

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: FOURTH**PROGRAM: SUGAR MANUFACTURING****COURSE CODE: SMF402/SME402****COURSE NAME: SUGAR MANUFACTURING -I****MAX. MARKS: 80****TIME: 3 HRS.****DATE: 21/05/2019****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 SMF 402	Marks
Section -I					
Q.1		Attempt any FOUR			(08)
	a)	Explain purpose of raw Juice heating.	U	1	
	b)	Compare Decanter and vacuum filter.	U	2	
	c)	Explain purpose of sulphar juice heating.	U	1	
	d)	State rentation time required for clarifier.	R	2	
	e)	State reasons for deposition for scale.	R	3	
	f)	Recall entrainment.	R	3	
Q.2		Attempt any FOUR			(16)
	a)	Draw neat sketch of juice heater with ammonia removal arrangement.	U	1	
	b)	Summarize possible cause of high mud level.	U	2	
	c)	Explain working of vacuum filter.	U	2	
	d)	Explain Reliux principle.	U	3	
	e)	Explain incondensable gas removal arrangement in evaporator body.	U	3	
	f)	Describe vapor bleeding arrangement of evaporator set.	U	3	
Q.3		Attempt any FOUR			(16)
	a)	Compare raw Juice heating and sulphor juice heating.	U	1	
	b)	Explain mode of heating of Raw Juice & Suphar Juice.	U	1	
	c)	Draw neat sketch of clarifier 444.	A	2	
P.T.O					

d)	Identify precautions to be taken during liquidation process of juice in clarifier.	A	2	
e)	Interpret reasons for deposition of scale.	U	3	
f)	Describe entrainment catcher.	U	3	

Section-II

Q.4	Attempt any FOUR			(08)
a)	Calculate water evaporated where juice =75000 kgs Inlet Brix =15 ⁰ & outlet Brix =60 ⁰	A	4	
b)	State minimum vacuum & temperature required for 4 th body of evaporator.	R	4	
c)	State minimum vacuum required for Pan Boiling.	R	5	
d)	List out types of Pans used in sugar industry.	R	5	
e)	Recall Boiling point elevation.	R	6	
f)	List out the zones of super saturation.	R	6	
Q.5	Attempt any FOUR			(16)
a)	Draw neat sketch of vapor cell.	U	4	
b)	Describe advantages of continuous vacuum pan.	A	5	
c)	Calculated quantity of syrup generated where juice =90,000 kg/Hr, Inlet Brix =15 ⁰ & outlet Brix=60 ⁰ .	A	4	
d)	Explain with neat sketch zones of super saturation.	U	6	
e)	Describe decomposition of sucrose during evaporation.	U	4	
f)	Summarie factors affecting boiling point elevation.	U	6	
Q.6	Attempt any FOUR			(16)
a)	Describe types of evaporator used in sugar factory.	U	4	
b)	Describe types of condensers used in sugar factory.	U	4	
c)	Explain indetail concentration of juice on two stages (i.e Evaporator & Pan)	U	4	
d)	Distinguish between Batch pan & Continuous pan.	U	5	
e)	Describe different zones of super saturation.	U	6	
f)	Describe heat injury to massecuite & its effects.	U	6	

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EVEN TERM END EXAM MAY -2019

EXAM SEAT NO.

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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

S	Q	Question Text	R	CO	Marks												
QN	N		U	CEF													
			A	313	(08)												
Q.1		Attempt any FOUR															
	a)	Define forward and backward difference operator.	R	1													
	b)	Prove that $E \nabla = \nabla E = \Delta$	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	A	1													
		<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			
x	1	2	3	4	5												
y	2	5	7	-	32												
	d)	Using Newton's forward interpolation formula find $f(8)$	A	1													
		<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					
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	A	1													
		<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>	x	0	1	2	3	4	y	7	17	45	103	203			
x	0	1	2	3	4												
y	7	17	45	103	203												
		Find y when $x = 3.6$ using suitable interpolation.															
	b)	Using Newton's forward interpolation formula find $\sin 45^\circ$	A	1													
		<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					
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: $L\{\cos 2t \cosh t\}$	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 ENDE EXAM MAY-2019**EXAM SEAT NO.**

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LEVEL :- FOURTH PROGRAM : SUGAR MANUFACTURING**COURSE CODE :- SMF404****COURSE NAME BY PRODUCT OF SUGAR INDUSTRY****MAX. MARKS : 80 TIME : 3 HRS. DATE :- 24/05 / 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 SMF 404	Mar ks
Q.1		Attempt any FOUR :			08
	a)	Define fibre.	R	1	
	b)	State clarifier value of bagasse.	R	1	
	c)	What is mean by waste effluent?	U	2	
	d)	Define final molasses.	R	3	
	e)	State % of filter cake in sugar cane.	R	3	
	f)	State any two uses of filter cake.	R	3	
Q.2		Attempt any FOUR :			16
	a)	State composition of cane bagasses.	R	1	
	b)	Draw flow sheet of fiber board manufacturing from bagasses.	U	1	
	c)	Summarize the manufacturing process of pulp form bagasses.	A	1	
	d)	State composition of final molasses.	R	2	
	e)	Explain the process of fermentation by using molasses.	U	2	
	f)	Summarize processes for extraction of wax from filter cake.	A	3	
Q.3		Attempt any FOUR :			16
	a)	Summarize the availability of bagasses on by product.	A	1	
	b)	State characteristics of waste effluent from paper mill.	R	1	
	c)	Compare the soda process and sulphate process.	U	1	
	d)	Summarize the process of production rectified spirit from molasses.	A	2	
	e)	State importance of molasses for industrial use.	R	2	
	f)	Write importance of filter cake as manure.	U	3	

P.T.O.

QN		Section- II		R/ U/ A	Co SMF 404	Mar ks
Q.4		Attempt any FOUR :				08
	a)	State pol % of Raw sugar.		R	4	
	b)	List out types of pollution.		R	5	
	c)	State the function of effluent Treatment plant.		R	5	
	d)	List out water pollution control equipments for sugar industry.		R	6	
	e)	State the pH of treated water from E.T.P.		R	6	
	f)	Define primary treatment.		R	6	
Q.5		Attempt any FOUR :				16
	a)	Summarize the pollution effect due to waste water generated from sugar industry.		U	5	
	b)	State the characteristics of waste generated from distillery.		U	5	
	c)	Summarize waste and effluent from various sources in sugar industry.		U	5	
	d)	Summarize the reduction of pollution by good housekeeping practices in sugar industry.		A	6	
	e)	Explain the importance of effluent treatment.		U	6	
	f)	Draw neat sketch of effluent treatment plant.		U	6	
Q.6		Attempt any TWO :				16
	a)	Describe manufacturing process of Jaggery.		A	4	
	b)	Describe the precautions to be taken in sugar mill station to reduce pollution.		A	5	
	c)	Tabulate the station wise water and solid waste generated from sugar industry		A	5	

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EVEN TERM END EXAM MAY -2019

EXAM SEAT NO.

