GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

EVEN TERM END EXAM APRIL/MAY. -2016

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **SUGAR MANUFACTURING**
COURSE CODE :- **SME304**
COURSE NAME :- **INTRODUCTION TO SUGAR MANUFACTURING**
MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **10 / 05 / 2016**

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

Marks

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

a) List out the names of four Sugar Factory in Kolhapur District.
b) Which type of sugar is manufactured in Indian Sugar Industry?
c) List out four sugar cane varieties.
d) Give stractural formulae of glucose.
e) List out colouring matter present in cane juice.
f) Draw heat sketch of sugar cane plant.

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

a) Give compositon of sugar cane juice.
b) Explain Raw sugar, Refined sugar, plantation white sugar in short.
c) Explain colouring matter in cane juice.
d) State composition of sugar cane.
e) Explain factors affecting maturity of cane.
f) Explain parts of sugar cane plant.

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

a) Describe preharvesting maturity survey.
b) Describe physical and chemical properties of sucrose.
c) Describe Biosynthesis of sugar in sugar cane plant.

P.T.O.

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

a) Define Molasse.

b) Define Khandsari Sugar.

c) Define Jaggery.

d) Define Brix.

e) Define Pol.

f) Define pH.

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

a) State flow chart of sugar manufacturing processes.

b) Write note on intermediate by product.

c) Explain the term lay-out plan of factory.

d) State function and specification of any one equipment used in sugar factory.

e) Explain criteria for selection of site for factory.

f) Explain role of pH. in sugar manufacturing processes.

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

a) State the procedure of brix, pol, purity of cane juice.

b) Write note on Polarimeter and Hydrometer.

c) Explain the role of lime and sulphur, phosphoric acid in clarification processes.

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B-07
CR-20
(20)

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EVEN TERM END EXAM APRIL/MAY -2016

EXAM SEAT NO. | | | | | | |

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

COURSE CODE: **CCE105/X104/R107/0107** COURSE NAME: **BASIC MATHEMATICS**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **30/04/2016**

Instruction:-

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

Marks

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

a) Resolve into partial fractions: $\frac{x+1}{(x+3)(x-2)}$

b) Resolve into partial fractions: $\frac{x}{x^2-1}$

c) Find X if $\begin{bmatrix} 4 & 5 \\ -3 & 6 \end{bmatrix} + x = \begin{bmatrix} 10 & -1 \\ 0 & -5 \end{bmatrix}$

d) Find x & y if $\begin{bmatrix} 3x^2 & 4 \\ 1 & y-3 \end{bmatrix} = \begin{bmatrix} 12 & 4 \\ 1 & 8 \end{bmatrix}$

e) If $A = \begin{bmatrix} 2 & 3 \\ 4 & 7 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 3 \\ 4 & 6 \end{bmatrix}$ find 2A+3B-4I

f) Find the middle term in the expansion of $(x+5)^8$

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

a) Solve using determinants: $x+y+z=1;\ \ 2x+3y+z=4;\ \ 4x+9y+z=16$

b) Prove using properties that $\begin{vmatrix} a & b & c \\ a^2 & b^2 & c^2 \\ a^3 & b^3 & c^3 \end{vmatrix} = abc(a-b)(b-c)(c-a)$

c) Resolve into partial fractions: $\frac{x^2+2x}{(x-3)(x^2+1)}$

d) Express the matrix 'A' as the sum of symmetric and skew-symmetric matrices $A = \begin{bmatrix} -1 & 7 & 1 \\ 2 & 3 & 4 \\ 5 & 0 & 5 \end{bmatrix}$

e) If $A = \begin{bmatrix} -1 & 3 & 5 \\ 0 & 6 & 3 \end{bmatrix}$, $B = \begin{bmatrix} 3 & -5 \\ 7 & 8 \\ 1 & -1 \end{bmatrix}$, $C = \begin{bmatrix} 4 & -5 \\ 1 & 1 \end{bmatrix}$, *verify that* $(AB)C = A(BC)$

f) Find A^{-1} by adjoint method if $A = \begin{bmatrix} 1 & 2 & -2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{bmatrix}$

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

a) Solve the following equation $\begin{vmatrix} x+10 & x+2 & x+3 \\ x+4 & x+5 & x+6 \\ 2x+7 & x+8 & 0 \end{vmatrix} = 0$

b) Resolve into partial fractions: $\frac{x^2+x+1}{(x+1)^2(x+2)}$

c) Resolve into partial fractions: $\frac{2x^4+x^2+4}{(x^2+1)(2x^2+3)(x^2-2)}$

d) Solve the following simulations equations by matrix method: 2x+y=3; 2y+3z=4; 2z+2x=8

e) Using Binomial theorem prove that $\left(\sqrt{2}+1\right)^5-\left(\sqrt{2}+1\right)^5=82$

f) The term independent of x in the expansion of $\left(x^3+\frac{m}{x^8}\right)^{11}$ is 1320 find m.

