GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

(An Autonomous Institute of Govt. of Maharashtra)

ODD TERM END EXAM NOV/DEC -2019

EXAM SEAT NO. | | | | | | |

LEVEL: **IV** PROGRAM: **SUGAR MANUFACTURING**

COURSE CODE:**SMF404** COURSE NAME: **BY PRODUCT OF SUGAR INDUSTRY**

MAX. MARKS: **80** TIME: **3 HRS.** DATE:**07/12/2019**

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

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QN	SQN	Question Text	RUA	COSMF404	Marks
		Section -I			
Q.1		Attempt any **FOUR**			**(08)**
	a)	Define bagasses.	R	1	
	b)	Define calorific value.	R	1	
	c)	State the bagasses % M sugarcane.	R	1	
	d)	Restate final molasses.	R	2	
	e)	State any two use of filter cake.	R	3	
	f)	State use of wax. Any two.	R	3	
Q.2		Attempt any **FOUR**			**(16)**
	a)	Explain the role of bagasses in co-generator.	U	1	
	b)	Draw schematic flow sheet of fibre board manufacturing process.	U	1	
	c)	Summarize the manufacturing process of paper form bagasses.	A	1	
	d)	State composition of final molasses.	R	2	
	e)	Explain procedure of production of cattel feed from molasses.	U	2	
	f)	Write composition of filter mud.	U	3	
Q.3		Attempt any **FOUR**			**(16)**
	a)	Summarize the availability of bagasse.	U	1	
	b)	Describe in brief manufacturing process of alcohol from molasses.	A	2	
	c)	State characteristics of waste effluent from paper mill.	R	1	
	d)	Compare the soda process & sulphate process.	U	1	
	e)	Describe the process of fermentation of molasses.	A	2	
	f)	Write characterisstics of filter cake.	U	3	

P.T.O.

Section-II					
Q.4		Attempt any **FOUR**			**(08)**
	a)	List out specification of raw sugar.	R	4	
	b)	State advantages and disadvantages of Khandsari sugar.	R	4	
	c)	State type of effulent treatment used in sugar industry.	R	5	
	d)	State the function of ETP.	R	5	
	e)	Identify the polluction takes place from sulphitation process.	R	5	
	f)	Define COD.	R	6	
Q.5		Attempt any **FOUR**			**(16)**
	a)	Draw neat flow diagram of khandsari sugar manufacturing process.	A	4	
	b)	Explain segregation of effluent.	U	5	
	c)	Summarize characteristics of waste from distillery.	U	5	
	d)	List out three types of effluent generated by sugar industry.	R	5	
	e)	Explain measure to prevent particulate matter and dust.	U	6	
	f)	Explain role of laboratory in controlling pollution.	U	6	
Q.6		Attempt any **FOUR**			**(16)**
	a)	Describe profile requirement of air and water pollution control equipment for sugar industry of 2500TCD plant.	A	6	
	b)	Describe steps taken by engineering and manufacturing department to reduce pollution.	A	5	
	c)	Describe effect of pollution on waste water, solid waste.	A	5	

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ODD TERM END EXAM NOV-DEC-2019

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **SMF405**

COURSE NAME **SUGAR CHEMICAL CONTROL**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **02/ 12 / 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.
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7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	SQN	**Section- I**	R/ U/ A	Co SMF 405	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Define Bagasse and fibre.	R	1	
	b)	Recall mixed juice and last mill juice.	R	1	
	c)	Write interpretation of equivalent ratio quotient value.	U	2	
	d)	Mix juice % cane = 98 Bagasse % cane = 29.50. Calculate added water % cane.	A	2	
	e)	State the factors which affects milling performance.	U	2	
	f)	State normal range of Pol % and moisture % in Bagasse.	R	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Describe the process to determine preparatory index.	A	1	
	b)	Moisture % Bagasse = 49.60 Pol % Bagasse = 1.98 Purity of Last Ex. Juice = 75.94 Bagasse % cane = 30.10 Calculate fibre % Bagasse and fibre % cane.	A	2	
	c)	Mixed Juice purity = 83.95 Primary Juice purity = 85.20 Last Mill juice purity = 74.85 Calculate ERQV values for Mixed juice and Last mill juice.	A	2	
	d)	Explain primary extraction and secondary extraction.	U	2	
	e)	Cane crushed = 50500 MT, Added water = 14345 MT Mixed juice = 49745 MT. Calculate added water % cane, Mixed juice % cane, Quantity of Bagasse and Bagasse % cane.	A	2	
	f)	Describe indirect method for determination of fibre % cane.	A	3	
Q.3		Attempt any **TWO:**			**16**
	a)	Describe brix curve in brief for five milling tendom. (Assume data if necessary)	A	1	
	b)	M.J. % cane = 96.00 Pol % M.J. 14.13 Bagasse % cane = 28.00 Pol % Bagasse = 2.40 Fibre % cane = 14.65 Calculate Pol in cane, Mill extraction, Reduced Mill Extraction.	A	2	
	c)	Describe Rapi Pol extractor method to determine Pol % Bagasse.	U	1	

P.T.O.