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LEVEL: THIRD

PROGRAM: MECHANICAL /SUGAR

COURSE CODE: MEF309/ME209/MEE309/SM207 COURSE NAME: ELECTRICAL TECHNOLOGY

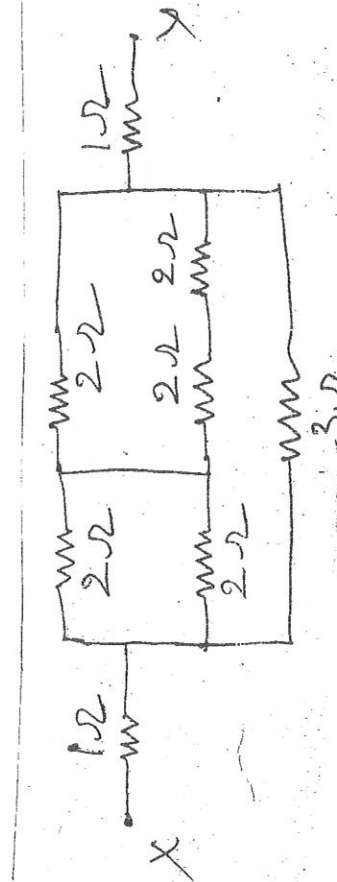
MAX. MARKS: 80

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 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
Q.1		Attempt any FOUR		MEF 309	(08)
	a)	Explain the phenomena of electrical resistance.	U	1	
	b)	Write Ohms law of electrical conductors and its mathematical expression.	R	1	
	c)	Define a three phase system in electrical engineering.	R	3	
	d)	Explain balanced loads in electrical engineering	U	3	
	e)	Explain the property of inductance of coils.	U	1	
	f)	Explain the need for earthing of electrical installations.	U	3	
Q.2		Attempt any FOUR			(16)
	a)	Explain Kirchhoff's laws for electrical circuits and write their equations along with simple diagram.	U	1	
	b)	Write the voltage relations for the line and phase values for a star network. If the phase current in such a network is 10A. Determine the line value.	U	3	
	c)	Determine the equivalent resistance between nodes X & Y for network in fig. given below.			
			A	1	
	d)	Compare the three phase three wire & three phase four wire system of electric supply.	V	3	
	e)	An electric heater rated at 230 V, draws a current of 5.2 A for 20 minutes. Calculated the power and energy assuming it a single phase heater.	A	1	
	f)	Explain using proper sketches the plate earthing system and give its two applications.	A	3	
P.T.O					

Q.3	Attempt any FOUR			(16)
a)	Explain with simple sketches the laws electromagnetic induction.	U	2	
b)	Write the applications of the following meters and show their connections in a simple circuit branch. i) Voltmeter ii) Clip-on-meter	U	2	
c)	Write down four applications of the digital multimeter.	U	2	
d)	Define cycle and frequency related to alternating quantities.	R	2	
e)	A certain alternating quantity is given by $q=141.4 \cos 100\pi t$. Determine its i) Frequency ii) Maximum peak value iii) RMS value iv) Average value	A	2	
f)	A certain electrical branch has a resistance of 6 ohms and inductive reactance of 8 ohms. Draw the circuit branch showing the same and calculated the impedance of the branch.	A	2	
Q.4	Attempt any FOUR			(08)
a)	Classify D.C motors.	R	6	
b)	State inverse square law of illumination.	R	5	
c)	Give classification of single phase AC motors.	R	7	
d)	Define transformer.	R	4	
e)	State the applications of 3 ϕ phase induction motors. (any four)	A	7	
f)	Why efficiency of a transformer is very high.	U	4	
Q.5	Attempt any FOUR			(16)
a)	Give the schematic representation and applications of D.C.motors.	U	6	
b)	Draw & explain torque-speed characteristics of 3 phase induction motors.	U	7	
c)	Explain dielectric heating with neat diagram.	R	5	
d)	Define the term illumination & give illumination level required for small & big workshop, drawing hall.	A	5	
e)	What are the constant and variable losses of a transformer?	R	4	
f)	Compare ideal & parallel transformer.	U	4	
Q.6	Attempt any FOUR			(16)
a)	Derive an emf equation of a transformer.	U	4	
b)	Compare stepper motor & servo motor.	U	6	
c)	Explain Direct-On-Line (DOL) starter used for starting the 3-phase induction motor.		7	
d)	Explain the need of starters for squirrel cage induction motor.	U	7	
e)	With neat diagram explain the working if induction furnace.	R	5	
f)	With help of neat sketch explain resistance heating.	U	5	

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

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LEVEL :- FOURTH PROGRAM : SUGAR MANUFACTURING**COURSE CODE :- SMF406****COURSE NAME CAPACITY DESIGN AND CALCULATION****MAX. MARKS : 80 TIME : 3 HRS. DATE :- 29/05 / 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 SMF 406	Mar ks
Q.1		Attempt any FOUR :			08
	a)	Calculate the water requirement of 2500 TCD sugar plant.	A	1	
	b)	State the formula for heating surface of juice heater.	R	1	
	c)	State formulae for power absorbed by cane carrier.	R	2	
	d)	State the active CaO% Lime required for process.	R	1	
	e)	Calculate ϕ of roller in mm, $V=12\text{m/min}$ & $n=4.77$.	A	3	
	f)	Calculate capacity of pump in HP where $H=25$, $h=5$, $P=0.6$ & $Q=$ <i>22-22 kg/sec</i>	A	1	
Q.2		Attempt any FOUR :			16
	a)	A milling tandem is preceded by a Knife set and fabrizer crushes 2000 M.T. of cane per day. The size of mill is 800 X 1600 mm. The mill rotates at 5.5 m/min. Determine the fibre % cane that the mill can handle.	A	2	
	b)	Calculate cane required for 2500 TCD plant.	A	1	
	c)	Draw neat sketch of fibrizer.	A	1	
	d)	Calculate the capacity of milk of storage tank for 2500 TCD plant.	A	1	
	e)	Calculate imbibition water pump capacity where added water % 35. Crushing rate 115 TCH $T=85^{\circ}\text{C}$. Head 45 mrs.	A	3	
	f)	Calculate capacity of the milling tendom by Hugot formula having No. of Roller = 12. Fib % cane = 14. Turbine speed 8000 RPM. The factory has one set of Knife followed by fibrizer.	A	3	
Q.3		Attempt any TWO :			16
	a)	Describe factors affecting capacity of mill.	A	3	
	b)	Draw sketch of Hydraulic cylinder and planger and describe the function of them.	A	2	

P.T.O.

	c)	Describe matter to be kept in mind while planning the layout of sugar industry and state advantages and disadvantages also.	A	1	
QN	S Q N	Section- II	R/ U/ A	Co SMF 406	Mar ks
Q.4		Attempt any FOUR :			08
	a)	Write the I.D & O.D. of tubes used in juice heater.	R	4	
	b)	Calculate the capacity of vacuum filter for 2500 TCD plant.	A	4	
	c)	State the factors affecting working capacity of centrifugal machine.	R	6	
	d)	State the massecuite % cane for A,B and C machines.	R	6	
	e)	State the factors affecting design and performance of vacuum pan.	R	6	
	f)	Give the formula for cooling surface of crystallizer.	U	6	
Q.5		Attempt any FOUR :			16
	a)	Calculate juice velocity in juice heater for 2500 TCD plant Mixed juice % cane = 100, Juice heater tube diameter = 42mm & No. of tubes per pass = 13.	A	4	
	b)	Calculate the vapour pipe diameter. $W = 2000 \text{ kg/hr}$, $T = 103^\circ\text{C}$, Velocity of vapour = 30 M/sec, Sp. volume at $103^\circ\text{C} = 1.515$ m^3/kg vapour.	A	5	
	c)	Explain the specific evaporation coefficient.	U	5	
	d)	Draw neat sketch of batch type vacuum pan.	U	6	
	e)	Summarize the mechanical considerations for centrifugal machines.	U	6	
	f)	Give the formula for gravity factor, angular velocity, centrifugal force and gravitational force.	U	6	
Q.6		Attempt any TWO :			16
	a)	Calculate the heating surface for vapour line juice heater for 2500 TCD plant. Mixed Juice % cane = 110 (including Oliver filtrate) Working Hrs/ day = 22 (for design purpose) Exhaust pressure = 0.49 kg/cm^2 . $C_J = 0.9 \text{ K-Cal.}$	A	5	
	b)	Calculate heating surface of individual body to quadruple with following data and arrangement. Crushing rate = 2500 TCD. Clear Juice % cane = 100 Clear Juice Brix = 15° Syrup Brix = 60° .	A	5	
	c)	Calculate number of centrifugal machines. Required of A, B & C curing for 2500 TD sugar plant.	A	6	

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

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LEVEL :- FIFTH**PROGRAM : SUGAR MANUFACTURING****COURSE CODE :- SMF504/SME506****COURSE NAME COGENERATION TECHNOLOGY****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 Q N	Section-I	R/ U/ A	Co ITF 409	Mar ks
Q.1		Attempt any FOUR :			08
	a)	Recall non commercial energy resources with example.	R	1	
	b)	State the formula to calculate power in hydroelectric power plant.	U	1	
	c)	Recall air pollution.	R	1	
	d)	Recall cogeneration.	R	2	
	e)	State benefits of cogeneration.	R	2	
	f)	State environmental benefits of bagasse based cogeneration.	R	3	
Q.2		Attempt any FOUR :			16
	a)	Explain advantages and disadvantages of thermal power plant.	U	1	
	b)	Compare conventional and non conventional energy sources.	U	1	
	c)	Explain green house effect and the carbon cycle.	U	1	
	d)	Explain need of cogeneration.	U	2	
	e)	Explain combined heat and energy production in sugar industry.	U	2	
	f)	Draw flow chart of bagasse based cogeneration process.	A	3	
Q.3		Attempt any TWO :			16
	a)	Describe in detail classification of energy resources along with examples.	A	1	
	b)	Describe geothermal power plant with the help of schematic diagram.	A	1	
	c)	Describe availability and importance of bagasse saving in sugar industry.	A	3	

P.T.O.