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

a) Prove that as $\cos(\pi+\theta)=-\cos\theta$

b) If A=30^0 verify that $\sin 3A=3\sin A-4\sin^3 A$

c) Express as product and evaluate $\sin 99^0-\sin 81^0$

d) Prove that a=b cos c + C cosB

e) Find principal value of $\cos^{-1}\left(-\frac{1}{2}\right)-\sin^{-1}\left(\frac{1}{2}\right)$

f) In ΔABC if a=125cm, b=123cm, c=62cm find $\sin\frac{A}{2}$

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

a) If $\tan(x+y)=\frac{3}{4}$, $\tan(x-y)=\frac{8}{15}$ *them show that* $\tan 2x=\frac{77}{36}$

b) Prove that $\frac{\sec 8A-1}{\sec 4A-1}=\frac{\tan 8A}{\tan 2A}$

c) Prove that $\frac{\sin 4A+\sin 5A+\sin 6A}{\cos 4A+\cos 5A+\cos 6A}=\tan 5A$

d) Prove that $\tan^{-1}\left(\frac{1}{7}\right)+\tan^{-1}\left(\frac{1}{13}\right)=\cot^{-1}\left(\frac{9}{2}\right)$

e) Prove that $\left(b^2-c^2\right)\sin^2 A+\left(c^2-a^2\right)\sin^2 B+\left(a^2-b^2\right)\sin^2 c=0$

f) Solve ΔABC *if* $b=1$, $c=\sqrt{3}-1$ & $A=60^0$

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

a) If α and β both are obtuse angles and $\sin\alpha=\frac{5}{13}$, $\cos\beta=\frac{-4}{5}$ *evaluate* $\cos(\alpha+\beta)$

b) Prove that $4\sin A\sin(60^0-A)\sin(60^0+A)=\sin 3A$

c) Show that $\cos^{-1}\left(\frac{4}{5}\right)+\tan^{-1}\left(\frac{3}{5}\right)=\tan^{-1}\left(\frac{27}{11}\right)$

d) In ΔABC *show that* $\tan A+\tan B+\tan C=\tan A\tan B\tan C$

e) Solve ΔABC in which the sides are a=52.8, b=39.3, c=72.1

f) In any ΔABC, prove that $a\cos\left(\frac{B-C}{2}\right)=(b+c)\sin\frac{A}{2}$

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EVEN TERM END EXAM APRIL/MAY -2016

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **SUGAR MANUFACTURING**
COURSE CODE :- **SME308/SM208/S208**
COURSE NAME :- **CHEMICAL PROCESS TECHNOLOGY**
MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **30 / 04 / 2016**

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

Marks

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

a) Give four uses of sulphuric acid.

b) Give symbol of open pan.

c) Give symbol of centrifugal pump.

d) Define endothermic process.

e) Define co-current process.

f) State the uses of hydrochloric acid.

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

a) Explain homogenous and hetergenous reaction.

b) Explain factors affecting reaction rates.

c) Explain unit process fermentation, hydration.

d) Explain with sketch Nelson's Cell.

e) State the properties of hydrochloric acid.

f) Draw neat sketch of synthetic process for the manufacture of hydrochloric acid.

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

a) Describe contact process of sulphuric acid manufacturing.

b) Describe Bosch Harber process.

c) Describe Solvay's process for the manufacturing of sodium carbonate.

P.T.O.

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

a) What is methylated spirit?

b) Write any two industrial applications of acetic acid.

c) What is meant by direct fertilizers? Give an example.

d) State the reasons for higher prices of urea.

e) Define pulp. State the raw materials for the manufacture of paper.

f) What are the main components of producer gas and water gas?

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

a) With the help of a flow sheet, explain manufacture of ethly alcohol from corn.

b) Explain synthesis process for acetic acid. Draw the flow sheet for the same.

c) With the help of a neat flow sheet, explain manufacture of ammonium sulphate.

d) Draw a neat flow sheet for the manufacture of triple superphosphate and describe the process.

e) Differentiate between sulphate process and sulphite process with reference to pulp and paper industry.

f) With the help of a neat flow sheet, explain the continuous process for manufacture of water gas.