QN	SQN	Section- II	R/U/A	Co SMF 405	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Define syrup.	R	4	
	b)	Write recovery formula.	U	4	
	c)	State brix range of M.J.	R	5	
	d)	Write different report used in sugar factory.	U	6	
	e)	Define Massecuite.	R	6	
	f)	Write contents of RT8C report. (any four)	U	6	
Q.5		Attempt any **FOUR** :			**16**
	a)	Calculate BHR by SJM formula Purity of M.J. 85 Purity of F.M. 38.	A	4	
	b)	State importance of stock taking	R	4	
	c)	Calculate available sugar and available molasses from data given below . Bx. 89.20 Pty. 89.3 Qty. $220m^3$ Sp.gr. 1.42 F.M. mol. Bx. 90.5 Pty. 33.5	A	5	
	d)	Write content of D.M.R. report.	U	5	
	e)	Summarize the duties of Lab Incharge.	U	6	
	f)	Calculate Qty. & sugar produced from data given : Cr 450000 MT Rec. % cane – 12.78 Assume data if required.	A	6	
Q.6		Attempt any **TWO:**			**16**
	a)	Pol % M.J.- 13.91 M.J. % cane – 93.67 Pol % Bag – 2.005 Bag % cane – 29.92 Pol % F.C. – 1.065 F.C. % cane – 4.328 Pol % F.M. – 31.76 F.M. % cane – 3.53 Pol % Sugar – 99.80 Recovery % cane – 11.83 Calculate Pol Balance.	A	4	
	b)	Describe duties of manufacturing chemist.	R	5	
	c)	Fiber % Cane - 15.30 Fibre % Bag – 44.0 M.J. % Cane - 83 M.J. Bx. - 15.10 Bx. % PJ - 18.90 Bx. % Bag - 6.50 Calculate Bx. Free cane water % cane % fiber.	A	6	

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ODD TERM END EXAM NOV/DEC -2019

EXAM SEAT NO. | | | | | | |

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

COURSE CODE: **SMF401** COURSE NAME: **SUGAR ENGINEERING**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **27/11/2019**

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.
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QN	SQN	Question Text	RUA	CO SMF 401	Marks
		Section -I			
Q.1		Attempt any **FOUR**			**(08)**
	a)	Restate primary extraction.	R	1	
	b)	State the roll trash plate in mill setting.	R	1	
	c)	Give classification of air compressor.	U	3	
	d)	List out condensate generation stations.	R	2	
	e)	Write the types of drives used for driving mills.	R	1	
	f)	Recall the compressor pressure to centrifugal stations.	U	3	
Q.2		Attempt any **FOUR**			**(16)**
	a)	State the advantages of electric drives operated mill.	R		
	b)	Summarize the working of "spray pond"	U		
	c)	Comparison between Reciprocating & Rotary compressor.	A		
	d)	Explain factory affecting efficiency of mill.	U		
	e)	Calculate the condensate generated for 2500 TCD plant, assume data if necessary.	A		
	f)	State any eight industrial application of Air compressor.	R		
Q.3		Attempt any **TWO**			**(16)**
	a)	Summarize duties of safety officer in sugar industry.	A	3	
	b)	Describe maintenance & supervision of power turbines indetail.	A	1	
	c)	i) Calculate the tail pipe diameter of the condenser (Barrometric) by using data. Quantity of warm water -1353MT/Hr Velocity of Warm water – 3 mtr/second. ii) Calculate the height of condenser for 2500 TCD plant. Data ratio of the ton of the vapour =0.75 m^3/ 1000kg vapour /Hr Dia of condenser =2.67 mtrs.	A	2	