Section- II					R/ U/ A	Co MEF 503	Mar ks
QN	S						08
Q.4		Attempt any FOUR :					
	a)	Restate heat to power ratio.			R	4	
	b)	State the factors on which selection of audit type depends.			R	5	
	c)	Define energy management.			R	5	
	d)	Draw simple line diagram of extraction and double extraction back pressure steam turbine.			U	5	
	e)	State the technical operations for co-generation.			R	5	
	f)	State the advantages of boiler efficiency by indirect method.			R	6	
Q.5		Attempt any FOUR :					16
	a)	Explain the various measures of energy conservation.			U	5	
	b)	State the objective of energy conservation.			R	5	
	c)	Summarise the energy saving opportunities for steam boilers			U	5	
	d)	Explain the steam turbine cogeneration system as a prime mover.			U	5	
	e)	Draw the schematic diagram of a boiler system.			U	6	
	f)	Explain the boiler water blow-down & its benefits.			U	6	
Q.6		Attempt any TWO :					16
	a)	Describe the bottoming cycle cogeneration systems with the help of neat diagram.			A	4	
	b)	Summarize the important technical parameters of cogeneration systems.			A	4	
	c)	Calculate the efficiency of the boiler by direct method. by using following data i) Type of boiler – coal fired ii) Qty. of steam (dry) generated – 10 TPH, iii) Steam pressure/ temp. - 10 kg/ cm ² (9), 180° C. iv) C.V. of coal – 3200 K Cal /kg v) Enthalpy of steam -665 K Cal /kg vi) Enthalpy of water – 85 K Cal /kg			A	6	

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

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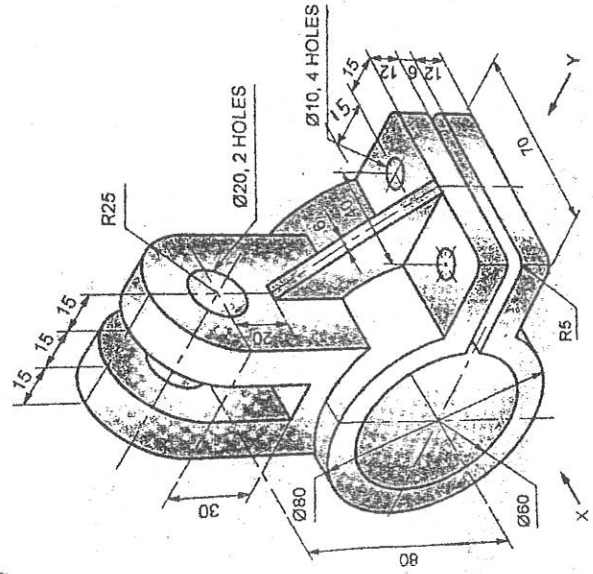
LEVEL :- FIRST**PROGRAM : CE/EE/MT/SM****COURSE CODE :- CCF108/R107/X107/CCE108/R110****COURSE NAME :- ENGINEERING DRAWING - II****MAX. MARKS : 80 TIME : 4 HRS. DATE :- 29 / 05 / 2019****Instruction :-**

- 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.

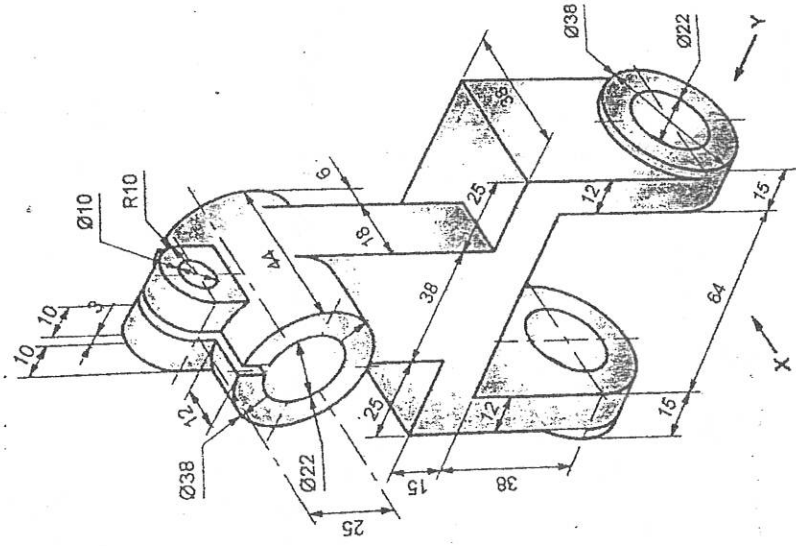
QN	S Q N	Question Text	R/ U/ A	Co CF 108	Ma rks
Q.1		Attempt any ONE :			16
	a)	Fig. (1) shows pictorial view of an object. Draw following views. i) Front view looking in the direction X. ii) Side view looking in the direction Y. iii) Top view.	U	1	
	b)	Fig. (2) shows pictorial view of an object. Draw 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.T.O.

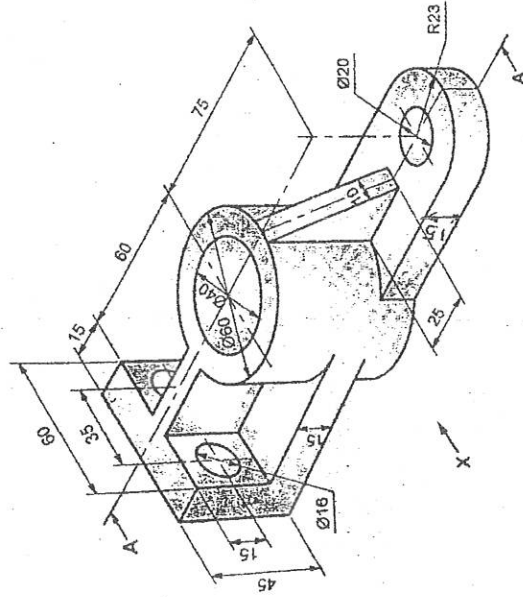
Q.3		Draw proportionate free hand sketches (any four) i) Internal thread (2 views) ii) Capstan Nut (2 views) iii) Eye Bolt (2 views) iv) Eye foundation Bolt. v) Double rivetted lap joint. vi) Looking by split pin (2 views)	U	3	08
Q.4		Attempt any ONE : a) Fig. 5 shows front view and top view of an object. 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