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

a) Mention any two industrial applications of hydrogen and also explain hydrogen manufacture, with the help of a neat flow sheet.

b) Write any two differences between chemical and mechanical method for pulp production. State two properties and two uses of ethyl acetate.

c) Draw a flow sheet and explain the process of urea manufacture. State the properties and uses of Denatured alcohol and vinegar.

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EVEN TERM END EXAM APRIL/MAY -2016

EXAM SEAT NO. | | | | | | |

LEVEL: **THRID** PROGRAM: **CE/ME/IE/E&TC/SM/MT/IT**

COURSE CODE:

MEE313/MTE312/ME214/R228/MG228/ITE312/R228/IEE/ETE312/IX/EJ210/R228/0228

COURSE NAME: **HIGHER MATH'S**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **02/05/2016**

Instruction:-

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

Marks

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

a) Evaluate $\left(\frac{\Delta^2}{E}\right)x^2$ *taking* $h=1$

b) Prove that $E\Delta = \Delta E$

c) Prove that $\Delta \log f(x) = \log\left[1+\frac{\Delta f(x)}{f(x)}\right]$

d) If $z=\log(x^2+y^2)$. *find* $\frac{\partial z}{\partial x}$ & $\frac{\partial z}{\partial y}$

e) If $z=x^y$, *then find* $\frac{\partial z}{\partial x}$ & $\frac{\partial z}{\partial y}$

f) If $u=\sin(xy)$, *find* $\frac{\partial^2 u}{\partial x.\partial y}$

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

a) Estimate the missing term in the following table.

x	1	2	3	4	5
y	2	5	7	-	32

b) Express $f(x)=2x^4+x-1$ in factorial notation & find $\Delta^3 f(x)$ *at* $x=1.5$

c) It f(x)is a polynomial of degree 2 in x If f(0)=8, f(1)=12, f(2)=18 then find f(x) using suitable interpolation formula.

d) The following table gives the premium payable for the policy of RS.1000 at age x.

Age	20	25	30	35	40
Premium	23	26	30	35	41

Find the premium, if the policy is taken at the age of 26 years.

e) Find f(1.7), if f(-2)=4, f(-1)=26, f(0)=58, f(1)=112, f(2)=446

f) Using Lagrange's formula, find f(6)

x	3	7	9	10
y	168	120	72	63

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

a) If $z = \sin^{-1}\left(\frac{y}{x}\right)$, *verify that* $\frac{\partial^2 z}{\partial x.\partial y} = \frac{\partial^2 z}{\partial y.\partial x}$

b) If $\sin U = \frac{x^2 y^2}{x+y}$ *show that* $x\frac{\partial u}{\partial x} + y.\frac{\partial u}{\partial y} = 3\tan u$

c) If $u = x^2.\tan^{-1}\left(\frac{y}{x}\right) - y^2.\tan^{-1}\left(\frac{x}{y}\right)$ *show that* $\frac{\partial^2 u}{\partial x.\partial y} = \frac{x^2 - y^2}{x^2 + y^2}$

d) If $x = r\cos\theta,\ y = r\sin\theta,$ *find* $\frac{\partial(x,y)}{\partial(r,\theta)}$

e) If $x = e^U.\cos V$ *and* $y = e^U.\sin V$ *prove that* $\frac{\partial(x,y)}{\partial(U,V)}\ X\ \frac{\partial(U,V)}{\partial(x,y)} = 1$

f) If $u = \tan^{-1}\left(\frac{x^3 + y^3}{x - y}\right)$ *then prove that* $x^2\frac{\partial^2 u}{\partial x^2} + 2xy\frac{\partial^2 u}{\partial x.\partial y} + y^2\frac{\partial^2 u}{\partial y^2} = \sin 4U - \sin 2U$