Section-II					
Q.4		Attempt any **FOUR**			**(08)**
	a)	State sugar test of boiler water.	R	4	
	b)	State the types of boiler used in sugar industry.	R	4	
	c)	State any four factors that affecting carry over.	R	4	
	d)	Draw diagram of Rankine cycle.	A	4	
	e)	Recall sensible heat.	R	5	
	f)	Recall Alternator.	R	5	
Q.5		Attempt any **FOUR**			**(16)**
	a)	Explain the purpose of soot blowing of boiler.	U	4	
	b)	Explain use of super heater in boiler.	U	4	
	c)	Explain effect of impurities present in the feed water on boiler.	U	4	
	d)	Explain the use of condensate obtained from various stations on boiler.	U	4	
	e)	Explain working of PRDS station.	U	5	
	f)	Draw flow chart of steam generation and distribution in sugar industry.	A	5	
Q.6		Attempt any **TWO**			**(16)**
	a)	Describe importance of economizer and airprehater.	A	4	
	b)	Describe construction and working of extraction cum condensing type steam turbine.	A	5	
	c)	Describe the role of co-generation in the economical boosting of sugar industry.	A	6	

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ODD TERM END EXAM NOV-DEC-2019

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **SMF308**

COURSE NAME **CHEMICAL PROCESS TECHNOLOGY**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **30/ 11 / 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.
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7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	SQN	Question Text	R/ U/ A	Co SMF 308	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Categories the material for chemical processes.	R	1	
	b)	Define endothermic reaction and exothermic reaction.	R	2	
	c)	What is Fermentation?	R	2	
	d)	Write merit and demerits of contact process.	U	3	
	e)	List out the raw materials required for the manufacturing of washing soda.	R	3	
	f)	Write the industrial applications of hydrochloric acid..	U	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Classify industrial chemical processes with simple diagrams.	U	1	
	b)	State important aspects of equilibrium reaction.	R	2	
	c)	Draw neat sketch of synthesis process for manufacturing of hydrochloric acid.	U	3	
	d)	Summarize Solvay's process for manufacturing of sodium carbonate.	A	3	
	e)	Compare platinum catalyst and vanadium catalyst.	A	3	
	f)	Write properties and application of washing soda.	U	3	
Q.3		Attempt any **TWO:**			**16**
	a)	i) Draw symbol and use of 1) rotary vacuum filter 2) Evaporator. ii) distinguish between irreversible and reversible reaction.	R U	2 2	
	b)	Draw neat diagram of contact plant for manufacturing of sulphuric acid and describe the working operations involved in the process.	A	3	
	c)	Describe the process of synthesis of ammonia with flow sheet.	A	3	

QN	SQN	Question Text	R/U/A	Co SMF 303	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Define the term molasses.	R	4	
	b)	State the molecular formula of ethyl alcohol.	R	4	
	c)	What is mean by NPK?	U	5	
	d)	Writ any two name of industrial gas.	A	5	
	e)	Write use of Co_2 in sugar manufacturing processes.	A	6	
	f)	What is the raw material for pulp & paper?	R	6	
Q.5		Attempt any **FOUR** :			**16**
	a)	Write properties of vinegar.	A	4	
	b)	State manufacturing processes of urea.	R	5	
	c)	Explain the term mixed fertilizer.	U	5	
	d)	Describe manufacturing process of phosphoric acid.	A	5	
	e)	Draw flow sheet of paper manufacturing.	A	6	
	f)	State manufacturing process of Hydrogen.	R	6	
Q.6		Attempt any **FOUR:**			**16**
	a)	Write method of production of ethyl acetate.	U	4	
	b)	Explain the term fermentation.	R	4	
	c)	Draw flow chart of manufacturing of carbon dioxide.	R	5	
	d)	State manufacturing process of paper from Bagasse.	A	5	
	e)	Write process of manufacturing of nitrogen.	A	6	
	f)	What is mean by water gas? Explain the same.	R	6	

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ODD TERM END EXAM NOV/DEC -2019

EXAM SEAT NO. | | | | | | |

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

COURSE CODE: **SMF408** COURSE NAME: **SUGAR FACTORY MAINTENANCE**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **04/12/2019**

Instruction:-

1) Answer to two sections must be written in separate section answer book provided
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QN	SQN	Question Text	RUA	CO SMF 408	Marks
		Section -I			
Q.1		Attempt any **FOUR**			**(08)**
	a)	Define 'effective maintenance'.	R	1	
	b)	List out stoppages during 'Crushing season'.	U	1	
	c)	Write the objective of preventive maintenance.	R	1	
	d)	Write the purpose of lubrication.	R	2	
	e)	Give four names of lubricants used in sugar factory.	A	2	
	f)	Write the RPM of mill.	U	3	
Q.2		Attempt any **FOUR**			**(16)**
	a)	Summarize factors affecting off season maintenance of sugar factories.	R	1	
	b)	Explain advantages of lubrication.	R	2	
	c)	Elaborate precautions to be taken while lubricating equipment.	U	2	
	d)	Summarize lubrication of open gearing.	A	2	
	e)	Summarize operating problem of mills.	A	3	
	f)	Explain the maintenance of mill during shutdown.	A	3	

