GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

ODD TERM END EXAM NOV./ DEC -2016

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **SME303**

COURSE NAME :- **BASIC SUGAR TECHNOLOGY**

MAX. MARKS : **80** TIME : **3 HRS.** DATE: - **24/ 11 / 2016**

Instruction:-

1) Answers must be written in the main answer book provided.(and supplements if required)
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.

Marks

Q.1 Attempt any **FOUR** (08)

a) Define primary juice.

b) What is imbibition?

c) Define bagasse.

d) Write molecular formula of sucrose and glucose.

e) What is mean by coagulation?

f) Write any two coagulating agents used in juice clarification.

Q.2 Attempt any **FOUR** (16)

a) Explain construction of hand refractometer.

b) What is normal weight sugar solution?

c) Explain polarised light and plane of polarization.

d) Explain the effect of poor quality sugar cane on sugar manufacturing process.

e) Write the % of P_2O_5 in phosphoric acid and explain why addition of phosphoric acid in juice is important.

f) Explain the role of amino acid in sugar manufacturing process.

Q.3 Attempt any **TWO** (16)

a) Define refractive index and write application and importance of hand refractometer.

b) Describe working principle and construction of saccharimeter.

c) Define mixed juice and write the composition of mixed juice.

P.T.O.

Q.4 Attempt any **FOUR** (08)

a) Define the term simple imbibition.

b) Define pH.

c) Explain in short milk of lime.

d) Define the term syrup.

e) Explain the term floculant.

f) State range of Bx, pol, purity of M.J.

Q.5 Attempt any **FOUR** (16)

a) State and explain importance of cane preparation.

b) What are the different processes of clearification explain any one?

c) What are the chemicals used in sugar manufacturing? Explain in short any two.

d) Effect of cane quality on juice clarification.

e) State the composition of sulpher.

f) State classification steam consuming unit in sugar factory.

Q.6 Attempt any **TWO** (16)

a) State importance of i) Imbibition ii) Mill sanitation in sugar manufactury.

b) State and explain role of time, temperature and pH in sugar manufacturing.

c) State amd explain filtrate clearification processes.

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ODD TERM END EXAM NOV./ DEC -2016

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **SME306**

COURSE NAME :- **MECH. FLUID FLOW OPERATION**

MAX. MARKS : **80** TIME : **3 HRS.** DATE: - **28 / 11 / 2016**

Instruction:-

1) Answers must be written in the main answer book provided.(and supplements if required)
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.

Marks

Q.1 Attempt any **FOUR** (08)

a) Define unit operation.

b) State Ideal gas law.

c) State the Kicks law.

d) What are two major types of impeller?

e) Define Mesh.

f) Define sedimentation.

Q.2 Attempt any **FOUR** (16)

a) Define dimensional analysis. What is it's significance?

b) Differentiate Jaw crusher and gyratory crusher.

c) State the advantages of ball mill.

d) Draw sketch of typical Agitated Vessel.

e) Differentiate Grizzlies and Trommels.

f) Explain in short laboratory batch sedimentation test with the help of neat diagram.

Q.3 Attempt any **FOUR** (16)

a) State and explain types of screening equipment.

b) Differentiate between crushing and grinding.

c) What do you understand by baffling? Why it is necessary in the agitated vessel?

d) Explain in short variables in screening operations.

e) Differentiate between ideal screen and Actual screen.

f) Explain with neat sketch settling zones in contineous thickener.

[P.T.O.]

Q.4 Attempt any **FOUR** (08)

a) Mention any two industrial application of classfication as a mechanical operation.

b) Define filtration.

c) State the concept of pressure head.

d) What is a potential flow of fluids?

e) State the purpose of valves. Give any two types of valves.

f) State Bernoulli's principle.

Q.5 Attempt any **FOUR** (16)

a) With a neat sketch, explain working of agravity settling tank.

b) Explain Deep bed filtration. List out four different driving forces in filtration.

c) Derive an expression for hydrostatic equilibrium.

d) Define i) Specific gravity of a liquid. ii) Turbulent flow of fluids.

e) Draw a neat sketch of Reynolds experiment and state its importance.

f) Write any two merits and two demerits of a centrifugal pump.

Q.6 Attempt any **FOUR** (16)

a) With the help of a neat sketch, explain the working of Dorr classifier.

b) Differentiate between constant pressure filtration and constant rate filtration.

c) Define i) An ideal fluid ii) Pump capacity.

d) Explain the construction and working of a reciprocating pump with the help of a diagram.

e) Write mathematical expression for Bernoulli's equation and state the application of the equation.

f) Define Fluid Mass flow rate and list out different types of filtration equipments.