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

a) Find L(f(t)) by using definition if $f(t) = 3,\ 0 < t < 5$
$= 0,\ t > 5$

b) Find $L\left(e^{2+3t}\right)$

c) Find $L\left(\cos^3 2t\right)$

d) Find $L^{-1}\left(\frac{2}{s} + \frac{1}{s^3} + \frac{1}{s^2+4}\right)$

e) Find $L^{-1}\left(\frac{1}{(s-3)^3}\right)$

f) Find $\left(D^3 - 1\right)y = 0$

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

a) Find $L\left(t\ e^t \sin 2t\cos t\right)$

b) Find $L\ \ L\left(\frac{e^{-3t}\sin 2t}{t}\right)$

c) Find by L.T method the value of $\int_0^\infty e^{-3t} t\sin t\ dt$

d) Find $L^{-1}\left(\frac{s+29}{(s+4)(s^2+9)}\right)$

e) Using convolution theorem find $L^{-1}\left(\frac{1}{s(s+4)}\right)$

f) Solve $\frac{d^3y}{dx^3} - 4\frac{d2y}{dx^2} + 5D - 2 = 0$

Q 6) A) Attempt Any **TWO** **08**

a) Solve $\left(D^3 - 3D^2 + 4\right)y = 0$

b) Solve $\frac{d^4y}{dx^4} + 6\frac{d^2y}{dx^2} + 9 = 0$

c) Solve $\frac{d^3y}{dx^3} + y = 0$

B) Attempt Any **ONE** **08**

a) Solve by using L.T. Method
$\left(D^2 - 3D + 2\right)y = 4e^{2t}$ *given that* $y^x(0) = -3$ *and* $y'(0) = 5$

b) $\left(D^2 - D - 2\right)y = 20\sin 2t$ *given that* $y(0) = 1$ *and* $y'(0) = 2$

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EVEN TERM END EXAM APRIL/MAY -2016

EXAM SEAT NO. | | | | | | |

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

COURSE CODE: **CCE107/X105/E109** COURSE NAME: **ENGINEERING DRAWING-I**

MAX. MARKS: **80** TIME: **4 HRS.** DATE: **29/04/2016**

Instruction:-

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

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

a) Write Auto CAD command for the following
   i) To draw line of 40mm
   ii) To draw circle of radius 25mm

b) State the applications of parabola.

c) If point B is in the V.P. and 35mm above H.P. Draw its projection.

d) Draw conventions/ symbols for the following.
   i) Long brake line
   ii) Center line

e) A 2cm long line on a drawing represents a distance of 1 meter calculate Representative Fraction (R.F)

f) State the uses of the following drawing instrument.
   i) Set squares
   ii) French curves.

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

a) Construct parabola by rectangle method, given the base 100mm and height 70mm.

b) Draw direct (external) common tangent to two unequal circles of radius 25mm and 35mm respectively. The distance between the centers of two circles is equal to 100mm.

c) A string is unwound from a circle of 30mm radius. Draw the Involute of a circles the end of a string for unwinding the string completely. String is kept tight while being unwound.

d) The length of the top view of line parallel to VP and inclined at 45^0 to the H.P is 50mm. One end of the line is 12mm above the HP and 25mm in front of V.P. Draw the projection of the line and determine its true length.

e) Construct an ellipse by Arcs of circle method, given the major axis and minor axis 80mm and 50mm respectively.

f) The distance between end projections of a line PQ 100mm long is 80mm. The line is parallel to H.P. The end P is 15mm above H.P and 35mm in front of V.P Draw projections of line PQ and find inclination with V.P.

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

a) Draw a cycloid of a circle of 50mm diameter.

b) Construct and Archemedian spiral for one convolution, given the greatest and least radii being 70mm and 15mm respectively.

c) A straight line AB 60mm long makes an angle of 55^0 to the H.P and 25^0 to the V.P The one end of the straight line AB is in the H.P and 20mm in front of V.P. Draw the projection of line AB.

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

a) An isosceles triangle of base 30mm and attitude 50mm is having its base on H.P. plane is perpendicular to V.P and is inclined to H.P. in such a way that top view appears to be an equilateral triangle. Draw three views of plane.

b) A circular plate of diameter 60mm is resting on the V.P on a point of its circumference. The plate is inclined to V.P. in such a way that the elevation length of diameter (minor axis) passing through the point on V.P is 35mm, The plate is perpendicular to H.P. Draw its three views of the plate.

c) A pentagonal plate of 30mm side is resting on one of the side on H.P such that plate is inclined at 40^0 with H.P. and perpendicular to V.P. The center of plate is 50mm from V.P. draw its three views.