Q.3		Attempt any **TWO**			**(16)**
	a)	Describe need of preventive maintenance.	A	1	
	b)	Describe equipments card with specification detail.	U	1	
	c)	Describe off season maintenance of mill-section.	U	3	

Section-II

Q.4		Attempt any **FOUR**			**(08)**
	a)	State RPH of the clarifier.	R	4	
	b)	List out types of pumps used on sugar industry.	R	4	
	c)	State the vacuum required in last body of the evaporator.	R	4	
	d)	State the required temperature of the so_2 gas.	R	5	
	e)	Give screen size of contineous machine.	R	5	
	f)	State the steam pressure required for batch machine.	R	5	
Q.5		Attempt any **FOUR**			**(16)**
	a)	Explain testing procedure of evaporator.	U	4	
	b)	Explain maintenance of So_2 furnace and pipe line.	U	4	
	c)	Explain procedure of hydraulic testing of pan.	U	5	
	d)	Explain maintenance of lime slalker.	U	4	
	e)	Explain off seasonal maintenance of batch machine.	U	6	
	f)	Draw neat sketch of contineous machine.	A	6	
Q.6		Attempt any **FOUR**			**(16)**
	a)	Explain procedure for testing of valves.	U	4	
	b)	Explain the procedure for cleaning of juice heater.	U	4	
	c)	Explain procedure of mechanical cleaning of evaporator.	U	4	
	d)	Explain seasonal maintenance of crystallizer.	U	5	
	e)	State cause of jamming of cat line. State remedies for the same.	R	5	
	f)	List out maintenance guide lines for grass hopper elevator, sugar grader.	R	6	

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ODD TERM END EXAM NOV/DEC -2019

EXAM SEAT NO. | | | | | | |

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

COURSE CODE: **SMF306** COURSE NAME: **MECHANICAL FLUID FLOW OPERATION**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **28/11/2019**

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.
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5) Assume and mention suitable additional data necessary.
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QN	SQN	Question Text	RUA	CO SMF306	Marks
Q.1		Attempt any **FOUR**			**(08)**
	a)	Restate Ideal gas law.	U	1	
	b)	Explain why mixing is necessary.	U	2	
	c)	Restate Bond's Law.	U	1	
	d)	Mention any two ways of preventing vertex formation.	U	2	
	e)	Select proper filter for filtration of muddy juice.	R	2	
	f)	Distinguish Ideal screen and Actual screen.	A	3	
Q.2		Attempt any **FOUR**			**(16)**
	a)	Distinguish between Jaw crush and Gyratory crusher.	A	1	
	b)	Illustrate factors influencing the size of the product in a ball mill.	U	1	
	c)	Draw neat sketch of Hammer mill.	U	1	
	d)	Explain with experiment Batch Sedimentation Test'.	U	2	
	e)	Draw neat sketch of Door Thickner.	U	2	
	f)	Draw neat sketch of typical agitated vessel.	A	2	
Q.3		Attempt any **TWO**			**(16)**
	a)	Distinguish between crushing and Grinding operation.	A	1	
	b)	Describe laboratory batch sedimentation test.	A	2	
	c)	Distinguish between Grizzlies and Trommels.	A	3	
Q.4		Attempt any **FOUR**			**(08)**
	a)	Define classification as a mechanical operation.	R	4	
	b)	State the concept of fluid pressure head.	U	6	
	c)	Define co-agulants in filtration.	R	5	
	d)	Mention any two applications of Bernoulli's equation.	R	6	

P.T.O

	e)	Explain priming of a pump.	U	4	
	f)	Explain Laminar flow of fluids.	U	6	
Q.5		Attempt any **FOUR**			**(16)**
	a)	State any two fundamental laws of classification and list two industrial application of classification.	U & R	6	
	b)	Outline the sketch of a Door classifier and explain working of the same.	A	4	
	c)	Distinguish between filter aids and filter media with suitable illustration.	U	5	
	d)	Explain the factors affecting rate of filtration.	U	5	
	e)	Differentiate between compressible fluids and incompressible flujds.	U	6	
	f)	With the help of neat diagram explain Reynolds's experiment.	A	6	
Q.6		Attempt any **FOUR**			**(16)**
	a)	Draw a neat sketch of hydraulic jig and explain its working.	A	4	
	b)	Compare and contrast; centrifugal pump with reciprocation pump.	U	4	
	c)	List two advantages and two disadvantages of plate and frame filter press.	R	5	
	d)	Define co-agulants and explain the role of the same in filtration.	R & U	5	
	e)	Derive basic equation of hydrostatics equilibrium.	A	6	
	f)	State Bernoulli's principle and explain basic Bernoulli's equation for incompressible fluids.	R & U	6	