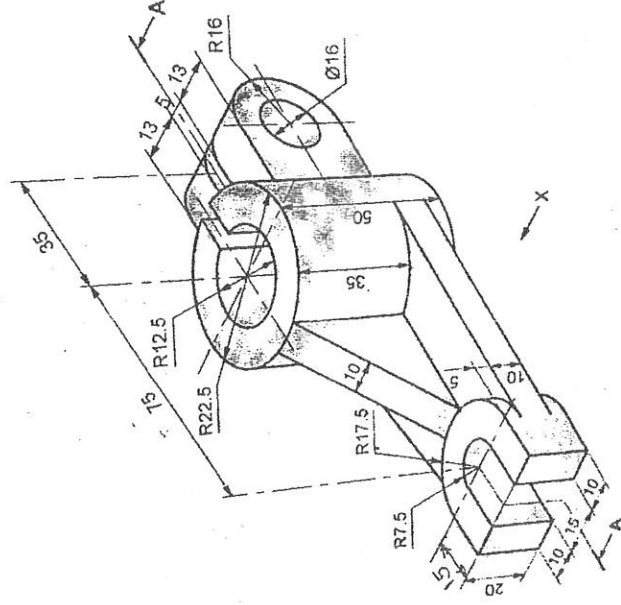
Q.1] (a) . Fig(1)



Q.1] (b) Fig(2)

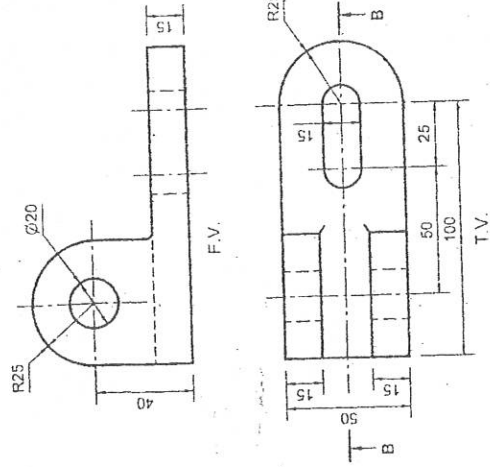


Q.2] (a) . Fig(3)

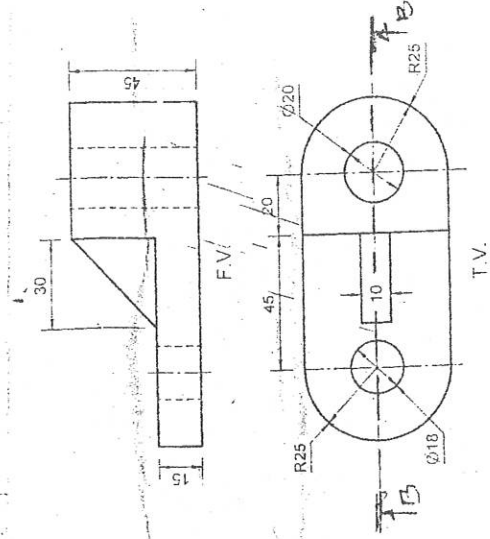


Q.2] (b) . Fig(4)

(P.T.O.) 3/5



Q.4(a) Fig-5



Q.4(b) Fig-6

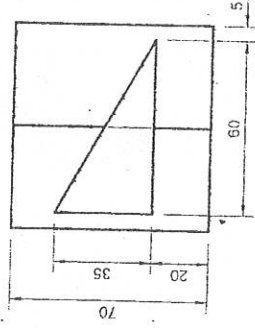
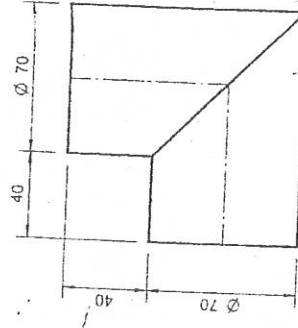


Fig. 8
Q.5(b)



Q.5(a) Fig-7

(P.T.O.) (4/5)

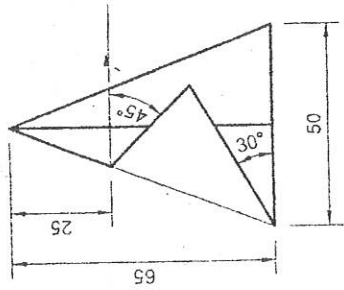
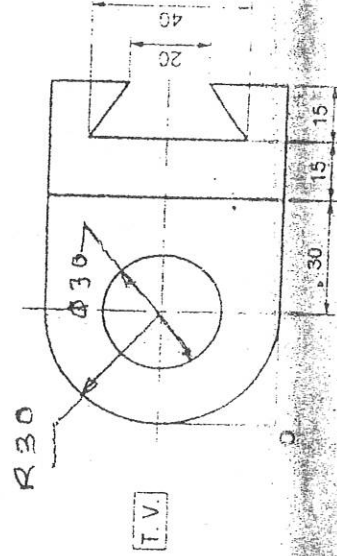
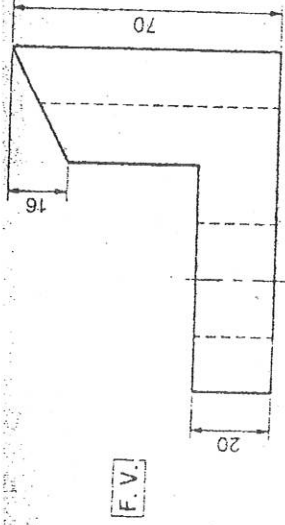
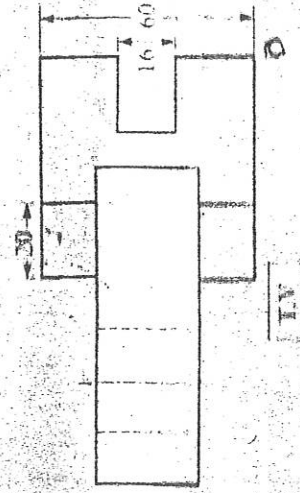
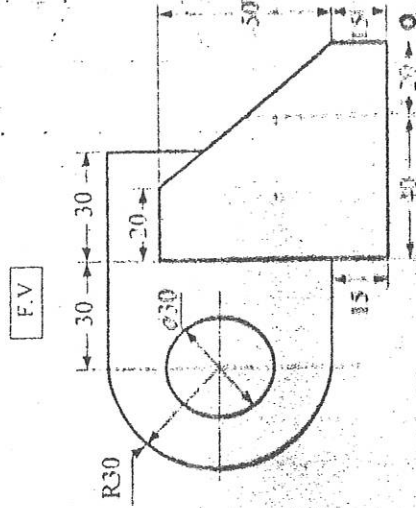


Fig-9
Q. 5(c)



Q. 6(a) Fig 10-10



Q. 6(b)

Fig-11

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EVENT TERM END EXAM MAY-2019

EXAM SEAT NO.

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LEVEL :- FIFTH PROGRAM : SUGAR MANUFACTURING

COURSE CODE :- SME503

COURSE NAME SUGAR INDUSTRY MANAGEMENT

MAX. MARKS : 80 TIME : 3 HRS. DATE :- 23/05 / 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)	Explain concept of Business with suitable example.	
	b)	Define administration.	
	c)	What is planning?	
	d)	What is organization?	
	e)	What are different forms of organization?	
	f)	What is leadership?	
Q.2		Attempt any FOUR :	16
	a)	Explain the procedure to be followed for recruitment.	
	b)	Differentiate between Recruitment and selection.	
	c)	How authority differs from responsibility?	
	d)	Compare public Ltd.and Private Ltd. Companies.	
	e)	State the various functions of administration.	
	f)	Explain the process of decision making.	
Q.3		Attempt any TWO :	16
	a)	Describe the steps involved in Launching a small scale Enterprise.	
	b)	Describe co-operative society, joint stock company, partnership and individual owner ship industry.	
	c)	Explain various qualities of a Leader. Distinguish manager and Leader with example.	

P.T.O.

Q.N	S Q N	Section- II	Ma rks
Q.4		Attempt any FOUR :	08
	a)	State the importance of Bagasse storage.	
	b)	State significance of ware housing in sugar industry.	
	c)	Differentiate between Tax and Duty.	
	d)	State the purpose of Budgeting in sugar industry.	
	e)	Mention any four ways to reduce inventory level.	
	f)	Draw a lay out of 'store' in sugar industry.	
Q.5		Attempt any FOUR :	16
	a)	Differentiate preference shares and Equity shares.	
	b)	State the importance of quality of sugar. Give specifications of export quality sugar.	
	c)	State the purpose of store keeping with its functions.	
	d)	Write limitations of centralized purchasing.	
	e)	What is ABC analysis? Write procedure of ABC analysis.	
	f)	Explain EOQ model with the help of graphical representation.	
Q.6		Attempt any FOUR :	16
	a)	Describe inventory cycle with the help of diagram.	
	b)	Give the limitations of i) EOQ model ii) ABC analysis.	
	c)	State the duties of purchase officer.	
	d)	Write the advantages of adequate working capital.	
	e)	State the method of handling and storing molasses in sugar industry.	
	f)	State the duties of store keeper.	