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

a) A pentagonal prism having base side 30mm and axis 60mm long is resting on H.P on one of its base edge. Draw the projections of prism if the face containing that edge makes an angle of 60^0 with the H.P and its axis is parallel to V.P.

b) A cylinder having its base diameter 40mm and axis length 60mm is kept on the V.P on a point of its base circle such that its axis is inclined to V.P at 30^0 and parallel to H.P. Draw the projections of the cylinder.

c) A square pyramid side of the base 30mm and height 50mm is resting on its base with one of the sides of the base perpendicular to the V.P. It is cut by on AIP inclined at 45^0 to the H.P. in such a way that it bisects the axis. Draw F.V. sectional T.V. and true shape of section

i) F.V. (02 Marks)
ii) Sectional T.V. (02 Marks)
iii) True shape (04 Marks)

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

a) A right circular cylinder of 60mm base diameter and axis 100mm long is resting on the ground on its base. It is cut by a section plane perpendicular to V.P. and inclined to H.P (or ground) in such a way that the true shape of section is an ellipse having major axis 80mm. Draw

i) Front view (02 Marks)
ii) Sectional Top view (02 Marks)
iii) True shape of section (04 Marks)

b) A cone of base diameter 40mm and axis length 50mm is kept on the H.P. on its base. It is cut by an AIP inclined at 45^0 to the H.P. and passes through a point on the axis 30mm above the base. Draw

i) Front view (02 Marks)
ii) Sectional Top view (02 Marks)
iii) True shape of section (04 Marks)

c) A cone of base diameter 40mm and axis length 60mm is kept on the V.P. on a point of its base circle such that its axis inclined to V.P. at 30^0 and parallel to H.P. Draw the projections of cone.

Stage I i) F.V (01 Marks)
ii) T.V (01 Marks)
Stage II i) F.V (03 Marks)
ii) T.V (03 Marks)

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EVEN TERM END EXAM APRIL / MAY 2016

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **SME503/SM403/S403**

COURSE NAME :- **SUGAR INDUSTRY MANAGEMENT**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **29 / 04 / 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) Name any four major industries in India.

b) What is business?

c) Write any four causes of accidents in sugar industry.

d) Define organization.

e) Define management.

f) Define public sector.

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

a) Explain the necessity of Factory Act 1948.

b) Write the characteristics of business.

c) What is planning? Write objectives of planning.

d) Write difference between private sector and public sector.

e) Explain function of personal management.

f) Write difference between recruitment and selection.

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

a) Describe various levels of management.

b) Explain functional organization and write advantages and disadvantages of functional organization.

c) Describe the types and benefits of motivation.

P.T.O.

Section – II	Marks

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

a) Define store.

b) Define Inventory.

c) Define Service Tax.

d) Define Budgeting.

e) Define finance Management.

f) Define Refine sugar.

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

a) Differentiate between shares and equity share.

b) State purpose of accounting and budgeting.

c) State advantage and disadvantage of EOQ model.

d) Give function and objective of puchase department.

e) State procedure of store keeping.

f) Explain the procedure of molasses handling in sugar industry.

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

a) What are the types of capital explain in short?

b) Explain the term excise and custom duty.

c) Explain the term material management.

d) What is the functional area of inventory management? Explain.

e) Explain the term centralized purchasing.

f) Write note on white sugar handling and conditioning.

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EVEN TERM END EXAM APRIL / MAY 2016

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **SME404/SM305/S305**

COURSE NAME :- **BY PRODUCTS OF SUGAR INDUSTRY**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **28 / 04 / 2016**

Instruction :-

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

Section – I

Marks

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

a) Define Molasses.

b) Define fermentation.

c) Define Bagasses.

d) Define True fibre.

e) Define Pith.

f) Define GCV.

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

a) State the composition of bagasses.

b) Write note on Bagases as a fuel.

c) Differentiate between sulphate and sulphite pulp.

d) Draw flow sheet of paper from pulp manufacturing.

e) State the characteristics of spent wash.

f) State the composition of molasses.

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

a) Explain the processes of manufacturing of paper from Bagasses.

b) Explain manufacturing process of alchole from molasses.

c) State characteristics of filter cake and explain manufacturing process of wax of filter cake.

(P.T.O.)

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

a) Define raw sugar.

b) What is anaerobic treatment?

c) Define BOD.

d) State specification of raw sugar.

e) State the different uses of treated water.

f) State the pH of treated water from ETP.

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

a) Explain the effect of waste water and solid waste on environment.

b) Write the sources of waste and effluents in sugar industry.

c) Write the MPCB norms for treated water of sugar industry.

d) Explain zero pollution.

e) List out pollution preventive measures.

f) Draw flow diagram of ETP.

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

a) Explain steps to betaken at different stations to reduce the pollution.

b) Describe the manufacturing process of Khandsari sugar.

c) Describe effluent treatment plant process used in sugar factory.