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ODD TERM END EXAM NOV-DEC -2016

EXAM SEAT NO. | | | | | | |

LEVEL: **THIRD** PROGRAM: **CE/ME/SM/MT**

COURSE CODE: **CEE301/CE201/C201/1201**
MEE301/ME201/M201/2201
SME301/SM201/S201/5201
MTE301/MG201/MT201

COURSE NAME: **APPLIED MATHEMATICS**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **16/11/2016**

Instruction:-
1) Answers must be written in the main answer book provided. (and supplements if required)
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.

Q.1 Attempt any **FOUR** **Marks (08)**

a) Evaluate $\int \frac{dx}{\sqrt{1+\cos x}}$ b) Evaluate $\int \frac{(1+\sqrt{x})^3}{\sqrt{x}}dx$

c) Evaluate $\int \frac{x}{(x+1)(x-1)}dx$ d) Evaluate $\int \frac{e^x}{\sqrt{16-e^{2x}}}dx$

e) Show that $\int_0^{\infty} \frac{dx}{a^2+b^2x^2}$ *is* $\frac{\pi}{2ab}$

f) Find the area enclosed by the curve $y=3x(x-2)$ and the x- axis.

Q.2 Attempt any **FOUR** **(16)**

a) Evaluate $\int \frac{\sin^{-1}x}{(1-x^2)^{3/2}}dx$ b) Evaluate $\int \frac{x+1}{x(x^2-4)}dx$

c) Evaluate $\int \frac{e^x(2+x)}{(3+x)^2}dx$ d) Evaluate $\int \frac{dx}{2-3\sin^2 x+5\cos^2 x}$

e) Evaluate $\int_0^{\pi/4} \log(1+\tan x)dx$

f) An alternating current is given by $i=a\sin 50\theta$. Find R.M.S value of the current over a complete wave.

Q.3 Attempt any **FOUR** **(16)**

a) If $E=2.75\sin 80\pi t$, find the mean value of E over a period $t=0$ *to* $t=\frac{1}{80}$

b) Find the area enclosed by the loop formed by the curve $y^2=x(x-2)^2$ by integration.

c) Evaluate $\int_0^{\pi} \frac{dx}{5+4\cos x}$

d) Evaluate $\int_0^{\pi/2} \frac{dx}{1+\sqrt[7]{\tan x}}$

e) Evaluate $\int \frac{1}{(e^x-1)^2}dx$

f) Evaluate $\int e^{2x}\cos 3x\,dx$

P.T.O

Q.4 Attempt any **FOUR** **(08)**

a) Find order and degree of the differential equation $\sqrt[3]{\frac{dy}{dx}+y}=\sqrt[4]{\frac{d^2y}{dx^2}}$

b) Form a differential equation of the equation $y^2=4Ax$

c) Solve the differential equation $\frac{1}{y^2+4}dx=\frac{1}{x^3-2}dy$

d) Show that the following equation is exact $\left(5x^4+3x^2y^2-2xy^3\right)dx+\left(2x^3y-3x^2y^2-5y^4\right)dy=0$

e) Find the probability that if a card is drawn from an ordinary pack it is a diamond.

f) Find the standard deviation of .18, 13, 9, 21, 20, 12, 25, 10

Q.5 Attempt any **FOUR** **(16)**

a) Solve $\frac{dy}{dx}=xy+x+y+1$

b) Solve $\frac{dy}{dx}=\frac{x^2+y^2}{xy}$ *given that* $y=2$ *when* $x=1$

c) Solve $\frac{dy}{dx}-\frac{2}{x}y=x^2.e^x$ *if* $y=0$ *when* $x=1$

d) Solve $\frac{dy}{dx}+\frac{2}{3}y=\frac{x}{\sqrt{y}}$

e) Find the equation of the curve passing through (1, 0) with slope $\left(\frac{y-1}{x^2+x}\right)$

f) A particle is moving in a straight line with initial velocity 5 m/sec and having acceleration $2\cos\pi/6\,t$ m/sec at any time t seconds. Find the distance traveled by the particle at the end of 2 seconds.

