GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

(An Autonomous Institute of Govt. of Maharashtra)

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) 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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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.

Q.5 Attempt the following questions. (Any **FOUR**) **(16)**

a) Draw a neat sketch of a tunnel dryer.

b) State and explain the factors that decide the drying rate.

c) Define crystallization and describe crystal formation mechanism.

d) Mention two industrial applications of liquid-liquid extraction and also list two advantages of L-L-E over distillation.

e) List different types of absorption tower packings and state various characteristics of such packings.

f) Describe the process of simple distillation with the help of a neat sketch.

Q.6 Attempt the following questions. (Any **FOUR**) **(16)**

a) In fractional distillation, what are stripping and rectifying sections ? State the advantages of fractional distillation over the other types of distillation.

b) What are the concepts of boiling point, vapour liquid equilibria, relative volatility with reference to distillation operation ?

c) Define gas absorption. Why is gas absorption normally carried out at low temperatures ?

d) Explain solvent selection criteria in liquid-liquid extraction operation.

e) Draw a graph to show the nature of solubility curve for F_eSO_4 and N_aCl in water.

f) Draw a neat sketch of a drum dryer and few of its applications.

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ODD TERM END EXAM NOV/DEC -2017

EXAM SEAT NO. | | | | | | | |

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

COURSE CODE: **SMF303/SME303** COURSE NAME: **BASIC SUGAR MANUFACTURING**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **02/12/2017**

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

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QN	S. Q. N	Question Text	R U A	CO SMF 303	Marks Marks
Q.1		Attempt any **FOUR**			**(08)**
	a)	Recall Bagasse.	**R**	**1**	
	b)	Restate clarified juice.	**R**	**1**	
	c)	Restate retractive index.	**R**	**1**	
	d)	Define normal weight of sugar.	**R**	**1**	
	e)	Recall P^H.	**R**	**2**	
	f)	Restate coagulation.	**R**	**3**	
Q.2		Attempt any **FOUR**			**(16)**
	a)	Explain working principle & construction of the Hand Refractometer with sketch.	**U**	**1**	
	b)	Summaries composition of cane.	**U**	**2**	
	c)	Draw neat sketch of compound Imbibition system.	**U**	**1**	
	d)	Explain Amino Acids & their rolls in Sugar manufacturing process.	**U**	**3**	
	e)	Illustrate the effect of poor quality sugar cane in brief.	**U**	**2**	
	f)	Draw neat sketch of optical system of polariscope.	**U**	**1**	
Q.3		Attempt any **TWO**			**(16)**
	a)	Describe in detail working principle & construction of the palarimeter i.e. sachharimeter with neat sketch.	**A**	**1**	
	b)	Describe the effect of non sugars & reducing sugars on the process of sugar manufacture.	**A**	**3**	
	c)	Describe the effect of Heat, alkali, acids, P^H & sulphur dioxide on juice.	**A**	**2**	

(P.T.O.)

Section – II

Marks

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

a) Define gravity factor.

b) Write brix and purity of C massecuite.

c) Write the bagging temperature of sugar.

d) State the grades of sugar.

e) State the types of crystatliser.

f) Write the temperature and pressure of water applied to batch type centrifugal machine.

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

a) Explain why massecuite kept in motion.

b) Draw neat sketch of monovertical crystallizer.

c) Which precautions to be taken to reduce grain breakage.

d) Write the advantages of continuous centrifugal machine.

e) Explain gradation of sugar.

f) Write composition of export quality sugar.

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

a) Describe C massecuite treatment in brif.

b) Describe the factors affecting time cycle of machine.

c) Describe sugar storage conditions in brief.

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ODD TERM END EXAM NOV. / DEC. 2017

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **SME405**

COURSE NAME :- **SUGAR CHEMICAL CONTROL**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **07 / 12 / 2017**

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 clarified juice.

b) Define bagasse.

c) State moisture % bagasse.

d) Define Imbibition.

e) Which type of curve will be obtained, when added water to fibre is equal to one?

f) Write importance of brix curve.

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

a) Calculate primary extraction
Pol % primary bagasse = 9.64. Moisture % primary bag = 57.50.
Purity of 1st expressed juice = 83.98. Fibre % cane = 13.65.

b) M.J. % cane = 96.00, Bag % cane = 28.00, Fibre % cane = 14.85. Calculate added water % fibre.

c) Calculate A.W. % cane, M.J. % cane, Bag % cane, Cane = 50525 M.T. ,
M.J. = 49742 M.T., A.W. = 14390 M.T.

d) Write the interpretation of brix curve.

e) Explain procedure to determine preparatory index.

f) Explain the need to calculate the expected recovery.

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

a) Pol % M.J. = 11.95 M.J. % Cane = 97.80
Fibre % cane = 14.24 Pol % bag = 1.98
Bag % cane = 28.75
Calculate M.E. & R.M.E.

b) Calculate fibre % bagasse and fibre % cane
Moisture % bag = 49.60 Purity of LEJ = 74.94
Pol % bag – 2.00 Bag % cane = 80.05

c) Describe Rapi Pol extraction method to determine fibre % cane.

P.T.O.

QN	SQN	Question Text	R/U/A	CO Code SMF306	Marks
Q.4		Attempt any **FOUR**			**08**
	a)	Restate free settling.	R	4	
	b)	Identify two industrial application b of hydraulic jig.	R	5	
	c)	Restate constant pressure filter.	R	5	
	d)	Select proper filter for filtration of muddy juice.	A	5	
	e)	Identify properties of fluid	R	6	
	f)	Restate Density.	R	6	
Q.5		Attempt any **FOUR**			**16**
	a)	Identify fundamental laws of classification	U	4	
	b)	Distinguish between centrifugal pump and Reciprocating pump (any four)	U	4	
	c)	Identify advantages & disadvantages of plate and frame filter.	U	5	
	d)	Explain Kinetic energy correction.	U	6	
	e)	Interpret steady flow and unsteady flow.	U	6	
	f)	Derive the basic equation for obtaining the pressure at any height using the principle of hydrostatic equilibrium.	A	6	
Q.6		Attempt any **TWO**			**16**
	a)	Describe with sketch construction and working of hydraulic Jig.	U	4	
	b)	Describe working and construction of centrifugal filter.	U	5	
	c)	Drive Bernoulli Equation for pump.	A	6	

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ODD TERM END EXAM NOV. / DEC. -2017

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **SUGAR /METALLURGY**

COURSE CODE :- **MTE301/MG201/SMF310/SM201/SME301**

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ODD TERM END EXAM NOV. / DEC. -2017

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **SMF308**

COURSE NAME :- **CHEMICAL PROCESS TECHNOLOGY**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **28/ 11 / 2017**

Instruction :-

1) Answers to each section must be written in same answer book.
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> Question No. R> Remembering, U> Understanding, A> Application.