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EVEN TERM END EXAM MAY-2019

EXAM SEAT NO.

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LEVEL :- FIFTH PROGRAM : SUGAR MANUFACTURING

COURSE CODE SME502

COURSE NAME :- SUGAR INDUSTRY INPLANT TRAINING

MAX. MARKS : 100 TIME : 3 HRS. DATE :- 17/ 05 / 2019

Instruction :-

- 1) Answer 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.

8) Q.1 is compulsory and attempt any four from Q.2 to Q.7

QN	S Q N		Mar ks
Q.1		Give your observations while working in sugar industry. any TEN	20
	a)	Which boiling scheme is used in sugar industry?	
	b)	Brix of molasses from molasses conditioner.	
	c)	List out cane preparatory equipments in sugar factory.	
	d)	State RPM of power turbine.	
	e)	Pol % and moisture % of bagasse.	
	f)	Pole % and moisture % of filter cake.	
	g)	Temperature and pH of boiler feed water.	
	h)	State Number of mills and turbine.	
	i)	Total losses.	
	j)	Define saturation.	
	k)	List out chemicals used for sanitation.	
	l)	Temperature of spray water.	
	m)	Bagging temperature of sugar.	
	n)	Height of boiler chimney	
	o)	List out varieties of cane.	
Q.2			
	a)	Describe with sketch compound imbibition system. State its advantages.	10
	b)	Calculate the capacity of juice heater for 2500 TCD plant.	10
Q.3			
	a)	Describe criteria for selection of site of sugar factory.	10
	b)	Describe working of economizer and air preheater of boiler.	10

Q.4				
	a)	Describe with sketch vacuum generation system.		10
	b)	Describe with sketch vapour bleeding arrangement of sugar factory.		10
Q.5				
	a)	Draw layout of pan, crystallizer and centrifugal station.		10
	b)	Describe safety measures taken in sugar industry		10
Q.6				
	a)	Describe purchase procedure of sugar industry.		10
	b)	Describe three massecuite boiling scheme.		10
Q.7				
	a)	Describe working of hopper, elevator and grader of sugar industry.		10
	b)	Describe working of batch type centrifugal machine.		10

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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		Attempt any FOUR	U	CCF10 A 5	ks (08)
	a)	Expand $\begin{vmatrix} 1 & 3 & -1 \\ 2 & 0 & 5 \\ 6 & -2 & -7 \end{vmatrix}$	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 $\left\{ \begin{bmatrix} 1 & 0 \\ 5 & 0 & 1 \\ 1 & 1 \end{bmatrix} \begin{bmatrix} 1 & 2 \\ -2 & 3 \\ 3 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} \right\} = \begin{bmatrix} x \\ y \\ z \end{bmatrix}$	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 $\cos^2 \theta - \cos^2 \theta \operatorname{cosec}^2 \theta = 1$	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 : SUGAR MANUFACTURING****COURSE CODE :- SMF308****COURSE NAME :- CHEMICAL PROCESS TECHNOLOGY****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 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 yield with respect to a chemical reaction.	R	1	
	b)	Name any four unit processes.	R	2	
	c)	What is meant by material beneficiation?	U	1	
	d)	Write properties and applications of sulphuric acid.	R	3	
	e)	Enlist the raw material required for ammonia production.	U	3	
	f)	Recall the chemical formula of washing soda and any one of its properties.	R	3	
Q.2		Attempt any FOUR :			16
	a)	Classify homogeneous and heterogeneous chemical reactions.	U	2	
	b)	Identify conditions for maximum yield in contact process for sulfuric acid manufacture.	A	3	
	c)	Distinguish between the unit operations and unit processes.	U	2	
	d)	Identify the reaction in which sodium bicarbonate is converted into washing soda .Also state the application of washing soda.	A	3	
	e)	Construct a neat flowsheet for the manufacture of caustic soda and chlorine.	A	3	
	f)	Explain the term 'aquaregia' and state two applications of hydrochloric acid.	U	3	
Q.3		Attempt any FOUR :			16
	a)	List any two differences between batch process and continuous process.	R	1	
	b)	Identify any four important aspects of chemical equilibrium.	A	2	
	c)	List any two important properties and application of hydrochloric acid .	U	3	

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	d)	Illustrate why V_2O_5 is preferred as a catalyst over platinized asbestos in contact process for manufacture of sulfuric acid	A	3
	e)	Construct a neat labelled flow sheet for the ammonia manufacture.	A	3
	f)	Recall the chemical name and formula for caustic soda. Also list any two uses of the same	R	3
Q.4		Attempt any FOUR :		08
	a)	Recall fermentation.	R	4
	b)	List out the uses of ethyl acetate.	R	4
	c)	State plant nutrient elements.	R	5
	d)	Define pulp.	R	6
	e)	State the properties of producer gas.	R	6
	f)	Write the constituents of water gas.	R	6
Q.5		Attempt any FOUR :		16
	a)	Draw flow sheet for manufacturing of alcohol from corn.	U	4
	b)	Classify inorganic fertilizers and state types of nitrogenous fertilizers.	U	5
	c)	Draw flow sheet for manufacturing of urea by Monatacatini process.	U	5
	d)	Compare sulphate and sulphite process for manufacturing pulp.	A	6
	e)	Describe Linde's process for manufacture of oxygen.	A	6
	f)	Write the uses of nitrogen and oxygen gas.	R	6
Q.6		Attempt any TWO :		16
	a)	Describe the manufacturing process of alcohol from molasses with neat sketch.	A	4
	b)	Describe manufacturing process of phosphoric acid with neat sketch.	A	5
	c)	Describe Bosch process for manufacturing of hydrogen.	A	6

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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EVEN TERM ENDE EXAM MAY-2019**EXAM SEAT NO.****PROGRAM : SUGAR MANUFACTURING****LEVEL :- THIRD****COURSE CODE :- SMF305/SME305****COURSE NAME :- SUGAR FACTORY EQUIPMENTS****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 SMF 305	Ma rks
Q.1		Attempt any FOUR :			08
	a)	Write the functions of scrubber in sulphur burner.	R	3	
	b)	Write out equipments in drying and grading of sugar.	R	1	
	c)	Write the function of fibrizer.	R	1	
	d)	Write revolving speed of vacuum filter.	R	3	
	e)	Write various methods of juice and water measurement.	R	2	
	f)	Write composition of brass tube.	R	2	
Q.2		Attempt any FOUR :			16
	a)	Explain how to start juice heater on vapour.	A	2	
	b)	Explain how to stop and clean juice heater.	A	2	
	c)	List out equipments involved in cane preparation and write their functions.	U	1	
	d)	Which precautions to be taken while operating the MAPCON system?	U	3	
	e)	Draw neat sketch of rotary vacuum filter	R	3	
	f)	Explain construction of juice sulphitor.	A	3	
Q.3		Attempt any TWO :			16
	a)	Describe the construction of Rapi 444 clarifier with neat sketch.	A	3	
	b)	Describe the construction of sulphur burner with neat sketch.	A	2	
	c)	Describe the construction of juice heater with neat sketch.	A	2	

P.T.O.