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ODD TERM END EXAM NOV/DEC -2019

EXAM SEAT NO. | | | | | | |

LEVEL: **IV** PROGRAM: **SUGAR MANUFACTURING**

COURSE CODE: **SMF406** COURSE NAME: **CAPACITY DESIGN AND CALCULATION**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **26/11/2019**

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.
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QN	SQN	Question Text	RUA	CO SMF406	Marks
		Section -I			
Q.1		Attempt any **FOUR**			**(08)**
	a)	List types of layout for sugar factory.	R	1	
	b)	Calculate cane area required for 3500 TCD plant.	A	1	
	c)	Write the formula to calculate peripheral speed of mill roller.	U	3	
	d)	Write Mill Capacity formula.	U	3	
	e)	Define fibre.	R	3	
	f)	State the function of fibrizer.	R	2	
Q.2		Attempt any **FOUR**			**(16)**
	a)	Calculate the capacity of the lime slaker for 2500 TCD plant.	A	1	
	b)	List out the disadvantages of a 'bad factory layout'.	R	1	
	c)	Calculate capacity of juice weighing scale for 3000 TCD plant.	R	1	
	d)	Explain the construction and operation of mill.	A	2	
	e)	Calculate the depth of the cane carrier from the following data: Mill roller size = 800mm X 1600mm, Mill speed = 12 m/min, Cane crushing = 2500MT/day and Bulk density of cane = 300 kg/m^3,	A	2	
	f)	Calculate the imbibition water pump capacity from the following data: Added water % cane = 30, Crushing rate = 115 TCH and Temperature of water = 85^{O}C - 95^{O}C.	A	3	
Q.3		Attempt any **TWO**			**(16)**
	a)	Describe the criteria for selection of site for sugar factory.	A	1	
	b)	A milling tendom is precided by a knife set and a fibrizer crushes 2000 MT cane/day. The size of mill is (762mm x 1524 mm) and mill rotates at 5 RPM. Calculate the fibre % cane that the mill can handle.	A	2	
	c)	Describe the factors affecting the capacity of the mill	A	3	
		Section-II			
Q.4		Attempt any **FOUR**			**(08)**
	a)	State RPM of vacuum filter	R	4	
	b)	List types of J.H.	R	4	
	c)	Write the details of juice heater tube.	R	5	
	d)	Write function of vapor cell body.	R	5	
	e)	Write the types of pan.	U	6	
	f)	Write the function of the centrifugal machine.	R	6	

P.T.O.

Q.5		Attempt any **FOUR**			**(16)**
	a)	Calculate H. S. from the data given below: i) No. of tubes 5200, ii) Tube length 2000mm, iii) Area of tube 42 mm – 45 mm (ID and OD). Assume additional data as required.	A	4	
	b)	Describe the term specific evaporation coefficient.	U	5	
	c)	Calculate quantity of water evaporated from data give below. i) Inlet Bx 15 ii) Outlet Bx 60^0 Bx iii) Cr. 4000 TCD iv) Clear juice % cane 93. Assume any data if required.	A	5	
	d)	Describe major consideration in pan design.	U	6	
	e)	Calculate no. of machine required for c m/c from data given below. Cr. 2500 TCD; CM/c % cane – 8% Capacity of machine - 6T/Hr. Assume data if any required.	A	6	
	f)	Draw neat sketch of vacuum pan.	R	6	
Q.6		Attempt any **FOUR**			**(16)**
	a)	Calculate capacity of vacuum filter required from data given below Cr. 4000 TCD filtering are 0.62 m^2/TCH. Assume data if any required.	A	4	
	b)	Draw neat sketch of vacuum filter.	U	4	
	c)	Calculate quantity of water evaporated for pan 'A' M/c given data H.S. of pan – 270 m^2. Evaporation rate – 55 kg/m^2/Hr.	A	5	
	d)	Calculate no. of machine required for B M/c from data given below. i) Cr. 3000 TCD ii) B M/c % cane – 16% iii) Capacity of machine 12T/Hr. Assume data if any required.	A	6	
	e)	Give mechanical consideration of Batch type centrifugal machine.	R	6	
	f)	Calculate capacity of grader required from data given below. i) Cr - 7000TCD ii) Recovery % cane – 12.50 Assume data if any required.	A	6	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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ODD TERM END EXAM NOV-DEC-2019