QN	SQN	Question Text	R/U/A	CO Code **MTF301**	Marks
Q.1		Attempt any **FOUR**			**08**
	a)	Name the basic types of chemical reactions & processes	R	1	
	b)	Define i) Fermentation ii) Combustion.	R	2	
	c)	Write the properties of Washing soda.	U	3	
	d)	Classify reversible & irrerversible reaction.	R	2	
	e)	Name the method of sulfuric acid production.	R	3	
	f)	Summerise the application of Ammonia.	U	3	
Q.2		Attempt any **FOUR**			**16**
	a)	Classify the chemical processes with the suitable example.	U	1	
	b)	Identify the unit operations.	A	2	
	c)	Outline the sulphate process of Hydrochloric acid.	U	3	
	d)	Draw the flow sheet of methods of sulfuric acid production.	R	3	
	e)	Describe solvays process of washing soda.	A	3	
	f)	Describe the process and uses of caustic soda.	A	3	
Q.3		Attempt any **TWO**			**16**
	a)	i) Illustrate size reduction ii) Summerise the unit operations in detail.	U	2	
	b)	Describe the Bosh-Haber process of Ammonia.	A	3	
	c)	Draw flow sheet of production of sulfuric acid with its uses and properties.	U	1	

P.T.O.

	c)	Find the integral $\int (\log x)^2 \, dx$.	A	1	
	d)	Evaluate $\int_{-\Pi/2}^{\Pi/2} \sin^2 x . \cos x \, dx$	A	1	
	e)	Apply integration to find the area of the ellipse $4x^2 + 9y^2 = 36$	A	1	
	f)	Find R.M.S. value of i, where i = I sin pt.	A	2	
Q.4		Attempt any **FOUR**			**08**
	a)	Verify that y = cos x is a solution of $\frac{d^2y}{dx^2} + y = 0$	U	2	
	b)	Define the probability of an Event.	R	4	
	c)	Find the mean of the following data 12, 18, 27, 23, 20.	A	3	
	d)	State order and degree of the D.E. $\sqrt{1+\left(\frac{dy}{dx}\right)^2} = 5\frac{d^2y}{dx^2}$	R	2	
	e)	Verify that $y = \log x$ is a solution of $x\frac{d^2y}{dx^2} + \frac{dy}{dx} = 0$	U	2	
	f)	From 20 tickets marked 1 to 20, one ticket is drawn at random. Find the probability that it is marked with multiple of 3 or 5.	A	4	
Q.5		Attempt any **FOUR**			**16**
	a)	Solve $(x^2 + y^2)\,dx - 2xy\,dy = 0$	A	2	
	b)	Show that $y \sec x = \sin x + c$ if $\frac{dy}{dx} + y \tan x = \cos^2 x$	U	2	
	c)	Solve (2xy + y - tan y) dx + (x^2-x $\tan^2$y + $\sec^2$y) dy=0	A	2	
	d)	Calculate the mean deviation about mean of the following data:	A	3	
	e)	The two sets of observation are given below	U	3	
	f)	A room has 3 electric lamps from a collection of 15 electric bulbs of which only 10 arc good, 3 arcs selected at random and put in the lamps. Find the probability that the room lighted by at least one the bulbs.	A	4	
Q.6		Attempt any **FOUR**			**16**
	a)	If A & B are two events such that P (A)= ½ , P (B)= 1/3 , P (A∩B) = 7/12. Find i) P (AUB) ii) P($A^{\prime} \cap B^{\prime}$)	A	4	
	b)	Verify that y = sin (log x) is a solution of the D.E. $x^2\frac{d^2y}{dx^2} + x\frac{dy}{dx} + y = 0$	U	2	
	c)	Solve $(1 + x^3)\,dy - x^2 y\,dx = 0$	A	2	
	d)	Calculate the standard deviation for the following distributions.	A	3	
	e)	Calculate the coefficient of variance from the following data	A	3	
	f)	Calculate the variance for the following distribution.	A	3	

xi	3	4	5	6	7
fi	4	9	10	8	6

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

Which of the two sets is more consistent?

C.I.	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40
f.I	3	5	9	15	20	16	10	2

xi	7	8	9	10	11	12	13
fi	4	6	9	12	9	6	4

C.I.	0-10	10-20	20-30	30-40	40-50	50-60
f.I	14	23	27	21	15	19

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ODD TERM END EXAM NOV/DEC -2017

EXAM SEAT NO. | | | | | | |

LEVEL: **FIRST** PROGRAM: **COMMON**

COURSE CODE: **CCF106/0108/R108/X110/CCE106** COURSE NAME: **ENGINEERING MATHEMATICS**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **21/11/2017**

Instruction:-

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

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QN	S. Q. N	Question Text	Cognition Level R/U/A	Co Code	Marks
Q.1		Attempt any **FOUR**			(08)
	a)	Find 'k' if the points (4, k), (2, 0) and (-4, -9) are collinear.	R	CCF106-1	
	b)	Show that the roots of the equation $x^3 - 9x + 1 = 0$ lies between 2 and 3.	U	CCF106-4	
	c)	Find the distance between the two parallel lines $3x - 2y + 26 = 0$ *and* $3x - 2y + 11 = 0$	R	CCF106-2	
	d)	Find the perpendicular distance of the point (-1,-8) from the line 4x+3y+28=0. What is the conclusion?	R	CCF106-2	
	e)	Find the slope and the intercepts made by the line $\frac{3x}{5} + \frac{2y}{7} = 11$ on both axes.	U	CCF106-2	
	f)	Find out which of the following circles is bigger. $x^2 + y^2 - 4x - 2y - 35 = 0$ *and* $x^2 + y^2 - 4x - 14y + 28 = 0$	U	CCF106-3	
Q.2		Attempt any **FOUR**			(16)
	a)	Find the area of quadrilateral whose vertices are (1, 5),(8, 2),(11, 3),(4, 6)	A	CCF106-1	
	b)	Find the equation of straight line passing though (5, 4), (3,-2). Also find slope and intercepts made by that line on both axes.	A	CCF106-2	
	c)	Find the equation of the perpendicular bisector of the join AB where A(3,-4) & B(-4,3)	A	CCF106-2	
	d)	Evaluate $\sqrt[3]{60}$ using Regula Falsi method, using 2 iterations.	A	CCF106-4	
	e)	Find a positive root of $f(x) = x^3 - 2x + 0.5$ using Bisection method , upto 3 iterations	A	CCF106-4	
	f)	Use Gauss Seidel method to solve the following simultaneous equations: $8x + 4y - 2z = 3, 2x - 6y + z = 15, 4x + 5y + 15z = 37$ up to 3 iteration.	A	CCF106-5	
				P.T.O	