Q.4	Attempt any FOUR :			08
a)	What is tube plate thickness of evaporator body	R	4	
b)	Write the function of spray and jet nozzles.	R	4	
c)	What is heating surface to volume ratio for continuous type pan?	R	5	
d)	Define gravity factor.	R	6	
e)	Write RPM for continuous type machine.	R	6	
f)	Write stroke and revolving speed of gross hopper.	R	6	
Q.5	Attempt any FOUR :			16
a)	Draw neat sketch of multijet condenser.	U	4	
b)	Write disadvantages of batch type pan.	R	5	
c)	Write design specification for continuous pan.	U	5	
d)	Explain the construction of molasses conditioning tank.	A	6	
e)	Write reasons for grain breakage and explain how it can be reduced.	U	6	
f)	Explain the construction of water cooled crystallizer.	A	6	
Q.6	Attempt any TWO :			16
a)	i) Explain why entrainment catcher is useful in evaporator. ii) Explain how to start evaporator set.	U U	4 4	
b)	Describe the construction of batch type pan with neat sketch.	A	5	
c)	Describe the construction of continuous type centrifugal machine with neat sketch.	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: CCF110/X111/CCE110

COURSE NAME: APPLIED MECHANICS

MAX. MARKS: 80

TIME: 3 HRS.

DATE: 20/05/2019

Instruction:-

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

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

S	Q	N	Question Text	R	CO	Marks
				U	CCF	
				A	110	
Q.1			Attempt any FOUR			(08)
	a)		Different between particle & body. (any two)	U	1	
	b)		State principle of transmissibility.	R	1	
	c)		Give field examples of i) Concurrent force system. ii) Parallel force system.	R	1	
	d)		Define equilibrant & state its effect on body.	R	2	
	e)		Define i) Angle of friction ii) Angle of Repose.	R	2	
	f)		State laws of friction. (any two)	R	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	
	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	
	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	
	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	
	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	
	f)		Solve Q.No.2(C) by Graphical method.	U	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	
	b)		Solve Q. No 3(a) by graphical method.	U	3	
	c)		State advantages & limitations of graphical method over analytical method.	R	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	

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

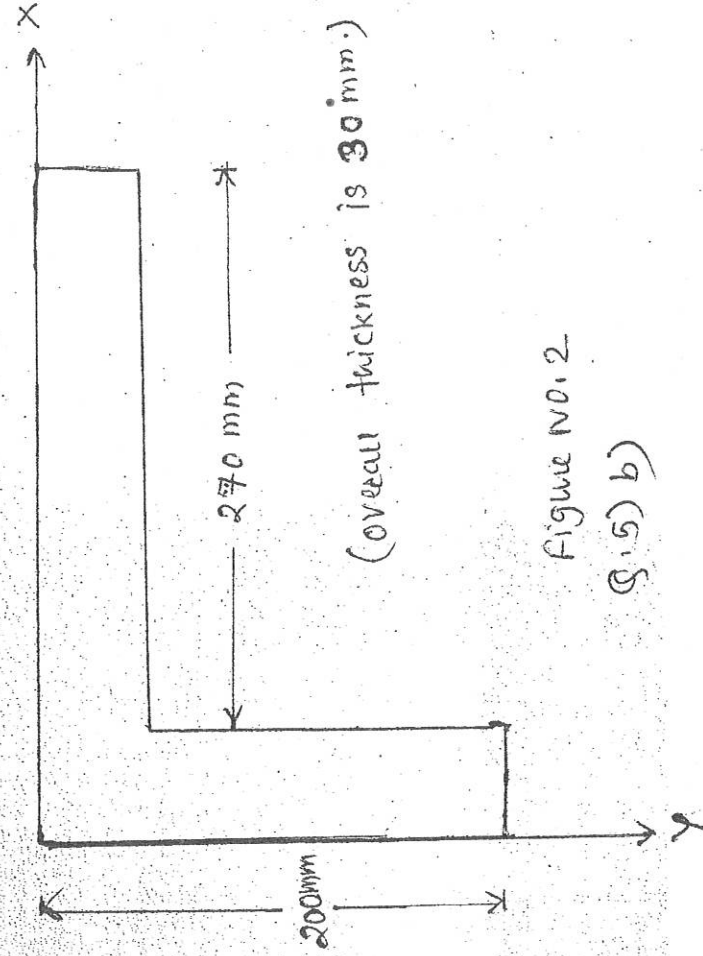
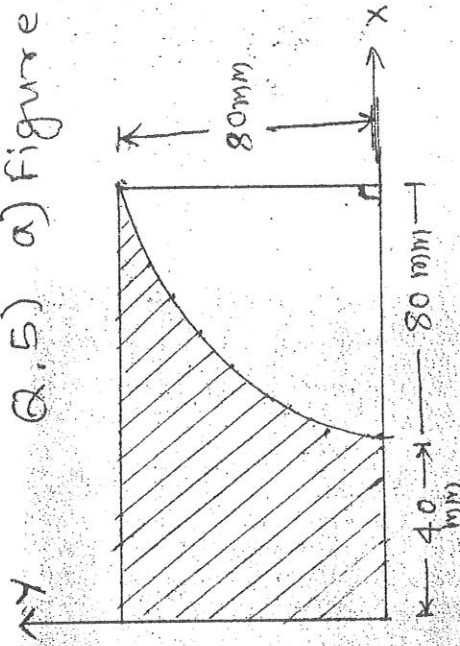


Figure NO.2

Q.5) b)

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EVEN TERM END EXAMMAY -2019

EXAM SEAT NO.

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LEVEL:

Third

PROGRAM: SUGAR MANUFACTURING

COURSE CODE:SMF 306 COURSE NAME: MECHANICAL & FLUID FLOW OPERATION

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

QN	S. Q. N	Question Text	Cognition Level R/U/A	Code	Marks
Q.1		Attempt any FOUR			(08)
	a)	Compare crushing & Grinding operation.	U	1	
	b)	Show the diagram of continuous thickener.	R	2	
	c)	State & Explain kicks law.	U	1	
	d)	Illustrate the sedimentation.	U	2	
	e)	Name the factors affecting on effectiveness of screen.	R	3	
	f)	Define Sedimentation.	U	2	
Q.2		Attempt any FOUR			(16)
	a)	Explain Ideal gas law.	U	1	
	b)	Compare the baffled & unbaffled tank in mixing.	U	2	
	c)	Identify the dimensional formula & equation.	A	1	
	d)	Show the different patterns in turbine & propellers.	R	2	
	e)	Identify the system of units.	A	1	
	f)	List out steps to prevent swirling & vortex formation in mixing.	R	2	
Q.3		Attempt any TWO			(16)
	a)	Describe the construction & working of Ball mill.	U	1	
	b)	Apply the process of laboratory batch sedimentation test.	A	2	
	c)	Summerise the working & construction of Grizzlies.	U	3	
Q.4		Attempt any FOUR			(08)
	a)	Write any two fundamental laws of classification.	U	4	
	b)	List out any four valves used in sugar factory.	R	4	
	c)	State the types of filtration.	R	5	
	d)	Write the characteristics of filter medium.	U	5	

	e)	Define real fluid.	R	6	
	f)	What is Reynold's number?	R	6	
Q.5		Attempt any FOUR			(16)
	a)	Explain construction of centrifugal pump with sketch.	U	4	
	b)	Explain principle & working of gravity settling tank.	U	4	
	c)	Write the factors which effects the rate of filtration.	U	5	
	d)	Distinguish between laminar & Turbulent flow.	U	6	
	e)	List out any four properties of fluid.	R	6	
	f)	Derive the basic equation for obtaining the pressure at any height using principle of hydrostatic equilibrium.	A	6	
Q.6		Attempt any TWO			(16)
	a)	Describe the construction & working of hydraulic Jig with neat sketch.	A	4	
	b)	Draw neat sketch of plate and frame press & explain construction & working.	A	5	
	c)	State Bernoulli's principle & Derive basic Bernoulli's equation for incompressible fluid.	A	6	

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EVEN TERM ENDE EXAM MAY-2019

EXAM SEAT NO.