Q.6 Attempt any **FOUR** **(16)**

a) Calculate S.D and coefficient of variance from the following distribution

Class	20-25	25-30	30-35	35-40	40-45
Frequency	25	35	50	90	75

b) Two set are given

Set- I	Set-II
$\bar{x}=82.5$	$\bar{x}=48.75$
$\sigma=7.3$	$\sigma=8.35$

Which of two set is more consistent?

c) Calculate mean deviation about mean from the following.

xi	0-10	10-20	20-30	30-40	40-50	50-60	60-70
fi	10	16	18	30	15	06	05

d) Two cards are drawn from a pack of 52 cards find the probability that

i) Both cards are kings

ii) One is king and other is queen.

e) There are 100 cards, numbered from 1 to 100 are a card is drawn at random. What is the probability that the number on it is a multiple of 4 or 6

f) If $p(A)=1/4$, $P(B)=2/5$, & $P(A\cup B)=1/2$. Find the values of the following probabilities *i)* $P(A\cap B)$ *ii)* $P(A\cap B')$ *iii)* $P(A'\cap B)$ *iv)* $P(A'\cup B')$

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ODD TERM END EXAM NOV. / DEC 2016

EXAM SEAT NO. | | | | | | |

LEVEL : - **FOURTH** PROGRAM : **SUGAR MANUFACTURING**

COURSE CODE :- **SME401**

COURSE NAME :- **SUGAR ENGINEERING**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **22 / 11 / 2016**

Instruction :-

1) Answer to 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

Marks

Q.1 Attempt any **FOUR** (08)

a) Define Condensate.

b) Define P.E.

c) Define Effluent.

d) Define M.E.

e) Define Compressor.

f) Define M.J.

Q.2 Attempt any **FOUR** (16)

a) What are the types of mill drive, explain?

b) Explain factors affecting mill capacity.

c) State the production of condensate water & its balance in typical plant.

d) State the typical flow chart for effluent plant.

e) Explain the importance of temperature gauge flow meter in processes of sugar manufacturing.

f) State the classification of air compressor.

Q.3 Attempt any **FOUR** (16)

a) Explain the term Trash Plate.

b) What are the factors that are important for calculation of mill setting, explain.

c) Explain the term Edward hydraulic accumulator.

d) Explain the term spray pond and effluent water.

e) State comprainson between Reciprocating and Rotary compressor.

f) Explain Raw water and its uses in sugar production.

P.T.O

Section – II	Marks

Q.4 Attempt any **FOUR** (08)

a) State the types of air heater.

b) Define blowing down.

c) State the steam-consuming units of sugar industry.

d) State the factors affecting steam balance.

e) Enlist the various types of steam.

f) State the function ofsteam trap.

Q.5 Attempt any **FOUR** (16)

a) Explain the importance of bagasse drying.

b) Explain the factory power failure.

c) Explain the significance of control on boiler water and feed water.

d) Explain steam pressure reducing valve used in sugar industry.

e) Explain importance of lubrication and cooling of alternator.

f) Explain steam requirement for evaporator, pan and juice heater

Q.6 Attempt any **TWO** (16)

a) Describe the working of extraction and condensing type steam turbine.
State characteristics of steam use in turbine.

b) Describe the procedure of hydraulic testing of boiler.

c) Describe in detail internal water treatment for boiler water and feed water.

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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ODD TERM END EXAM NOV. / DEC 2016

EXAM SEAT NO. | | | | | | |

LEVEL : - **FOURTH** PROGRAM : **SUGAR MANUFACTURING**

COURSE CODE :- **SME406**

COURSE NAME :- **CAPACITY DESIGN & CALCULATION**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **18 / 11 / 2016**

Instruction :-

1) Answer to 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.
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Section – I

Marks

Q.1 Attempt any **FOUR** (08)

a) State the types of layouts of the sugar factory.
b) State the formula for power absorbed by compressing of Bagasse.
c) State the water requirement for a 2500 T.C.D. sugar plant.
d) State the active C_aO% Lime required in process and what is the Lime % cane used in process?
e) State the formula for power absorbed by cane carrier.
f) Calculate the cane area in Acres for 2500 TCD plant where yeild is 50 M.T/ Acre.

Q.2 Attempt any **FOUR** (16)

a) What are the cane preparatory devices and state power required for fibrizer device?
b) A milling tandom is precided by a Knief set and fibrizer crushed 1800 M.T. of cane/day. The size of the mill is 762 X 1524MM. the mill rotates at 5.5RPM. Determine the Fibre % cane that the mill can handle.
c) Calculate the Imbibition water weighing scale capacity for 2500 T.C.D. sugar plant.
d) Why the grooving of Roller is necessary and give the types of grooves with sketch?
e) Calculate the capacity of Milk of Lime storage tank for 2500 T.C.D. sugar plant.
f) Sketch a drawing of Lime slaker and calculate the Lime slaker capacity for 2500 T.C.D. sugar plant.