Q.3		Attempt any **FOUR**			(16)
	a)	Show that the following circles touch each other $x^2+y^2+4x-12y+4=0$; $x^2+y^2-2x-4y+4=0$	U	CCF106-3	
	b)	Find the equation of circle which has its center at (4, 3) and touches the line $5x-12y-10=0$	A	CCF106-3	
	c)	Solve by Jacobi's method (3 iterations only) $25x+6y-z=82$; $6x+15y+5z=75$; $x+4y+40z=66$	A	CCF106-5	
	d)	Find approximate root of the equation $x^3+x-1=0$ by using bisection method (3 iteration only).	A	CCF106-4	
	e)	Find the root of the equation $2x-\log_{10}x=7$ using Regula Falsi method (3 iterations).	A	CCF106-4	
	f)	Solve by Jacobi's method (Take 3 iterations) $2x+20y-3z=19$; $3x-3y+25z=22$; $15x+2y+z=18$	A	CCF106-5	
Q.4		Attempt any **FOUR**			(08)
	a)	If $f(x)=x^2+x+1$ then find $f(x-1)$.	R	CCF106-3	
	b)	Show that $f(x)=x^4+2x^2+\cos x$ is an even function.	U	CCF106-3	
	c)	Evaluate $\lim_{x\to 0}\frac{\sin 4x}{\tan 3x}$	R	CCF106-3	
	d)	Evaluate $\lim_{x\to 5}\frac{x^3-125}{x^2-3x-10}$	R	CCF106-3	
	e)	Find $\frac{dy}{dx}$, if $y=e^{2x}+\log_5 x+\log_7 7$	R	CCF106-4	
	f)	Find $\frac{dy}{dx}$, if $y=e^{\sin x+\cos x}$	R	CCF106-4	
Q.5		Attempt any **FOUR**			(16)
	a)	If $f(x)=\frac{1}{1-x}$ show that , $f\{f[f(x)]\}=x$	U	CCF106-3	
	b)	Evaluate $\lim_{x\to 1}\frac{\sqrt{3+x}-\sqrt{5-x}}{x^2-1}$	A	CCF106-3	
	c)	Evaluate $\lim_{x\to \pi/4}\frac{\sin x-\cos x}{x-\pi/4}$	A	CCF106-3	
	d)	If $y=\sin^{-1}\left[\frac{1-x^2}{1+x^2}\right]$ *find* $\frac{dy}{dx}$	A	CCF106-4	
	e)	If $y=x^x+(\cos x)^x$ *find* $\frac{dy}{dx}$	A	CCF106-4	
	f)	Find the equation of tangent and normal to the curve $y=x\ (2-x)$ at point (2,0)	A	CCF106-4	
Q.6		Attempt any **FOUR**			(16)
	a)	Find $\frac{dy}{dx}$, if $\sin y=\log(x+y)$	A	CCF106-4	
	b)	Find $\frac{dy}{dx}$, if $x=a[\cos t+t\sin t]$ *and* $y=a[\sin t-t\cos t]$	A	CCF106-4	
	c)	If $y=(\sin^{-1}x)^2$ *prove that*, $(1-x^2)\frac{d^2y}{dx^2}-x.\frac{dy}{dx}-2=0$	U	CCF106-4	
	d)	If $y=\tan^{-1}\left[\frac{5x}{1-6x^2}\right]$ *find* $\frac{dy}{dx}$	A	CCF106-4	
	e)	If $y=\sqrt{4x^2-3}\ .\ (7x^2+6)^6$ *find* $\frac{dy}{dx}$	A	CCF106-4	
	f)	Find the maximum and minimum value of x^3-18x^2+96x	A	CCF106-4	
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ODD TERM END EXAM NOV. / DEC. 2017

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **SME401**

COURSE NAME :- **SUGAR ENGINEERING**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **29 / 11 / 2017**

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) State the factors influencing secondary extraction in mill.

b) Mention the factors to decide the capacity of condenser.

c) Write industrial use of compressed air.

d) Name the important elements of rotary air compressor.

e) State the importance of industrial safety.

f) List the indicating instruments used in sugar industry.

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

a) Mention the various unit operations in sugar industry where controllers are essential.

b) Explain reciprocating air compressor.

c) Draw a net sketch of multi-jet condenser.

d) State the causes of abnormal noises in mill.

e) State the factors affecting efficiency of the mill.

f) Classify the cold water requirement for a sugar factory.

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

a) Explain various causes of troubles and their removal in sugar mill turbine.

b) Mention equipment wise cold water requirement (during season) with purpose and quantity of water.

c) i) Explain rotary air compressor. ii) Write the duties of instruments operator.

Section – II	Marks

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

a) Explain the objective of heat Boiler.

b) List out the items related to Boiler heat balance.

c) What measures are to be taken to reduce steam loss from steam trap?

d) State the factors responsible for high steam consumption in sugar mill.

e) State the principles affecting the design of modern sugar plant with respect to maximum steam economy.

f) What is the power required for 2500 TCD sugar plant?

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

a) Explain air supply in Bagasse fired boiler.

b) Explain two main parts of boiler unit used in sugar industry.

c) State the factors required for boiler water treatment.

d) List down the factors determine steam consumption in sugar factory.

e) Draw a flow sheet diagram showing steam cycle in sugar industry.

f) List down the measures for steam economy of clarification station.

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

a) Describe indetail the boiler water management, methods of feed water and boiler water treatment.

b) Describe the steam requirement in the 2500 T.C.D. plant indetail and how the steam economy is achieved?

c) Describe generation of electricity, requirement of sugar factory and parameters. Explain the constructional aspects of condensing turbine used in sugar industry.

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

(An Autonomous Institute of Govt. of Maharashtra)

ODD TERM END EXAM NOV/DEC -2017

EXAM SEAT NO. | | | | | | |

LEVEL: **FIRST** PROGRAM: **COMMON**

COURSE CODE: **CCF105/107/CCE105/R107/X104** COURSE NAME: **BASIC MATHEMATICS**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **15/12/2017**

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	SQN	Question Text	RUA	Co CCF105-	Marks
Q.1		Attempt any **FOUR**			**(08)**
	a)	Find 'x' *if* $\begin{vmatrix} 1 & x & x^2 \\ 1 & 2 & 4 \\ 1 & 3 & 9 \end{vmatrix} = 0$	R	1	
	b)	Resolve in to partial fraction : $1+\frac{1}{x^2-1}$	U	1	
	c)	If $A=\begin{bmatrix} 3 & 2 \\ 1 & -1 \\ 0 & 4 \end{bmatrix}, B=\begin{bmatrix} -1 & -1 \\ 3 & 2 \\ 4 & -2 \end{bmatrix}$, verify that A+B=B+A	U	3	
	d)	If $\begin{bmatrix} 1 & 3 \\ 2 & 4 \end{bmatrix}$, $B=\begin{bmatrix} 2 & -1 \\ 3 & 2 \end{bmatrix}$ verify that $(A+B)'=A'+B'$	U	3	
	e)	If $\begin{bmatrix} 7 & 0 & 2 \\ 1 & 2 & 6 \\ 4 & 5 & 3 \end{bmatrix}$, find whether matrix A is singular or non singular.	R	3	
	f)	If $A=\begin{bmatrix} 3 & -1 \\ 2 & 4 \end{bmatrix}$, $B=\begin{bmatrix} 1 & 2 \\ -3 & 0 \end{bmatrix}$, find X such that 2X+3A-4B = I	A	3	
Q.2		Attempt any **FOUR**			**(16)**
	a)	The voltages in an electric circuit are related by following equation. $v_1+v_2+v_3=9$; $v_1-v_2+v_3=3$; $v_1+v_2-v_3=1$. Find v_1, v_2 & v_3	A	1	
	b)	Solve the equations: $x+2y+3z=1$, $2x+3y+2z=2$ & $3x+2y+4z=1$, by using matrix inversion method.	A	3	
	c)	Resolve into partial fractions: $\frac{x-5}{x^3+x^2-6x}$	A	2	
	d)	If $\left\{3\begin{bmatrix} 3 & 1 \\ 4 & 0 \\ 3 & -3 \end{bmatrix}-2\begin{bmatrix} 0 & 2 \\ -2 & 3 \\ -5 & 4 \end{bmatrix}\right\}\begin{bmatrix} -1 \\ 2 \end{bmatrix}=\begin{bmatrix} x \\ y \\ z \end{bmatrix}$, find x, y, z.	A	3	
	e)	Resolve into partial fractions : $\frac{x^2+23x}{(x+3)(x^2+1)}$	A	2	
	f)	Expand using Binomial Theorem $\left(3a-\frac{8}{b}\right)^7$	A	4	