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LEVEL :- THIRD PROGRAM : SUGAR MANUFACTURING

COURSE CODE :- SMF307/SME307

COURSE NAME :- MASS AND HEAT TRANSFER OPERATION

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 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)	Restate radiation.	R	1	
	b)	Restate evaporation.	R	3	
	c)	Stat the formula of Fourier's Law of heat conduction.	R	1	
	d)	State the Kirchhoff's Law of radiation.	R	2	
	e)	State the formula of Log mean temperature difference.	R	2	
	f)	Draw a diagram of single effect evaporator.	U	3	
Q.2		Attempt any FOUR :			16
	a)	Explain the process of heat conduction.	U	1	
	b)	Explain counter current and co-current flow with neat sketch.	U	2	
	c)	Explain the effect of temperature on radiation.	U	2	
	d)	Summarise the overall heat transfer co-efficient for juice heater.	U	2	
	e)	Explain the optimum number of effects needed for evaporation process.	U	3	
	f)	Summerise the material balance in process of evaporation with respect to enthalpy.	U	3	
Q.3		Attempt any TWO :			16
	a)	Describe the short tube vertical evaporator with neat sketch.	A	3	
	b)	Describe in brief temperature gradient in forced convection.	A	2	
	c)	Describe the process of heat conduction through hollow cylinder. Also derive formula for heat flow rate through it.	A	1	

P.T.O.

Q.4	Attempt any FOUR :			08
	a) State Raoult's law.	R	4	
	b) Write the common methods used in distillation practices.	U	4	
	c) Define raffinate phase.	R	5	
	d) List out the equipments used for gas absorption.	R	5	
	e) Define equilibrium moisture content.	R	6	
	f) State the factors affecting rate of drying.	R	6	
Q.5	Attempt any FOUR :			16
	a) Draw the neat diagram of flash distillation.	U	4	
	b) Summarize the energy balance in distillation.	U	4	
	c) Summarize the molecular diffusion.	U	5	
	d) Explain rating disk contactor for liquid extraction.	U	5	
	e) State and explain the qualities needed for solvent selection in liquid extraction.	U	5	
	f) Summarize the reason due to which caking of crystals occurs.	U	6	
Q.6	Attempt any TWO :			16
	a) Describe in brief boiling point diagram with suitable example.	A	4	
	b) Describe the construction and working of agitated tank crystallizer with neat sketch.	A	6	
	c) Illustrate the typical rate of drying curve with neat sketch.	A	6	

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EVEN TERM END EXAM MAY -2019

EXAM SEAT NO.

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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 CCF	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	
	c)	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 $h_{1r1} = h_{2r2}$ 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	

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 ENDE 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	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 N	Question Text	R U A	CO CCF106	Marks
Q.1		Attempt any FOUR			(08)
	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 / A	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 / A	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	

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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EVEN TERM ENDE EXAM MAY-2019

EXAM SEAT NO.

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LEVEL :- **THIRD** PROGRAM : SUGAR MANUFACTURING

COURSE CODE :- SMF303

COURSE NAME :- BASIC SUGAR MANUFACTURING

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 MEF 303	Ma rks
Q.1		Attempt any FOUR :			08
	a)	Compare Leorotatory Levorotatory and Dextrotratory.	U	1	
	b)	Define Bagasse.	R	1	
	c)	List out application of colloidal chemistry.	A	3	
	d)	List out colouring matter in cane juice.	U	2	
	e)	Define clarified juice.	R	1	
	f)	Select instrument for measurement of syrup Brix.	A	1	
		i) Polarimeter ii) Saccharimeter iii) Refractometer.			
Q.2		Attempt any FOUR :			16
	a)	Show with neat sketch compound imbibition system for 4 mill tandom.	U	1	
	b)	Explain normal weight of sugar.	U	1	
	c)	Compare composition of cane and cane juice.	U	2	
	d)	Show neat sketch of construction of hand refractometer.	I	1	
	e)	Explain role of Amino Acid in manufacturing of sugar.	U	3	
	f)	Explain Reducing sugar is helpful in sugar manufacturing.	U	3	
Q.3		Attempt any FOUR :			16
	a)	Show a neat sketch of polarimeter.	U	1	
	b)	Explain nickol prism with sketch.	U	1	
	c)	Construct polarimeter by using working principle.	A	1	
	d)	Explain phosphoric acid is useful in manufacturing process.	U	3	
	e)	Give composition of colouring matter.	U	2	
	f)	Describe effect of heat and alkali on poor quality sugar cane.	U	2	

P.T.O.

Q.4	Attempt any FOUR :			08
	a) List out various cane preparatory devices.	R	4	
	b) Write importance of mill sanitation.	R	4	
	c) Write the aim of clarification.	R	3	
	d) State temperature of SO ₂ gas used for Sulphitation.	R	6	
	e) State the types of clarifier.	R	6	
	f) Name chemicals used in juice clarification.	R	6	
Q.5	Attempt any FOUR :			16
	a) Explain importance of cane preparation.	U	4	
	b) Explain compound imbibition system with neat sketch.	U	4	
	c) Summarise the role of PH, temperature and time in juice clarification.	A	5	
	d) Explain effect of poor cane quality on sugar manufacturing process.	U	5	
	e) What is sulphitation and carbonation?	R	6	
	f) Explain MAPCON system used for sulphitation.	U	6	
Q.6	Attempt any TWO :			16
	a) Describe construction and working of clarifier with neat sketch.	A	5	
	b) Describe constructional details of Sulphur burns with neat sketch.	A	6	
	c) Describe the role of flocculent and phosphoric acid in clarification.	A	6	

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EVEN TERM END EXAM MAY -2019

EXAM SEAT NO.

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LEVEL: THIRD

PROGRAM: CE/ME/SM/MT

COURSE CODE:

CEF301/MEF301/MTE301/SMF310/1201/C201/CEE301/2201/M201/ME201/MEE301/MG201/SM201/SME301

COURSE NAME: APPLIED MATHEMATICS

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 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 CEF301	Marks
Q.1		Attempt any FOUR			(08)
	a)	Evaluate $\int \frac{x+3}{x-2} dx$	U	1	
	b)	Find the area under the curve $y = \cos x$ & $x = 0$ & $x = \pi$	A	1	
	c)	Evaluate $\int_0^{\frac{1}{2}} \frac{dx}{\sqrt{1-x^2}}$	R	1	
	d)	Evaluate $\int \sqrt{1-\cos 2x} dx$	R	1	
	e)	Find the mean value of the function $y = 3e^{-x}$ over the range from $x = 0$ to $x = 1$	A	1	
	f)	Evaluate $\int \frac{3-5x^2+9x^4-10x^6}{x^6} dx$	R	1	
Q.2		Attempt any FOUR			(16)
	a)	Evaluate $\int_1^x \frac{x^5}{1+x^{12}} dx$	U	1	
	b)	Find the area of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ by integration method.	A	1	
	c)	Evaluate $\int_1^{\frac{1-\tan x}{1+\tan x}} \frac{dx}{x}$	U	1	
	d)	Evaluate $\int_0^{\frac{\pi}{2}} \cos^2 x dx$	A	1	
	e)	Evaluate $\int \cot^{-1} x dx$	A	1	
	f)	Evaluate $\int_2^6 \frac{\sqrt{1-x} dx}{\sqrt{1-x} + \sqrt{x-7}}$	A	1	
Q.3		Attempt any FOUR			(16)
	a)	Evaluate $\int \frac{(x^2+1)dx}{x(2x-1)(1-x)}$	A	1	
	b)	Evaluate $\int_{-1}^1 \frac{x+x^2}{x^2+1} dx$	A	1	
	c)	Find the area enclosed between the parabola $y^2 = 4x$ and the line $2x - y = 4$	A	1	
P.T.O					