Q.3 Attempt any **TWO** (16)

a) Brief the juice reaction tank (Juice Sulphitor) with sketch, dimenssions and working height of 2500 TCD sugar plant.
b) Calculate M.T. of fibre/ Hour handled by a milling plant of 800mmX1600mm of Five Roller mill tandom having a fibrizer, the mill spead is 12m/min crushing 2400 M.T. of cane per day.
c) Sketch a flow diagram of a 2500 TCD sugar plant starting from cane carrier, Preparatory devices, mill tandom, bagasse carrier, Boiler, turbine House, Boiling House up to sugar bagging.
d) Give a detailed on imbibition water system used in the sugar factory. What should be the quantity and temperature of imbibition water?

[P.T.O.]

Section – II

Marks

Q.4 Attempt any **FOUR** (08)

a) State rotation per hour of the clarifier stirrer.

b) How much graining volume required in vacuum pan?

c) Give formulae for specific evaporation coefficient.

d) Give vacuum required for quadruple set in last body.

e) Give formula for gravity factor of centrifugal machine.

f) Give formula for capacity of hopper.

Q.5 Attempt any **FOUR** (16)

a) Draw neat sketch of batch type vacuum pan.

b) Calculate the quantity required for juice heater to heat the juice from 30^0-65^0C, quantity of juice =200000kg/hr, sp. Heat of juice = 0.9, Latent heat= 548, dryness fraction = 0.95.

c) Weight of vapour = 2,00,000 kg/hr, T= 103^0C, vapour velocity = 30m/sec, vapour supplied to second body. Calculate vapour pipe diameter of body. (sp. Volume at 103^0C=1.515 m^3/kg vapour)

d) Calculate quantity of syrup generated by evaporator for 3000TCD plant Inlet Bx=15^0, outlet Bx=60^0, clear juice % = 105%.

e) Draw net sketch of juice sulphitor.

f) Diameter of crystalizer = 2m, sp. Heat of m/c = 0.44, L/D = 3.3m, Ambient temperature θ=28^0C, value of K= 7 Kcal/m^2/hr/^{0}C. Dencity of m/c d= 1470 kg/m^3. To = 65^0C. Calculate the temperature of cooled massecuite.

Q.6 Attempt any **TWO** (16)

a) Calculate mumber of pan required for A, B and C boiling of 2500 TCD plant.

b) Calculate heating surface and no. of tubes of juice heater required for 2500 TCD plant.

c) Calculae no, of machines required for A B and C curing of 2500 TCD plant.

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ODD TERM END EXAM NOV-DEC -2016

EXAM SEAT NO. | | | | | | |

LEVEL: THIRD | PROGRAM: SUGAR

COURSE CODE: SME302 | COURSE NAME: BASIC SUGAR ENGINEERING

MAX. MARKS: 80 | TIME: 3 HRS. | DATE: 19/11/2016

Instruction:-

1) Answers must be written in the main answer book provided. (and supplements if required)
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.
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7) Use of Mobile is strictly prohibited.

Marks

Q.1 Attempt any **FOUR** **(08)**

a) Define working substance.

b) Define surrounding.

c) What is thermal equilibrium?

d) Define cylinder bore.

e) State Charle's law.

f) Draw P-V & T-ϕ diagram for isobaric process.

Q.2 Attempt any **FOUR** **(16)**

a) What is system? Explain types of system.

b) Explain the term enthalpy & entropy.

c) State and apply first law of thermodynamics to boiler.

d) State the types of thermodynamic cycles and explain any one in brief.

e) Write relation between cycle and engine.

f) State various ideal gas processes.

Q.3 Attempt any **TWO** **(16)**

a) Define perfect gas and derive the equation of perfect gas.

b) State

i) Zeroth law of thermodynamics.

ii) Second law of thermodynamics.

iii) Kelvin plank statement.

iv) Clausius statement.

c) Describe Carnot cycle with diagram.

P.T.O

Q.4 Attempt any **FOUR** (08)

a) Write a function of cane carrier & feeder table.

b) Write the speed of mill.

c) State the function of Grooving of mill.

d) Define super heated steam.

e) Write GCV & NCV for dry Bagasse.

f) Write the function of superheater.