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **SMF303**

COURSE NAME **BASIC SUGAR MANUFACTURING**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **26/ 11 / 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	SQN	Question Text	R/U/A	Co SMF 303	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Define last expressed juice.	R	1	
	b)	Recall condensate.	R	1	
	c)	Define polarization.	R	1	
	d)	Explain sugar scale.	U	1	
	e)	List out coloring matter in juice.	U	2	
	f)	Define secondary juice.	R	1	
Q.2		Attempt any **FOUR:**			**16**
	a)	Summerise optical method of sugar analysis.	U	1	
	b)	Illustrate practical consideration while operating polariscope.	U	1	
	c)	Classify composition of coloring matter.	U	U	2
	d)	Explain brief application of colloidal chemistry.	U	3	
	e)	Explain rotation of plane of polarization.	U	1	
	f)	Distinguish between primary and secondary juice.	A	1	
Q.3		Attempt any **TWO:**			**16**
	a)	Describe indetail application and importance of refractometer in sugar industry and describe hand refractometer with neat sketch.	A	1	
	b)	Describe colour formation in process of sugar manufacturing and the composition of the coloring matter.	A	2	
	c)	Describe indetail phosphoric acid preparation tank with sketch and give indetail the uses of phosphoric acid on cane juice.	A	3	

P.T.O.

QN	SQN	Question Text	R/U/A	Co SMF 303	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	List out cane preparatory devices.	R	4	
	b)	Define imbibitions.	R	4	
	c)	Write the aim of clarification.	U	5	
	d)	State different types of clarifier.	R	6	
	e)	Write the RPM of lime slaker.	R	6	
	f)	Inter pH and temperature of sulphited juice.	U	6	
Q.5		Attempt any **FOUR** :			**16**
	a)	Summerise compound imbibition system with neat sketch.	A	4	
	b)	Draw neat sketch of juice clarifier 444.	U	5	
	c)	Explain why pH, temperature and retention time is important in juice sulphitation.	U	5	
	d)	Restate clear juice and write pH and temperature of clear juice.	R	6	
	e)	Write the function of abortion tower.	U	6	
	f)	State different types of liming and summerise any one in brief.	A	6	
Q.6		Attempt any **TWO:**			**16**
	a)	i) Draw neat sketch of steam distribution in sugar industry. ii) Write the benefits of MAPCON system.	U U	4 6	
	b)	Describe the construction of sulphar burner with neat sketch.	A	6	
	c)	Describe the reactions taking place during clarification.	A	5	

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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ODD TERM END EXAM NOV/DEC -2019

EXAM SEAT NO. | | | | | | |

LEVEL: **IV** PROGRAM: **SUGAR MANUFACTURING**

COURSE CODE:**SMF403** COURSE NAME: **SUGAR MANUFACTURING-II**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **29/11/2019**

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

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QN	SQN	Question Text	RUA	COSMF403	Marks
		Section –I			
Q.1		Attempt any **FOUR**			**(08)**
	a)	State brix & purity of A massecuite.	R	1	
	b)	Write different methods of grainning.	U	1	
	c)	Restate massecuite.	R	2	
	d)	Write brix & pH of syrup.	U	2	
	e)	State the different types of pan's used in sugar industry.	R	3	
	f)	State the formula of exhaustion % massecuite.	R	3	
Q.2		Attempt any **FOUR**			**(16)**
	a)	Draw the neat sketch of multi jet condenser.	U	1	
	b)	Write the precaution's to be taken during A massecuite boiling.	U	1	
	c)	Explain the cobenz diagram with suitable example.	U	2	
	d)	Write the brix and purities of A heavy , B heavy, A massecuite & B massecuite.	U	2	
	e)	Calculate number of pan required for 3000 TCD plant. A m/c % cane – 26, B m/c % cane-10, C m/c % cane-8. Time required for A m/c boiling – 4hrs., Bm/c boiling – 6hrs. , C m/c boiling – 8hrs., (Capacity of pan – 60MT).	A	2	
	f)	Write the purpose of molasses conditioning.	U	3	
Q.3		Attempt any **TWO**			**(16)**
	a)	Describe the method of sugar slurry preparation in brief.	A	1	
	b)	Describe the three massecuite boiling scheme in brief.	A	2	
	c)	i)write the compositon of exhausted molasses. ii) State the causes of conglomeration.	U U	3 3	