	d)	Evaluate $\int \cos(\sqrt{x}) dx$	U	1										
	e)	If $i_1 = 10 \sin wt$ & $i_2 = 20 \cos wt$ Find $i_1 + i_2$ in the form $r \sin(wt + \alpha)$ & calculate the R.M.S value over the range from $t = 0$ to $t = \frac{\pi}{w}$	A	1										
	f)	Evaluate $\int \frac{dx}{(x+1)(x^2+4)}$	A	1										
Q.4		Attempt any FOUR			(08)									
	a)	Define order and degree of a differential equation.	R	2										
	b)	What is the solution of a linear differential equation $\frac{dy}{dx} + Py = Q$. Where P and Q are functions of x only or constants.	R	2										
	c)	Show that the differential equation $(ye^{xy} - 2y^2) dx + (xe^{xy} - 6xy^2 - 2y) dy = 0$ is exact.	U	2										
	d)	If C.V of a distribution is 4 with mean 80 find S.D.	R	3										
	e)	The two sets of observations are given below: <table><tr><td>Set I</td><td>Set II</td></tr><tr><td>$\bar{x} = 82.5$</td><td>$\bar{x} = 48.75$</td></tr><tr><td>$\sigma = 73$</td><td>$\sigma = 8.35$</td></tr></table> Which of the two sets is more consistent?	Set I	Set II	$\bar{x} = 82.5$	$\bar{x} = 48.75$	$\sigma = 73$	$\sigma = 8.35$						
Set I	Set II													
$\bar{x} = 82.5$	$\bar{x} = 48.75$													
$\sigma = 73$	$\sigma = 8.35$													
	f)	Two coins tossed simultaneously. Find the probability of getting at least one head.	R	4										
Q.5		Attempt any FOUR			(16)									
	a)	Solve $(1 + y^2) dx = (\tan^{-1} y - x) dy$	A	2										
	b)	Show that the solution of D.E $\left(4 - \frac{y^2}{x^2}\right) dx + \frac{2y}{x} dy = 0$ is $4x^2 + y^2 = cx$	U	2										
	c)	Solve $x \log x \frac{dy}{dx} + y = 2 \log x$	A	2										
	d)	Solve $x(x + y) dy - y^2 dx = 0$	A	2										
	e)	Find the particular solution of D.E $y\sqrt{1 - x^2} dy + x\sqrt{1 - y^2} dx = 0$ When $x = \frac{3}{4}, y = \frac{4}{5}$	A	2										
	f)	A set of 18 items has mean and variance 7 and 16 respectively. But one number was taken 21 instead of 12 by mistake. Calculate correct mean and correct S.D.	U	3										
Q.6		Attempt any FOUR			(16)									
	a)	Two kinds of electric bulbs of the same wattage manufactured by a factory have mean life and S.D as given below: <table><tr><td>Sample</td><td>Mean life</td><td>S.D</td></tr><tr><td>A</td><td>1620hrs</td><td>300hrs</td></tr><tr><td>B</td><td>1940hrs</td><td>345hrs</td></tr></table> Which of the two bulbs has a greater variability?	Sample	Mean life	S.D	A	1620hrs	300hrs	B	1940hrs	345hrs	U	3	
Sample	Mean life	S.D												
A	1620hrs	300hrs												
B	1940hrs	345hrs												

b)	The following data gives the age in years of 100 voters of certain constituency.								A	3																								
<table><tr><td>Age less than or equal to</td><td>30</td><td>40</td><td>50</td><td>60</td><td>70</td><td>80</td><td>90</td></tr><tr><td>No of Voters</td><td>13</td><td>40</td><td>68</td><td>80</td><td>90</td><td>97</td><td>100</td></tr></table>											Age less than or equal to	30	40	50	60	70	80	90	No of Voters	13	40	68	80	90	97	100								
Age less than or equal to	30	40	50	60	70	80	90																											
No of Voters	13	40	68	80	90	97	100																											
Find mean and S.D																																		
c)	Find the mean deviation from the mean for the following data								A	3																								
<table><tr><td>C.I</td><td>10-20</td><td>20-30</td><td>30-40</td><td>40-50</td><td>50-60</td><td>60-70</td></tr><tr><td>Frequency</td><td>4</td><td>6</td><td>10</td><td>18</td><td>9</td><td>3</td></tr></table>											C.I	10-20	20-30	30-40	40-50	50-60	60-70	Frequency	4	6	10	18	9	3										
C.I	10-20	20-30	30-40	40-50	50-60	60-70																												
Frequency	4	6	10	18	9	3																												
d)	The weights in gms of the tins are given below.								A	3																								
<table><tr><td>Wt in gms</td><td>900-920</td><td>920-940</td><td>940-960</td><td>960-980</td><td>980-1000</td><td>1000-1020</td><td>1020-1040</td></tr><tr><td>No of tins</td><td>4</td><td>11</td><td>63</td><td>90</td><td>73</td><td>38</td><td>10</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>05</td></tr></table>											Wt in gms	900-920	920-940	940-960	960-980	980-1000	1000-1020	1020-1040	No of tins	4	11	63	90	73	38	10								05
Wt in gms	900-920	920-940	940-960	960-980	980-1000	1000-1020	1020-1040																											
No of tins	4	11	63	90	73	38	10																											
							05																											
Calculate S.D by using step deviation method.																																		
e)	A box contains 10 radio valves of which 4 are defective. Show that the probability is $\frac{2}{15}$ if two of them valves are taken from the box such that both are defective.								U	4																								
f)	The probability that a student passes H.S.C examination is $\frac{2}{3}$ and the probability that he passes both H.S.C and IIT entrance examinations is $\frac{14}{45}$. The probability that he passes atleast one examination is $\frac{4}{5}$. What is the probability that he passes the IIT entrance examination?								A	4																								

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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: **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

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	
	f)	State the effect of temperature & impurity on surface tension.	U	1	
Q.2		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	
	e)	Differentiate between longitudinal wave and transverse wave (any four points).	U	2	
	f)	Define Nanostructured material. Give its any two examples.	R	3	
Q.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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EVEN TERM END EXAM MAY-2019**EXAM SEAT NO.**

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LEVEL :- THIRD**PROGRAM : SUFAR MANUFACTURING****COURSE CODE :- SMF302/SME302****COURSE NAME :- BASIC SUGAR ENGINEERING****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 CEF 308	Ma rks
Q.1		Attempt any FOUR :			08
	a)	Define the term open system	R	1	
	b)	Restate system boundary.	R	1	
	c)	Define thermodynamic air cycle.	R	2	
	d)	State Charles's law.	R	3	
	e)	State Boyle's Law.	R	3	
	f)	Recall perfect gas.	R	3	
Q.2		Attempt any FOUR :			16
	a)	Explain intensive and extensive properties.	U	4	
	b)	Apply 1 st law of thermodynamics to condenser.	A	1	
	c)	State 2 nd law of thermodynamics. Give the statement of Clausius and Kelvin Planks regarding this law.	R	1	
	d)	Write the assumption of thermodynamic cycle.	U	3	
	e)	Write the condition of reversibility of thermodynamic cycle.	U	3	
	f)	Summarize steady flow energy equation with neat sketch.	A	1	
Q.3		Attempt any TWO :			16
	a)	Define system. State the types of system and explain in short.	R	1	
	b)	Define air cycle and write the assumption of thermodynamics air cycle.	R	4	2
	c)	State various ideal gas processes and draw PV and T ϕ diagram for isochoric, isobaric & isothermal processes	R	3	

P.T.O.

Q.4	Attempt any FOUR :			08
	a) List out the cane preparatory devices.		R	4
	b) Write the functions of feeder table and cane carrier.		U	4
	c) State the speed of cane carrier.		R	4
	d) Restate entropy.		R	5
	e) State the applications of superheated steam.		R	5
	f) Define bagasse.		R	6
Q.5	Attempt any FOUR :			16
	a) Explain the over feed roller with the help of neat sketch.		U	4
	b) Summarize the circumferential grooves with neat sketch.		U	4
	c) Illustrate the formation of steam under constant pressure.		A	5
	d) Summarize degree of superheat and state its significance.		U	5
	e) Write the merits and demerits of water tube boiler.		U	6
	f) Write the functions of boiler mountings.		U	6
Q.6	Attempt any TWO :			16
	a) Describe off seasonal maintenance of feeder table and cane carrier.		A	4
	b) Define trash plate setting and explain three roller mill unit with the help of neat sketch.		U	4
	c) Describe in brief water tube boiler used in sugar industry.		A	6