Q.5 Attempt any **FOUR** (16)

a) State the objective of cane preparation & name the devices used for cane preparation.

b) Explain different drives for milling tandom.

c) Explain with neat sketch Three Roller mill unit.

d) What is enthalpy of water & enthalpy of evaporation?

e) Write the different types of furnaces draught & explain in brief.

f) Draw the steam cycle used in sugar industry.

Q.6 Attempt any **TWO** (16)

a) Describe indetail the parameters if feed water & Boiler water, what are the precautions taken about Boiler water?

b) i) State the application & advantage of super heated steam.

ii) Explain the construction & working of cane carrier.

c) Explain off seasonal maintenance of fiberizar & cane carrier in detail.

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ODD TERM END EXAM NOV./ DEC -2016
EXAM SEAT NO. | | | | | | |

LEVEL : - **FIFTH** PROGRAM : **SUGAR MANUFACTURING**
COURSE CODE :- **SME503**
COURSE NAME :- **SUGAR INDUSTRY MANAGEMENT**
MAX. MARKS : **80** TIME : **3 HRS.** DATE: - **05 / 12 / 2016**

Instruction :-
1) Answer to 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

Marks

Q.1 Attempt any **FOUR** (08)

a) Define Business.
b) Define Organization.
c) Define Management.
d) Define authority.
e) Define Human Resource planning.
f) Define Company.

Q.2 Attempt any **FOUR** (16)

a) What are the types and features of business?
b) Explain the term administration with its functions.
c) What are the types of organization? Explain.
d) What are the steps and principls of organization?
e) What are the types of traning and traning program?
f) Differentiate between leader and manager.

Q.3 Attempt any **FOUR** (16)

a) Explain any four provisions in the factory act 1948.
b) Explain the term forecasting.
c) What are the functional areas and level of management? Explain.
d) Explain the term proprietorship & partnership.
e) Explain benefits of motivation and importance of it.
f) What are the functions of personnel management?

P.T.O.

Section – II	Marks

Q.4 Attempt any **FOUR** (08)

a) Define working capital.

b) What is VAT?

c) What are the types of stores?

d) What is inventory control?

e) Write the specification of raw sugar.

f) Define raw sugar.

Q.5 Attempt any **FOUR** (16)

a) Write the function and objectives of financial management.

b) Write difference between tax and duty.

c) Write merits and demerits of EOQ.

d) Write the duties of material manager.

e) Explain the need of market analysis while purchasing goods.

f) Explain the objectives of store layout.

Q.6 Attempt any **TWO** (16)

a) Describe procedure of ABC analysis with their limitations.

b) Describe the duties of storekeeper in sugar factory.

c) i) Write the composition of refining sugar.

ii) Explain the bagasse handling and storage.

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ODD TERM END EXAM NOV./ DEC -2016

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **SME408**

COURSE NAME :- **SUGAR FACTORY MAINTENANCE**

MAX. MARKS : **80** TIME : **3 HRS.** DATE: - **30 / 11 / 2016**

Instruction :-

1) Answer to 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

Marks

Q.1 Attempt any **FOUR** (08)

a) What is crushing season and off-season?

b) Why effective maintenance is necessary?

c) Write the scope of maintenance department.

d) What is preventive maintenance?

e) Define Lubrication.

f) Which factors effects the efficiency of mills?

Q.2 Attempt any **FOUR** (16)

a) Explain equipment history card.

b) Write the responsibility of maintenance of maintenance department.

c) Explain need of preventive maintenance.

d) Which precautions to be taken while lubricating equipments.

e) Explain off season maintenance of feeder table.

f) Explain special problems of mill.

Q.3 Attempt any **TWO** (16)

a) Describe the reasons of mill stoppages in running crushing season in sugar factory.

b) Explain operating problems of mill.

c) Describe lubrication of open gearing.

P.T.O.

Section – II

Marks

Q.4 Attempt any **FOUR** (08)

a) Write tube length of evaporator body.

b) How much pressure is applied to check the calendria of evaporator body?

c) Write the R.P.M. of crystallizer stirror.

d) Write the R.P.M. of continuous centrifugal machine.

e) Write any four types of pumps and valves used in sugar factory.

f) Write the purpose of absorption towers in reaction tank.

Q.5 Attempt any **FOUR** (16)

a) Describe the off-season maintenance of Lime slacker.

b) Explain chemical cleaning and calendria testing of the evaporator.

c) Explain off-seasonal maintenance of an evaporator.

d) Write the causes of jamming of cut line and write the remmidies for the same.

e) Explain maintenance guidelines for hopper.

f) Explain off-season maintenance of transient heater.

