a) Fig. 7.4

(P.T.O.)

4/5

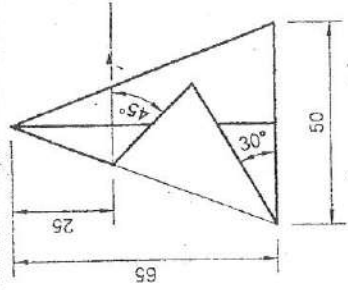
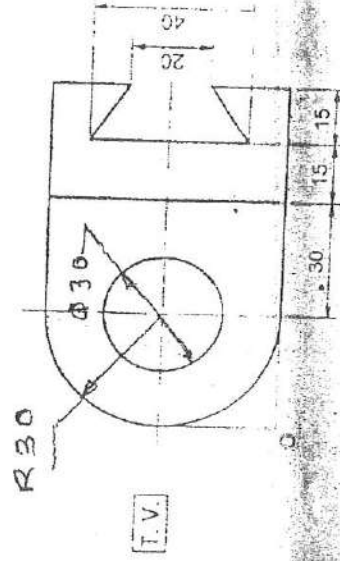
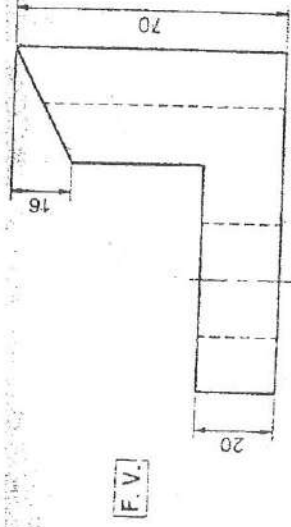
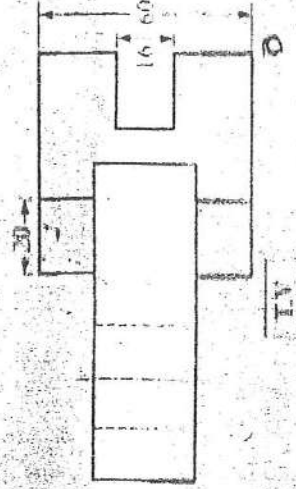
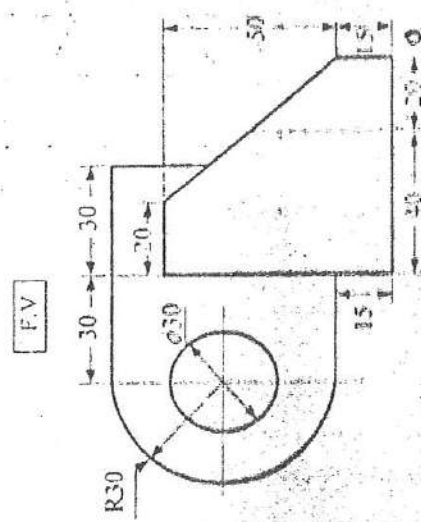


Fig-9
Q.5(c)



Q.6(a) Fig 10-10



Q.6(b)

Fig-11