P.T.O

Q.3		Attempt any **FOUR**			**(16)**
	a)	Solve by Cramer's Rule : $x+y=3,\ y+z=5,\ z+x=4$	A	1	
	b)	Find inverse of matrix , $\begin{bmatrix} 3 & -3 & 4 \\ 2 & -3 & 4 \\ 0 & -1 & 1 \end{bmatrix}$	A	3	
	c)	Resolve into partial fractions : $\frac{2x+1}{x^2.(x+1)}$	A	2	
	d)	If $A=\begin{bmatrix} 0 & 1 & -1 \\ 3 & -2 & 3 \\ 2 & -2 & 3 \end{bmatrix}$, *show that* $A^2=I$	U	3	
	e)	Resolve into partial fractions: $\frac{x^3}{x^2-1}$	A	2	
	f)	Show that $\left(\sqrt{3}+1\right)^5-\left(\sqrt{3}-1\right)^5=152$	U	4	
Q.4		Attempt any **FOUR**			**(08)**
	a)	Express the following angles in radian measures. i) 75^0 ii) -270^0	R/ U	5	
	b)	Evaluate without using calculator $\frac{\tan 85^0-\tan 40^0}{1+\tan 85^0\tan 40^0}$	R/ U	5	
	c)	Prove that $\sin\left(\theta+\frac{\pi}{6}\right)-\sin\left(\theta-\frac{\pi}{6}\right)=\cos\theta$	U	5	
	d)	If sinA=0.4 find cos2A using multiple angle formula.	R/ U	5	
	e)	Prove that $\cos ec^2\theta-\cos^2\theta.\cos ec^2\theta=1$	R/ U	5	
	f)	Find the value of $\sin\left[\cos^{-1}\left(-\frac{1}{2}\right)\right]$	R/ U	5	
Q.5		Attempt any **FOUR**			**(16)**
	a)	The difference between two acute angles of a right angled triangle is $\frac{2\pi^C}{5}$. find the angles in degrees	U/ A	5	
	b)	Prove that $\sin 20^0.\sin 40^0.\sin 60^0.\sin 80^0=\frac{3}{16}$	U/ A	5	
	c)	Prove that $\frac{\sin 4\theta+\sin 2\theta}{1+\cos 2\theta+\cos 4\theta}=\tan 2\theta$	U	5	
	d)	Prove that $\cos(A+B)=\cos A\cos B-\sin A\sin B$	U/ A	5	
	e)	Show that $\frac{\sin 7x+\sin x}{\cos 5x-\cos 3x}=soin2x-\cos 2x.\cot x$	U/ A	5	
	f)	Show 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)	If $\tan(x+y)=\frac{3}{4}$ *and* $\tan(x-y)=\frac{8}{15}$ Then show that $\tan(2x)=\frac{77}{36}$	U/ A	5	
	b)	Prove that $\cos A\cos(60-A).\cos(60+A)=\frac{1}{4}\cos 3A$	U/ A	5	
	c)	Prove that $\frac{\sin A-\sin 3A}{\sin^2 A-\cos^2 A}=2\sin A$	U/ A	5	
	d)	Prove that $\frac{\sin A+\sin 2A+\sin 3A+\sin 4A}{\cos A+\cos 2A+\cos 3A+\cos 4A}=\tan\left(\frac{5A}{2}\right)$	U/ A	5	
	e)	Prove that $2\tan^{-1}x=\tan^{-1}\left(\frac{2x}{1-x^2}\right)$	U/ A	5	
	f)	Show that $\tan^{-1}\left(\frac{1}{7}\right)+\tan^{-1}\left(\frac{1}{13}\right)=\tan^{-1}\left(\frac{2}{9}\right)=\cot^{-1}\left(\frac{9}{2}\right)$	A	5	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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ODD TERM END EXAM NOV. / DEC. 2017

EXAM SEAT NO. | | | | | | |

LEVEL : - **FIFTH** PROGRAM : **SUGAR MANUFACTURING**

COURSE CODE **SME-503**

COURSE NAME :- **SUGAR INDUSTRIES MANAGEMENT**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **11 / 12/ 2017**

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) State the significance of extractive industry with suitable examples..

b) Write any four characteristics of an entrepreneur.

c) Define planning.

d) State the importance of management.

e) State four advantages of co-operative sugar industry.

f) Mention any four advantages of Human Resources Planning.

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

a) Define leadership and write characteristics of leadership.

b) How to motivate the employees in an organization?

c) Draw organization structure of co-operative sugar industry.

d) List out salient features of individual ownership with its limitations.

e) Explain various levels of management with their functions.

f) What is Business? Write any four characteristics?

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

a) Describe Directing and controlling functions of Management.

b) Differentiate between Leader and Manager.

c) Write characteristics of i) Co-operative society ii) Sugar industry.

P.T.O

Section – II	Marks

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

a) Write down the steps in CPM.

b) What are ordinary shares?

c) What are the objectives of purchasing?

d) What is the store keeping?

e) State the function of inventory control

f) What is VAT?

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

a) Explain preferential shares and Debentures.

b) State the various sources of finance.

c) Explain any four purpose of material management.

d) State the functions of material management.

e) Give the advantages and disadvantages of controlised store.

f) Write down the necessities of good location store.

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

a) Compare fixed capital and working capital with respect to following points
i) Nature ii) Financing iii) Liquidity iv) Use and application.

b) Explain the types of inventories with suitable example.

c) Explain the following terms of purchase procedure any two
i) Purchase decision. ii) Market Analysis. iii) Purchase order.

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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ODD TERM END EXAM NOV. / DEC. -2017

EXAM SEAT NO. | | | | | | |

LEVEL : - **FIRST** PROGRAM : **COMMON**

COURSE CODE :- **CCF110/X111/CEE110/R112**

COURSE NAME :- **APPLIED MECHANICS**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **12/ 12 / 2017**

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> Question No. R> Remembering, U> Understanding, A> Application.

QN	SQN	Question Text	R/U/A	Code **CCF110**	Marks
Q.1		Attempt any **FOUR**			**08**
	a)	Differentiate between weight and mass.	U	1	
	b)	Define force system and enlist any four types of force systems.	R	1	
	c)	Define composition of forces.	R	1	
	d)	State Lami's theorem.	R	2	
	e)	State any two advantages and any two limitations of graphical methods.	R	3	
	f)	Define friction.	R	3	
Q.2		Attempt any **FOUR**			**16**
	a)	Two forces 6 KN and 8 KN acting on a particle and their lines of action are inclined to each other at an angle of 70^0. Determine the resultant force & its inclination.	A	1	
	b)	Determine the forces A & B. Shown in Figure No.1. If resultant of this concurrent force system is zero.	A	2	
	c)	A smooth sphere weighing 500 N is resting in a trough as shown in Figure No.2. Determine the reactions at points of contact A & B.	A	2	
	d)	Determine graphically the resultant of concurrent force system shown in figure No.3.	U	3	
	e)	A block weighing 500 N is resting on a plane inclined at 30^0 with the horizontal. Determine the force P that can be applied on the block at an angle of 10^0 to the inclined plane so that the block is just on the point of moving up the plane. Take coefficient of friction between body and inclined plane is 0.22.	A	2	

P.T.O

QN	SQN	Question Text	R/U/A	Code CCF110	Marks
	f)	A wooden block is resting on a rough inclined plane whose inclination to the horizontal is 10^0. The smallest force acting parallel to the inclined plane is 2 N due to which block moves down the plane. If the coefficient of friction between block and plane is 0.32. Determine the weight of the block.	A	2	
Q.3		Attempt any **TWO**			**16**
	a)	Forces 2N, 3N, 4N, 5N & 6N acts at one of the angular point of a regular hexagon towards the other five angular points taken in order. Find the resultant of the system. Refer Figure No.4	A	2	
	b)	i) A beam of 6m in span is simply supported at the ends. It carries a point load of 8 KN at the distance 2 m from the left hand support and a concentrated clockwise moment of intensity 10KN.m. at a distance 2 m from right hand support and u.d.l. of intensity 5 KN/m over the distance 4 m from the left hand support. Calculate reactions at the end supports analytically. ii) One end of a uniform ladder weighing 30 N rests against a smooth wall and the other end on a rough horizontal floor, coefficient of friction being 0.24. Find the inclination of ladder to the horizontal when it is on the point of slipping.	A	2	
	c)	A beam is as shown in Figure No. 5. Find support reaction graphically.	U	3	
Q.4		Attempt any **FOUR**			**08**
	a)	State the position of $\bar{X}$ & $\bar{Y}$ for a triangle having 'B' as base and 'H' as height.	R	4	
	b)	Locate the centriod of semi circle of radius 'R'.	A	4	
	c)	State any two equations of motion under gravity with meaning of them.	R	5	
	d)	Differentiate between distance and displacement.	U	5	
	e)	Define angular motion and give 5.1 unit of angular velocity.	R	5	
	f)	Define Ideal Machine.	R	6	
Q.5		Attempt any **FOUR**			**16**
	a)	Locate the position of centriod for T-beam as shown in figure.	A	4	
	b)	From a solid cylinder 300mm diameter and 600mm height a co-axial cylinder of 100mm diameter is 200mm height is cut off from the top locate the center of gravity (C.G) with respect to bottom .	A	4	
	c)	A body is projected vertically upward from a height of 25m above the ground calculate the time required for the body to reach the ground take initial velocity $\mu = 20$m/s.	A	5	