Q.6 Attempt any **TWO** (16)

a) Describe indetail Batch type Pan off seasoal maintenance and calandria testing.

b) Describe the off seasonal maintenance of a Batch type centrifugal machines indetail.

c) Describe indetail the off seasonal maintenance of a clarifier.

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ODD TERM END EXAM NOV. / DEC 2016

EXAM SEAT NO. | | | | | | |

LEVEL : - **FOURTH** PROGRAM : **SUGAR MANUFACTURING**

COURSE CODE :- **SME402**

COURSE NAME :- **SUGAR TECHNOLOGY- I**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **23 / 11 / 2016**

Instruction :-

1) Answer to 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

Marks

Q.1 Attempt any **FOUR** (08)

a) Why raw juice is heated upto 70^0C in first stage? What is the velocity of juice and vapour in juice heater?

b) Write the retenssion time of the juice clarifier.

c) Why Brix of mixed juice is in between 12 to 15^0?

d) What is the Brix of Milk of Lime and what is the normal consumption of Lime % cane?

e) What is the Sulphur Burner Temperature and what is the SO_2 gas temperature while entering into juice or syrup.

f) Explain the types of the clarifiers used in sugar plant.

Q.2 Attempt any **FOUR** (16)

a) Describe the condensate removal system and nonconensable gases removal system in Juice Heater with sketch.

b) Describe the factors affecting the evaporation of juice in Quadruple Effect evaporator system.

c) Why the mud level in the clarifier is increased and what are the remidies?

d) Describe the Bagassecilo Blower and Bagassecilo cyclone system use for vacuum filter. (sketch)

e) Describe the working of Juice Sulphitation Tank with sketch.

f) Working of the clarifier with sketch.

Q.3 Attempt any **TWO** (16)

a) Draw a neat sketch of vacuum filter and describe the working of vacuum filter.

b) Draw a neat sketch of Evaporator body and describe the working of Evaporator.

c) Describe the scale formation during Evaporation, nature of scale, reasons for deposition, composition of scale and remidies-give detail study.

P.T.O.

Section – II

Marks

Q.4 Attempt any **FOUR** (08)

a) Define saturated solution.

b) Define super satruation.

c) Define super saturation coefficient.

d) Define elevation of Boiling Point.

e) Give critical value coefficient.

f) What are reducing sugars?

Q.5 Attempt any **FOUR** (16)

a) Draw neat sketch of Semi Kestener evaporator.

b) Calculate water evaporated; Plant capacity 2500 TCD, M.J. % Cane = 95, Inlet $Bx=15^0$, Outlet $Bx^0=62^0$.

c) Explain circulation in pan.

d) Draw the sketch showing compartments of contineous vacuum pan.

e) Explain effect of hydrostatic head on pan boiling.

f) Explain the factors on which rise in boiling point depends.

Q.6 Attempt any **FOUR** (16)

a) Explain factors on which rate of crystallisation depends.

b) Explain mechanism of boiling in short.

c) Explain zones of super saturation with sketch.

d) Explain concentration of juice in vacuum.

e) Explain. How vacuum is created in pan?

f) Explain working of vapour cell.

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

ODD TERM END EXAM NOV. / DEC 2016

EXAM SEAT NO. | | | | | | |

LEVEL :- **FOURTH** PROGRAM : **SUGAR MANUFACTURING**

COURSE CODE :- **SME403**

COURSE NAME :- **SUGAR TECHNOLOGY-II**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **25/ 11 / 2016**

Instruction :-

1) Answer to 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

Marks

Q.1 Attempt any **FOUR** (08)

a) What is the percentage of A m/c, B m/c & Cm/c on cane?

b) Give the types of Massicuite boiling systems.

c) Which zone is used for pan boiling?

d) What is extrainment?

e) Define Mother Liquer in the masecuite.

f) Give Brixes and Purities of Am/c & B m/c.

Q.2 Attempt any **FOUR** (16)

a) Explain preparation methods of slurry and their proportion during B & C grain respectively.

b) What is false grain? Explain the drobacks of false grain.

c) Explain cobenzes Diagram.

d) Explain the precausions to be taken during A m/c boiling.

e) Explain causes of conglomeration formation and remidies.

f) Give the composition of final molasses.