Section-II					
Q.4		Attempt any **FOUR**			**(08)**
	a)	Recall maturity zone.	R	1	
	b)	Illustrate C massecuite requires double curing.	U	2	
	c)	State moisture % sugar.	R	3	
	d)	Recall massecuite.	R	2	
	e)	Explain double curing.	U	3	
	f)	State crystal percent massecuite A B & C.	R	1	
Q.5		Attempt any **FOUR**			**(16)**
	a)	Compaire batch type & continuous machine.	U	2	
	b)	State specification of packing material (PP Bags).	R	3	
	c)	Explain gradation of sugar with the help of screens.	U	3	
	d)	Explain C massecuite treatment.	U	2	
	e)	Explain principles involved in crystallization.	U	1	
	f)	Draw neat sketch of continuous machine.	A	2	
Q.6		Attempt any **TWO**			**(16)**
	a)	Describe working of Air cooled crystallizer with sketch.	U	1	
	b)	Describe working of Batch type centrifugal machine with neat sketch.	U	2	
	c)	Describe sugar storage & staking system in sugar industry.	U	3	

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EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **SMF302**

COURSE NAME **BASIC SUGAR ENGINEERING**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **20/ 11 / 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	SQN	Question Text	R/U/A	Co SMF 302	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	State first law of thermodynamics.	R	1	
	b)	Define working substance.	R	1	
	c)	What is thermal equilibrium?	R	1	
	d)	What is air cycle?	R	2	
	e)	State Boyle's law.	R	3	
	f)	What is reversible process?	R	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Explain enthalpy and entropy.	U	1	
	b)	Apply first law of thermodynamics to condenser.	A	1	
	c)	Write Kelvin plank and clausius statement for second law of thermodynamics.	R	1	
	d)	Write the condition for reversibility of thermodynamic cycle.	U	2	
	e)	Explain working of an ideal engine.	A	2	
	f)	List out the various ideal gas processes.	R	3	
Q.3		Attempt any **TWO:**			**16**
	a)	Define system, state types of system and explain in brief.	U	1	
	b)	Describe Carnot cycle in P-V & T-S diagram and explain different processes.	A	2	
	c)	Define perfect gas and derive equation for perfect gas.	A	3	

P.T.O.

Q.4		Attempt any **FOUR:**			**08**
	a)	List out cane preparatory devices.	R	4	
	b)	Write the function of cane cicker.	R	4	
	c)	State the speed of mill.	R	4	
	d)	Write GCV & NCV for dry Bagasse.	R	6	
	e)	Define Entropy.	R	5	
	f)	Define wet steam.	R	5	
Q.5		Attempt any **FOUR** :			**16**
	a)	Write the function of Boiler mountings and accessories.	U	6	
	b)	Differentiate between water tube boiler and fire tube boiler.	A	6	
	c)	Explain why cane preparation is necessary.	U	4	
	d)	State objects of mill setting.	R	4	
	e)	Explain types of grooves and explain nay one.	U	4	
	f)	State factory affecting mill operation.	R	4	
Q.6		Attempt any TWO:			**16**
	a)	Describe with sketch of fabrizer and its use in detail.	A	4	
	b)	State types of furnaces and explain any one with neat sketch.	R	6	
	c)	Describe in brief the process of steam formation using temperature enthalpy diagram.	R	6	

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ODD TERM END EXAM NOV/DEC -2019

EXAM SEAT NO. | | | | | | |

LEVEL: **IV** PROGRAM: **Sugar Manufacturing**

COURSE CODE: **SMF402** COURSE NAME: **Sugar Manufacturing I**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **25/11/2019**