	d)	A stone is released from a height of 15m. Determine its velocity when it strikes the ground.	A	5	
	e)	A fly wheel is rotating at 400rpm. If the radius of rotation is 1.5m. Calculate the i) Angular velocity ii) Linear velocity.	A	5	
	f)	A turbine runs at 3000rpm. It is brought to rest in i) 30 min and ii) 300 revolutions. Calculate the retardation in rad / S^2 in each Phase.	A	5	
Q.6		Attempt any **FOUR**			16
	a)	For a lifting M/C VR=50.00. An effort of 100 N lifts load of 1800N and effect of 150N lifts a load of 3200N.Dtermine law of M/C and maximum efficiency of machine.	R	5	
	b)	In a differential axle & wheel machine which has velocity ratio is 10 & a load of 12 KN is lifted by an effort of 2KN then determine efficiency of machine and state type of machine reversible or non-reversible.	A	6	
	c)	Draw the nature of graph for a lifting machine i) Load Vs effect ii) Load Vs ideal effect iii) Load Vs MA iv) Load Vs effect cost in friction.	U	6	
	d)	An body of mass of 10kg is moving with velocity of 100 m/s at height of 150m from ground find the total energy passed the body.	A	5	
	e)	How many litres of water can be raised in 10 minutes to a height of 20m by mean of pump of 3.0 KW power and efficiency is 75%?	A	5	
	f)	An oil tank of 10m diameter and height 5m has its bottom 6m above the ground. Determine the work done in lifting this tank.	A	5	

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Q.No. 2
(b)

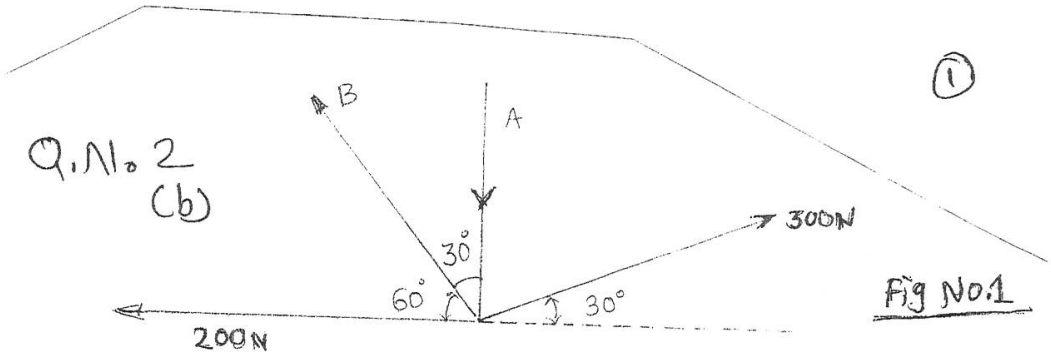


Fig No.1

Q.N.2
(c)

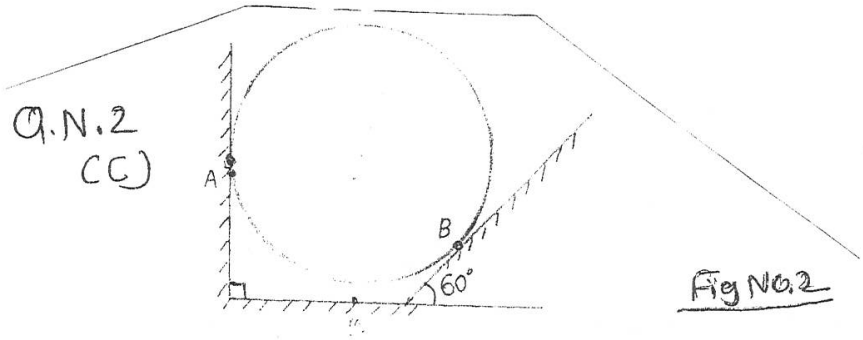


Fig No.2

Q.N.2
(d)

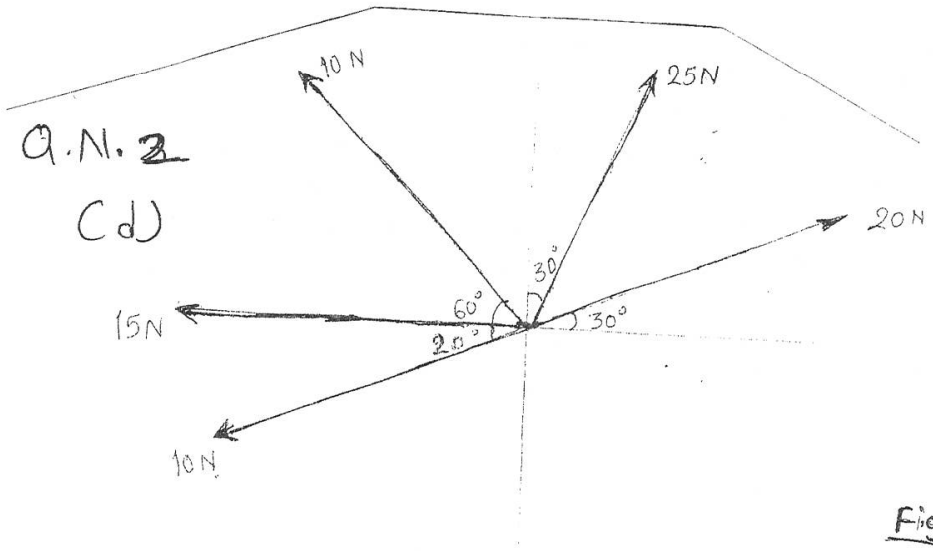
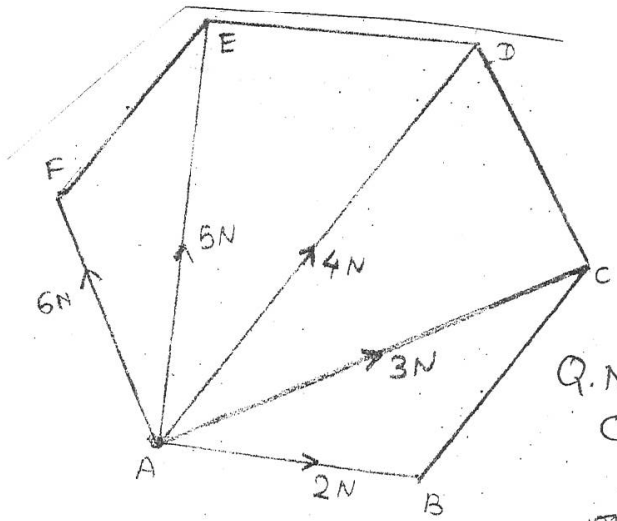
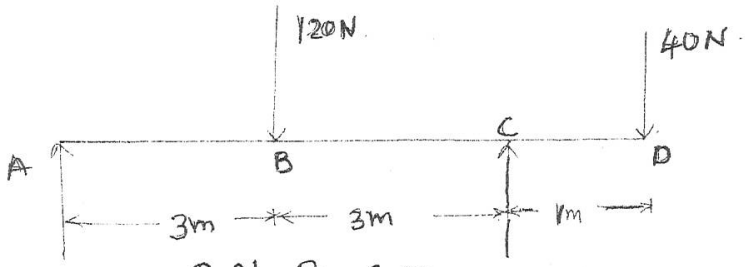