Q.3 Attempt any **TWO** (16)

a) What is conditioning of molasses? Describe the A Heavy B Heavy & C light molasses conditioning. Explain why molasses are to be conditioned.

b) Describe indetails the procedure of C massecuite Boiling and what is the dropping purity and temperature of the C massecuite?

c) Describe three massecuite boiling system, with flow chart.

P.T.O.

Section – II	Marks

Q.4 Attempt any **FOUR** (08)

a) State the density of massecuite.

b) Define massecuite.

c) Which type of crystalliser is used for C m/c treatment?

d) What is ICUMSA?

e) Which type of machines used for B m/c curing?

f) State temperature required for bagging of sugar.

Q.5 Attempt any **FOUR** (16)

a) Give the reasons for grain breakage. How can be reduced?

b) State principles involved in centrifugal operation.

c) Explain gradation of sugar.

d) Give specification of PP bags required for sugar packing.

e) State norms of export quality sugar.

f) List out precautions to be taken during crystallization.

Q.6 Attempt any **TWO** (16)

a) Describe the working of contineous machine with neat sketch.

b) Describe with sketch C massecuite treatment.

c) Give composition of sugar, sugar storage conditon and guidelines for storage of sugar.

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

ODD TERM END EXAM NOV./ DEC -2016

EXAM SEAT NO. | | | | | | |

LEVEL : - **FOURTH** PROGRAM : **SUGAR MANUFACTURING**

COURSE CODE :- **SME405**

COURSE NAME :- **SUGAR CHEMICAL CONTROL**

MAX. MARKS : **80** TIME : **3 HRS.** DATE: - **03 / 12 / 2016**

Instruction :-

1) Answer to 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 Marks

Q.1 Attempt any **FOUR** (08)

a) Define primary juice.
b) Define mixed juice.
c) State moisture % bagasse.
d) Define M.E.
e) When ME and RME are equal?
f) Write the importance of brix curve.

Q.2 Attempt any **FOUR** (16)

a) Cane = 7000 M.T. , M.J. = 6440 M.T., A.W. = 1540 M.T.
Calculate A.W. % cane, M.J.% cane, Bagasse % cane.

b) Caclulate fibre % bagasse and fibre % cane.
Moist % bag = 50 Pty of LEG = 75.94
Pol % bag = 1.98 Bag % cane = 30.10

c) Explain ERQV.

d) Calculate ERQV value of M.J. & LMJ.
M.J. purity = 83.90, primary juice pty = 85.15, LMJ pty = 74.80

e) Explain Rapi pol extractor.

f) M.J. % cane=92.20, Pol % bag=1.80, fibre % cane = 13.40,
Moisture % bagasse = 48.00, LMJ pty = 75.00, calculate A.W. % fibre.

Q.3 Attempt any **TWO** (16)

a) Describe brix curve procedure.
b) Describe lab crusher method for determination of expected recovery.
c) Compare the milling performance of following sugar factory

Particulers	Factory A	Factory B
A.W.% Cane	22.43	23.20
Fibre % Cane	14.89	14.47
Bri % M.J.	16.41	16.05
Pty. of M.J.	82.63	84.42
Pol % bag.	2.83	3.07
Moisture % bag	49.02	49.13
Purity of LEJ	73.91	76.55

(P.T.O.)

Section – II

Marks

Q.4 Attempt any **FOUR** (08)

a) Define the term final molasses.

b) Write formula of S.N. Gundurao for RBHR.

c) Explain the term Recovery % cane.

d) Write the normal range of actual % theoretical molasse.

e) Explain in short purpose of RT8C.

f) Write the range of bagasses % cane.

g) Define fiber.

Q.5 Attempt any **FOUR** (16)

a) Calculate BJR by SJM formula

Purity of M.J. = 88.20
Purity of F.M. = 32.20

b) Explain the procedure of stock taking.

c) Calculate N.S. from data given below

i) Brix of clean Juice = 16 ii) Pol of clean Juice – 14.30

d) Explain contents of Daily manufacturing report.

e) Write different report that used in sugar factory.

f) Explain the duties of manufacturing chemist.

g) Explain the term pol balance and Bx. Balance.