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

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QN	SQN	Question Text	RUA	CO SMF402	Marks
		Section -I			
Q.1		Attempt any **FOUR**			**(08)**
	a)	State the PH of syrup maintain for process.	R	3	
	b)	Illustrate factors for heat transfer.	U	1	
	c)	Explain role of Bagasse in filteration.	U	2	
	d)	List out reasons for deposition of scale.	R	3	
	e)	Explain purpose of sulphur juice heating.	U	1	
	f)	List out types of clarifier.	R	2	
Q.2		Attempt any **FOUR**			**(16)**
	a)	Draw neat labeled sketch of clarifier.	A	2	
	b)	List out three principles of Relliux.	R	3	
	c)	Describe entrainment catcher.	A	3	
	d)	Describe mode of heating of raw juice.	A	1	
	e)	Describe multiple effect evaporation.	A	3	
	f)	Explain possible causes of high mud level.	U	2	
Q.3		Attempt any **FOUR**			**(16)**
	a)	Draw neat sketch of Evaporator Body.	A	3	
	b)	Explain working of vaccum filter.	U	2	
	c)	Identify precaution to be taken during shut down of clarifier.	A	2	
	d)	Explain incondensable gas removal arramgement.	U	3	
	e)	Explain vapour bleeding arrangement of multiple effect evaporator.	U	3	
	f)	Draw neat sketch of juice heater.	A	1	
		Section -II			
Q.4		Attempt any **FOUR**			**(08)**
	a)	List out different types of evaporator.	R	4	
	b)	Write temperature and pH of condensate.	R	4	
	c)	State the types of ~~coninuous~~ Continuous pan.	R	5	
	d)	What is low head pan.	R	5	
	e)	State the factors which affects the rate of crystallization.	R	6	
	f)	State super saturation.	R	6	
Q.5		Attempt any **FOUR**			**(16)**
	a)	Calculate quantity of water evaporated for 2500 TCD plant, where Inlet Brix=16° and Outlet Brix = 60°.	A	4	
	b)	Draw neat sketch of vapour cell.	U	4	
	c)	Summarize concentration of juice performed in two stages.	A	4	
	d)	Explain decomposition of sucrose during evaporation.	A	4	
	e)	Summarise factors affects boiling point elevation.	A	6	
	f)	Explain heat injury to massecuite.	A	6	
Q.6		Attempt any **TWO**			**(16)**
	a)	Describe the generation of vaccum by multijet condenser with neat sketch.	A	4	
	b)	Describe circulation of massecuite in pan.	A	5	
	c)	Describe different zones of super saturation coefficient with neat sketch.	A	6	

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ODD TERM END EXAM NOV/DEC -2019

EXAM SEAT NO. | | | | | | |

LEVEL: **V** PROGRAM: **SUGAR MANUFACTURING**

COURSE CODE:**SMF504** COURSE NAME: **COGENERATION TECHNOLOGY**

MAX. MARKS: **80** TIME: **3 HRS.** DATE:**06/12/2019**

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

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QN	SQN	Question Text	RUA	CO	Marks
		Section -I			
Q.1		Attempt any **FOUR**			**(08)**
	a)	List out the pollutants which are responsible for acid rain.	R	1	
	b)	Write the advantages of Geothermal energy.	R	1	
	c)	Define cogeneration.	R	2	
	d)	State the normal range of bagasse production % cane.	R	3	
	e)	State the environmental benefits of cogeneration.	U	3	
	f)	Restate combined heat & power.	R	2	
Q.2		Attempt any **FOUR**			**(16)**
	a)	Draw neat sketch showing acid rain and its effects.	U	1	
	b)	Summarize the relation between energy and economy.	U	1	
	c)	Distinguish between conventional and non-conventional energy source.	A	1	
	d)	Summarize the importance of bagasse saving.	U	3	
	e)	Write the principle of cogeneration.	R	2	
	f)	Explain the basic concepts of cogeneration with neat sketch.	U	2	
Q.3		Attempt any **TWO**			**(16)**
	a)	Describe thermal energy power plant with schematic diagram.	A	1	
	b)	Describe green house effect with neat diagram also state current evidence of climate change.	A	1	
	c)	Elaborate the current status and future potential of cogeneration in Indian sugar industries.	A	3	

P.T.O.

Section-II					
Q.4		Attempt any **FOUR**			**(08)**
	a)	State classification of co-generation system.	R	4	
	b)	List out prime movers used in sugar industry.	R	5	
	c)	State different types of boilers.	U	6	
	d)	State disadvantage of reciprocating engine co-generation system.	R	5	
	e)	State function of steam trap.	U	6	
	f)	Explain effect of silica on quality of steam.	U	6	
Q.5		Attempt any **FOUR**			**(16)**
	a)	Explain topping cycle cogeneration system.	U	4	
	b)	Explain working of extraction & condensing steam turbine.	U	5	
	c)	Differentiate between internal & external water treatment.	U	6	
	d)	List out important technical parameters for co-generation.	U	4	
	e)	Explain working of Back pressure turbine with sketch.	U	5	
	f)	State importance & benefits of Blowdown.	R	6	
Q.6		Attempt any **FOUR**			**(16)**
	a)	Explain heat to power ratio for co-generation.	U	4	
	b)	Summerise Energy Conservation act 2001.	U	5	
	c)	State necessity of Boiler water treatment.	U	6	
	d)	Explain in brief factors influencing co-generation choice.	U	4	
	e)	State importance of energy security & energy conservation.	U	5	
	f)	Explain the need of energy audit.	U	5	

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