Fig No.3

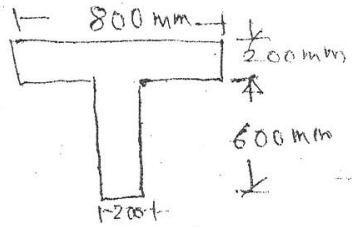


Q.N.3
(a)

Fig. No.4



Q.N. 3 (c) Fig. No. 5



Q.N. 5 (a)

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ODD TERM END EXAM NOV. / DEC. 2017

EXAM SEAT NO. | | | | | | |

LEVEL : - **FIFTH** PROGRAM : **SUGAR MANUFACTURING**

COURSE CODE :- **SME506**

COURSE NAME :- **COGENERATION TECHNOLOGY**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **13 / 12/ 2017**

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 Define any **FOUR** (08)

a) Tidal energy.

b) Bagasse.

c) Spent wash.

d) Hydraulic energy.

e) Co-generation.

f) Can Trash.

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

a) Explain the air pollution with reference to co-generation.

b) Explain the energy needs of growing economy.

c) What are the types of energy? Explain any one.

d) Explain the benefits of co-generation.

e) Explain the applications of solar energy.

f) State flow chart of Bagasse based co-generation processes.

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

a) Explain the term non-commercial energy.

b) Explain merits and limitation of nuclear energy.

c) State classification of source of energy.

d) Describe scope of co-generation in Indian sugar industry.

e) State availability of bagasse and importance of saving.

f) What are the social and environmental benefits of bagasse based co-generation.

P.T.O.

Section – II	Marks

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

a) Give heat to power ratio of co-generation application.

b) State the classification of co-generation system.

c) Define gas turbine efficiency.

d) Define energy management.

e) State the objectives of energy management.

f) State the types of energy audit.

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

a) Draw schematic diagram of steam turbine co-generation system.

b) State the energy efficiency opportunity in gas turbine co-generation system.

c) State the advantages of back pressure steam turbine.

d) Explain the process of 'blow down' of boiler.

e) Mention some of the long term energy strategies available for better energy secured motion.

f) State the formula for steam turbine efficiency and Gas turbine performance.

Q.6 Attempt any TWO. (16)

a) Describe topping cycle co-generation system in brief.

b) Describe Back pressure steam turbine used as a prime mover in co-generation system.

c) Calculate boiler efficiency and evaporation ratio by direct method. By using following data.
   i) Quantity of steam generated (Output) = 8 TPH.
   ii) Steam pressure. Temperature = 10 kg/ cm^2 (g) / 180^0 C
   iii) Enthalpy of steam (dry/ saturated) at 10 kg/ cm^2 (g) pressure = 665 kCal/kg.
   iv) Feed water temperature = 85 ^{0}C.
   v) Enthalpy of feed water = 85 kCal/kg.
   vi) Quantity of fuel consumed = 1.6 TPH.
   vii) G.C.V. of fuel = 4000 kCal/kg.

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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ODD TERM END EXAM NOV. / DEC. -2017

EXAM SEAT NO. | | | | | | |

LEVEL : - **FIRST** PROGRAM : **COMMON**

COURSE CODE :- **CCF110/X111/CEE110/R112**

COURSE NAME :- **APPLIED MECHANICS**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **12/ 12 / 2017**

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> Question No. R> Remembering, U> Understanding, A> Application.

QN	SQN	Question Text	R/U/A	Code CCF110	Marks
Q.1		Attempt any **FOUR**			**08**
	a)	Differentiate between weight and mass.	U	1	
	b)	Define force system and enlist any four types of force systems.	R	1	
	c)	Define composition of forces.	R	1	
	d)	State Lami's theorem.	R	2	
	e)	State any two advantages and any two limitations of graphical methods.	R	3	
	f)	Define friction.	R	3	
Q.2		Attempt any **FOUR**			**16**
	a)	Two forces 6 KN and 8 KN acting on a particle and their lines of action are inclined to each other at an angle of 70^0. Determine the resultant force & its inclination.	A	1	
	b)	Determine the forces A & B. Shown in Figure No.1. If resultant of this concurrent force system is zero.	A	2	
	c)	A smooth sphere weighing 500 N is resting in a trough as shown in Figure No.2. Determine the reactions at points of contact A & B.	A	2	
	d)	Determine graphically the resultant of concurrent force system shown in figure No.3.	U	3	
	e)	A block weighing 500 N is resting on a plane inclined at 30^0 with the horizontal. Determine the force P that can be applied on the block at an angle of 10^0 to the inclined plane so that the block is just on the point of moving up the plane. Take coefficient of friction between body and inclined plane is 0.22.	A	2	

P. T. O

QN	SQN	Question Text	R/U/A	Code CCF110	Marks
	f)	A wooden block is resting on a rough inclined plane whose inclination to the horizontal is 10^0. The smallest force acting parallel to the inclined plane is 2 N due to which block moves down the plane. If the coefficient of friction between block and plane is 0.32. Determine the weight of the block.	A	2	
Q.3		Attempt any **TWO**			**16**
	a)	Forces 2N, 3N, 4N, 5N & 6N acts at one of the angular point of a regular hexagon towards the other five angular points taken in order. Find the resultant of the system. Refer Figure No.4	A	2	
	b)	i) A beam of 6m in span is simply supported at the ends. It carries a point load of 8 KN at the distance 2 m from the left hand support and a concentrated clockwise moment of intensity 10KN.m. at a distance 2 m from right hand support and u.d.l. of intensity 5 KN/m over the distance 4 m from the left hand support. Calculate reactions at the end supports analytically. ii) One end of a uniform ladder weighing 30 N rests against a smooth wall and the other end on a rough horizontal floor, coefficient of friction being 0.24. Find the inclination of ladder to the horizontal when it is on the point of slipping.	A	2	
	c)	A beam is as shown in Figure No. 5. Find support reaction graphically.	U	3	
Q.4		Attempt any **FOUR**			**08**
	a)	State the position of $\bar{X}$ & $\bar{Y}$ for a triangle having 'B' as base and 'H' as height.	R	4	
	b)	Locate the centriod of semi circle of radius 'R'.	A	4	
	c)	State any two equations of motion under gravity with meaning of them.	R	5	
	d)	Differentiate between distance and displacement.	U	5	
	e)	Define angular motion and give 5.1 unit of angular velocity.	R	5	
	f)	Define Ideal Machine.	R	6	
Q.5		Attempt any **FOUR**			**16**
	a)	Locate the position of centriod for T-beam as shown in figure.	A	4	
	b)	From a solid cylinder 300mm diameter and 600mm height a co-axial cylinder of 100mm diameter is 200mm height is cut off from the top locate the center of gravity (C.G) with respect to bottom .	A	4	
	c)	A body is projected vertically upward from a height of 25m above the ground calculate the time required for the body to reach the ground take initial velocity $\mu = 20$m/s.	A	5	