Q.6 Attempt any **TWO** (16)

a) Calculate available sugar and available molass

	Bx	Pry.	Qty.
A m/c :-	90.3	89.2	320MT
F.M. :-	Bx.	PG	
	91.0	31.50	

b) Cane crushed 5000MT
M.J. % 98% Pty. of M.J. 83.85
BX. % M.J.- 16 F.C. % Cane – 3.50
Pty. of C.ljc.= 84
Pol % F.C. = 1.9
Calculate cleanfication factor and efficiency.

c) Calculate overall recory.
Pol % M.J. 14.32
K.J. % Cane – 93
Rec % can -11.99
Pol% Bag – 2.9
Bag % cane – 31
Pol % sugar – 99.98

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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ODD TERM END EXAM NOV-DEC -2016

EXAM SEAT NO. | | | | | | |

LEVEL: FIFTH | PROGRAM: SUGAR MANUFACTURING

COURSE CODE: SME506 | COURSE NAME: CO-GENERATION TECHNOLOGY

MAX. MARKS: 80 | TIME: 3 HRS. | DATE: 02/12/2016

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) Define cane trash.

b) Define co-generation

c) Define Bagasse

d) What is spent wash?

e) Define Bio-mass

f) Define Air pollution

Q.2 Attempt any **FOUR** **(16)**

a) Explain the term commercial & non-commercial energy.

b) Describe the term Tidal energy

c) State principle of co-generation & explain in short.

d) State importance of Bagasses saving

e) What are the benefits of bagasses based co-generation.

f) Give comparison between conventional & non-conventional energy.

Q.3 Attempt any **TWO** **(16)**

a) What is mean by fuel? State & describe detail process of Bagasse based cp-generation process in sugar factory.

b) State & explain in short classification of energy.

c) State an application of nuclear & Heat energy, give its merits & demerits.

P.T.O

Section – II

Marks

Q.4 Attempt any **FOUR** **(08)**

a) List out important components of cogeneration plant

b) State the various options for cogeneration.

c) Define heat to power ratio.

d) Define gas turbine efficiency.

e) Define energy management.

f) Write the classification of cogeneration system.

Q.5 Attempt any **FOUR** **(16)**

a) Explain Bottoming cycle cogeneration.

b) State the energy saving opportunities of boiler in cogeneration system.

c) Write role and function of steam trap.

d) Write the parameters of boiler water and boiler feed water.

e) Explain energy conservation is a time need.

f) Explain importance of energy security.

Q.6 Attempt any **TWO** **(16)**

a) Describe gas turbine as a prime mover in cogeneration system in brief with neat sketch

b) Describe in brief working of steam turbine cogeneration system.

c) Describe in brief internal water treatment of boiler water.

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.
(An Autonomous Institute of Govt. Of Maharashtra)
ODD TERM END EXAM NOV./ DEC -2016
EXAM SEAT NO. | | | | | | |

LEVEL : - **FOURTH** PROGRAM : **SUGAR MANUFACTURING**
COURSE CODE :- **SME404**
COURSE NAME :- **BY PRODUCT OF SUGAR INDUSTRY**
MAX. MARKS : **80** TIME : **3 HRS.** DATE: - **02 / 12 / 2016**

Instruction :-
1) Answer to 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

Marks

Q.1 Attempt any **FOUR** (08)

a) Define pith.
b) Define final molasses.
c) Define filter cake.
d) Give two uses of molasses.
e) Define fibre.
f) Give two uses of filter cake.

Q.2 Attempt any **FOUR** (16)

a) Calculate available bagasse when added water = 28%, M.J.% cane = 97% for 5000 TCD plant.
b) Give composition of bagasse.
c) Differentiate between sulphate and sulphite pulp (any four)
d) List out by products from sugar industry and give any three uses of each.
e) Give composition of spent wash.
f) Give composition of filter cake.

Q.3 Attempt any **TWO** (16)

a) Describe with flow chart manufacturing process of particle board from bagasse.
b) Describe manufaturing process of wax from filter cake.
c) Describe manufacturing process of ethyl alcohol from molasses.

(P.T.O.)

	Section – II	Marks
Q.4	Attempt any **FOUR**	(08)

a) Define Raw sugar.

b) Define Effluent.

c) Define Jaggery.

d) Define solid waste.

e) Define Tertiary Treatment

f) Define Entrainment.

Q.5 Attempt any **FOUR** (16)

a) State the manufacturing process of Jaggery.

b) State specification of Raw sugar.

c) Explain the term sources of waste water and effluent from various source of sugar factory.

d) State characteristics of waste water from sugar factory.

e) Explain steps to be taken at different station to reduce the pollution.

f) List out pollution prevention measures.

Q.6 Attempt any **TWO** (16)

a) Explain in detail pollution effect waste water, solid waste, air pollution molasses.

b) Explain the term pollution of water due to entrainment of from pan, evaporators.

c) Explain the term primary, secondary, tertiary treatment of effluent water.

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