	d)	A stone is released from a height of 15m. Determine its velocity when it strikes the ground.	A	5	
	e)	A fly wheel is rotating at 400rpm. If the radius of rotation is 1.5m. Calculate the i) Angular velocity ii) Linear velocity.	A	5	
	f)	A turbine runs at 3000rpm. It is brought to rest in i) 30 min and ii) 300 revolutions. Calculate the retardation in rad / S^2 in each Phase.	A	5	
Q.6		Attempt any **FOUR**			16
	a)	For a lifting M/C VR=50.00. An effort of 100 N lifts load of 1800N and effect of 150N lifts a load of 3200N.Dtermine law of M/C and maximum efficiency of machine.	R	5	
	b)	In a differential axle & wheel machine which has velocity ratio is 10 & a load of 12 KN is lifted by an effort of 2KN then determine efficiency of machine and state type of machine reversible or non-reversible.	A	6	
	c)	Draw the nature of graph for a lifting machine i) Load Vs effect ii) Load Vs ideal effect iii) Load Vs MA iv) Load Vs effect cost in friction.	U	6	
	d)	An body of mass of 10kg is moving with velocity of 100 m/s at height of 150m from ground find the total energy passed the body.	A	5	
	e)	How many litres of water can be raised in 10 minutes to a height of 20m by mean of pump of 3.0 KW power and efficiency is 75%?	A	5	
	f)	An oil tank of 10m diameter and height 5m has its bottom 6m above the ground. Determine the work done in lifting this tank.	A	5	

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Q.No. 2
(b)

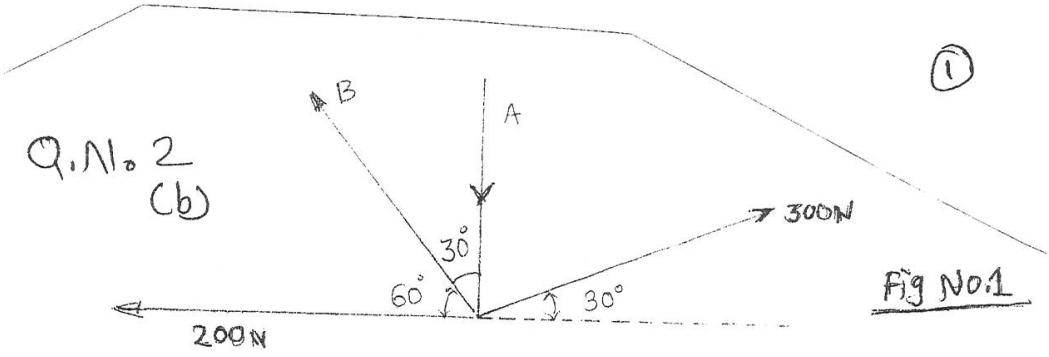


Fig No.1

Q.N.2
(c)

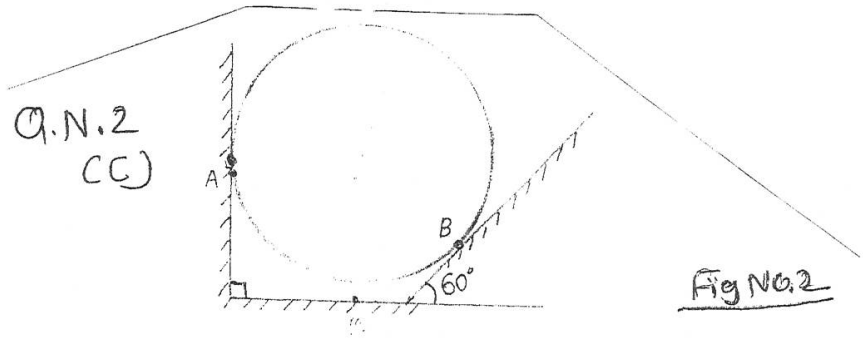


Fig No.2

Q.N.2
(d)

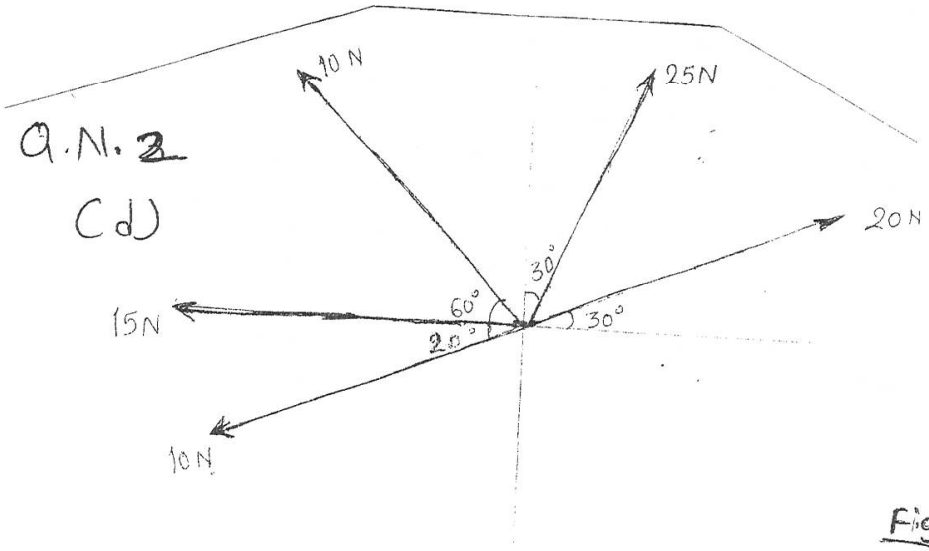
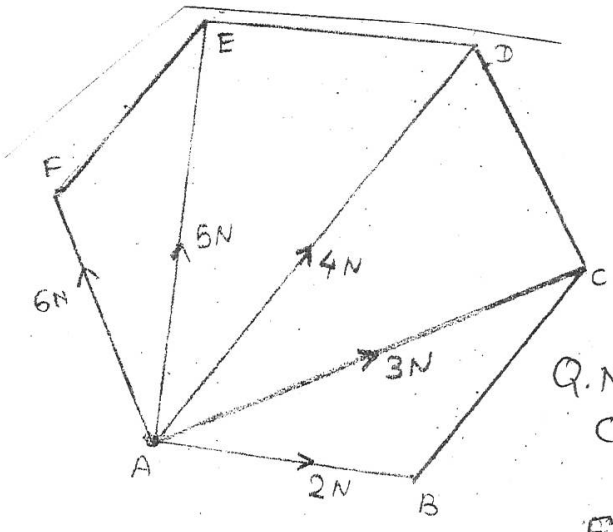
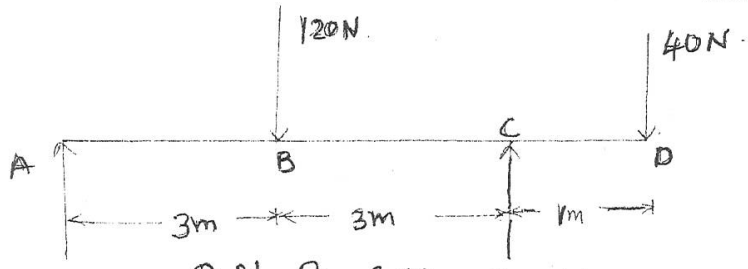


Fig No.3

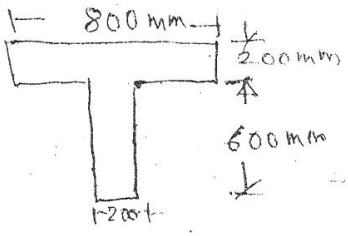


Q.N.3
(a)

Fig. No.4



Q.N. 3 (c) Fig. No. 5



Q.N. 5 (a)

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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ODD TERM END EXAM NOV. / DEC. -2017

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **SUGAR /METALLURGY**

COURSE CODE :- **MTE301/MG201/SMF310/SM201/SME301**

COURSE NAME :- **APPLIED MATHEMATICS**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **28/ 11 / 2017**

Instruction :-

1) Answers to each section must be written in same answer book.
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> Question No. R> Remembering, U> Understanding, A> Application.

QN	SQN	Question Text	R/U/A	CO SMF301	Marks
Q.1		Attempt any **FOUR**			**08**
	a)	Recall: i) $\int \sec(ax+b).\tan(ax+b)\,dx$ ii) $\int e^{ax+b}\,dx$ iii) $\int \frac{dx}{a^2-x^2}$ iv) $\int \operatorname{cosec} x\,dx$.	R	1	
	b)	If $f^1(x)=\frac{1}{x}+\frac{1}{1+x^2}$ & $f(1)=\frac{\Pi}{4}$, *Find* $f(x)$	R	1	
	c)	Evaluate $\int x\,e^x\,dx$	R	1	
	d)	Show that $\int_0^\infty e^{-x}\,dx=1$	U	1	
	e)	Evaluate $\int_0^2 \frac{5x}{x^2+4}\,dx$	R	1	
	f)	Find the area between the X-axis and y=sin x from $x=\frac{\Pi}{6}$ *to* $x=\frac{\Pi}{3}$	A	1	
Q.2		Attempt any **FOUR**			**16**
	a)	Show that $\int e^{2x}\sin 3x\,dx=\frac{e^{2x}}{13}(2\sin 3x-3\cos 3x)+c$	U	1	
	b)	Evaluate $\int \frac{dx}{5-3\sin x}$	A	2	
	c)	Evaluate $\int \frac{\sin x}{(1+\cos x)(2+\cos x)}\,dx$	A	1	
	d)	Show that $\int_{-3/2}^{1/2} \frac{dx}{4x^2+12x+13}=\frac{1}{4}\tan^{-1}(2)$	U	2	
	e)	Evaluate $\int_4^5 \frac{\sqrt{5-x}}{\sqrt{5-x}+\sqrt{x-4}}\,dx$	A	1	
	f)	Find the area enclosed by the parabola $y^2=2ax$ and the line y=x.	A	2	
Q.3		Attempt any **FOUR**			**16**
	a)	Integrate the following function with respect to x: $\frac{x^3+5x^2+2x+3}{2x+3}$	U	1	
	b)	Evaluate $\int \frac{dx}{1+7\cos^2 x}$	A	2	

P.T.O.

	c)	Find the integral $\int(\log x)^2\,dx$.	A	1	
	d)	Evaluate $\int_{-\Pi/2}^{\Pi/2} \sin^2 x.\cos x\,dx$	A	1	
	e)	Apply integration to find the area of the ellipse $4x^2 + 9y^2 = 36$	A	1	
	f)	Find R.M.S. value of i, where i = I sin pt.	A	2	
Q.4		Attempt any **FOUR**			08
	a)	Verify that y = cos x is a solution of $\frac{d^2y}{dx^2} + y = 0$	U	2	
	b)	Define the probability of an Event.	R	4	
	c)	Find the mean of the following data 12, 18, 27, 23, 20.	A	3	
	d)	State order and degree of the D.E. $\sqrt{1+\left(\frac{dy}{dx}\right)^2} = 5\frac{d^2y}{dx^2}$	R	2	
	e)	Verify that $y = \log x$ is a solution of $x\frac{d^2y}{dx^2} + \frac{dy}{dx} = 0$	U	2	
	f)	From 20 tickets marked 1 to 20, one ticket is drawn at random. Find the probability that it is marked with multiple of 3 or 5.	A	4	
Q.5		Attempt any **FOUR**			16
	a)	Solve $(x^2 + y^2)\,dx - 2xy\,dy = 0$	A	2	
	b)	Show that $y\sec x = \sin x + c$ if $\frac{dy}{dx} + y\tan x = \cos^2 x$	U	2	
	c)	Solve (2xy + y - tan y) dx + (x^2-x $\tan^2$y + $\sec^2$y) dy=0	A	2	
	d)	Calculate the mean deviation about mean of the following data:	A	3	
	e)	The two sets of observation are given below	U	3	
	f)	A room has 3 electric lamps from a collection of 15 electric bulbs of which only 10 arc good, 3 arcs selected at random and put in the lamps. Find the probability that the room lighted by at least one the bulbs.	A	4	
Q.6		Attempt any **FOUR**			16
	a)	If A & B are two events such that P (A)= ½ , P (B)= 1/3 , P (A∩B) = 7/12. Find i) P (AUB) ii) P(A′ ∩ B′)	A	4	
	b)	Verify that y = sin (log x) is a solution of the D.E. $x^2\frac{d^2y}{dx^2} + x\frac{dy}{dx} + y = 0$	U	2	
	c)	Solve $(1+x^3)\,dy - x^2y\,dx = 0$	A	2	
	d)	Calculate the standard deviation for the following distributions.	A	3	
	e)	Calculate the coefficient of variance from the following data	A	3	
	f)	Calculate the variance for the following distribution.	A	3	

xi	3	4	5	6	7
fi	4	9	10	8	6

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

Which of the two sets is more consistent?

C.I.	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40
f.I	3	5	9	15	20	16	10	2

xi	7	8	9	10	11	12	13
fi	4	6	9	12	9	6	4

C.I.	0-10	10-20	20-30	30-40	40-50	50-60
f.I	14	23	27	21	15	19

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ODD TERM END EXAM NOV./ DEC. -2017

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **ALLIED**
COURSE CODE :- **MEE312/IEE/ETE311/MTE311/MG227/R227**
COURSE NAME :- **NON CONVENTIONAL ENERGY SOURCES**
MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **24 / 11 / 2017**

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) What do you meant by fossiel fuels?
b) Define solar constant.
c) State the merits of solar energy. (any four)
d) What are the causes of wind?
e) State the advantages of wind energy. (any four)
f) What is biomass energy?

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

a) Briefly explain the challenges to explore non conventional energy sources.
b) Explain briefly flat plate collector.
c) What are the various solar energy utilization methods?
d) Draw block diagram of control panel of wind energy system and explain it.
e) State the classifications of wind turbine? Explain any one in brief.
f) Explain various biomass types.

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

a) With neat sketch explain the working of sunshine recorder.
b) What is the future of wind energy in India? Explain the environmental effects of wind energy.
c) Explain with neat sketch the working of floating drum type biogas plant.

P.T.O.

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

a) State the four advantages of ocean energy.

b) Enlist the basic components of a tidal power plant.

c) State four limitations of geothermal energy.

d) State four applications of fuel cell.

e) State the objectives of energy conservation.

f) Define i) ROI ii) Life cycle cost.

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

a) State the requirement for site selection of ocean thermal power plant.

b) Draw a neat sketch of Dry steam system geothermal power plant and explain its working.

c) Enlist the components of small mini hydroelectric plant and state the function of each component.

d) Define energy management. Write four objectives of it.

e) What is energy audit? Explain detailed energy audit methodology.

f) State the ways of improving boiler efficiency.

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

a) Describe single basin tidal power plant.

b) State the main components of fuel cell and the function of each component.

c) State the principle of Magneto-hydro dynamic power generation. State is advantages.

d) State the factors affecting site selection for geothermal power plant.

e) Draw a neat sketch of gas turbine co-generation plant and explain its working.

f) State four waste heat recovery devices. State advantages of waste heat utilization.

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