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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EVEN TERM END EXAM APRIL/MAY -2016

EXAM SEAT NO. | | | | | | |

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

COURSE CODE: **CCE103/X103/X109/R105/R106** COURSE NAME: **ENGINEERING CHEMISTRY**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **28/04/2016**

Instruction:-

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

Marks

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

a) Why inert gases are monoatomic in nature?

b) Write the orbital electronic configuration of $_{7}N^{14}$, $_{16}S^{32}$

c) Define i) Degree of ionization ii) Electro refining.

d) Define corrosion mention two types of corrosion.

e) Distinguish between hard water & soft water (any two points)

f) Define p^H. What is the p^H of extremely acidic & extremely alkaline solution?

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

a) Give the four assumptions of Bohr's Atomic theory.

b) Distinguish between electrovalent & covalent compound.

c) Describe the process of silver plating on iron spoon.

d) State and explain the type of impurities present in natural water. Name the process for the removal of these impurities.

e) Explain the disadvantages of hard water in cooking & washing use.

f) State & explain four causes of scale formation in boiler.

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

a) When same amount of current was passed through the solution of copper sulphate & zinc sulphate 0.7gm & 0.7164gm of copper & zinc get deposited on cathodes. If atomic weight of copper is 63.5. Calculated equivalent weight of Zn.

b) Describe electrolysis of $CuSo_4$ solution by using copper electrode.

c) Name & explain the method used for coating on large & irregular shape of articles for prevention of corrosion.

d) Define atmospheric corrosion. Explain two factors affecting atmospheric corrosion.

e) Draw the diagram. Give two chemical reactions in regeneration of ion exchange process.

f) Define sterilization of water. Explain with reactions use of bleaching powder.

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

a) Name the products of blast furnace. Give the composition of one product.

b) What is flash point and fire point of a lubricant?

c) Give two properties and two uses of glass wool.

d) What is vulcanization of rubber?

e) What are composite materials? Give its types.

f) Give the chemical composition of Portland cement.

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

a) What is nonferrous alloy? Give the composition, properties and uses of a) Duralumin b) Monel metal.

b) Give the reactions in heat absorption zone of blast furnace.

c) Name and explain the lubrication used for delicate machine parts.

d) Define paint. Give the functions of paints.

e) Give the reactions of setting and Hardening of cement.

f) Give four properties and uses of rubber.

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

a) Give the difference between calcinations and Roasting process.

b) What is ferrous alloy? Give the composition, properties and uses of i) Heat resisting steel ii) Magnetic steel.

c) Define lubricant. What are the functions of lubricant?

d) Name the drying oil and thinner added in paint. Give its functions.

e) What is thermocole? Give the properties and uses of thermocole.

f) What us addition polymerisation? Explain with examples.

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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EVEN TERM END EXAM APRIL/MAY -2016

EXAM SEAT NO. | | | | | | |

LEVEL : - **FIRST** PROGRAM : **COMMON**
COURSE CODE :- **CCE110/X111/R112/0116**
COURSE NAME :- **APPLIED MECHANICS**
MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **26 / 04 / 2016**

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

Marks

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

a) Define equilibrium and state the relation between resultant force and equilibrant force.
b) State principle of Transmissibility.
c) Define Resolution of force.
d) State graphical conditions of equilibrium for parallel force system.
e) Define angle of repose.
f) If angle of repose is 30^0, calculate coefficient of friction.

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

a) A force of 100KN makes an angle of 135^0 with the horizontal. Find its orthogonal components.
b) Calculate the total moment about point 'A' for the force system shown in fig.
c) Find resultant force of concurrent force system graphically.
d) Find support reaction of a given beam as shown in figure by analytical method.
e) A body resting on a rough horizontal plane is on the point of moving by a pull of 22N acting 30^0 inclined to horizontal. Find the weight of body and coefficient of friction.
f) A body of weight 400N is placed on plane inclined at an angle of 18^0 with the horizontal. If $\mu = 0.27$, find the value of the force to be applied parallel to the plane just to move the body up the plane.

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

a) Two point loads are acting on beam as shown in fig. The self weight of beam is 2 KN/m. Using graphical method. Find support reactions.
b) A sphere of diameter 1.2m and weighing 1800N rest against two smooth planes inclined at 60^0 and 45^0 respectively. Determine reactions offered by the planes.
c) Determine analytically, the resultant of coplanar parallel forces acting vertically upwards. 40N, 20N at 30mm, 30N of 50mm and 60N at 70mm. All distances are taken from first force towards right.

PTO

d) Four forces 20N, 15N, 30N and 25N are acting at 0^0,60^0,90^0 and 150^0 from X-axis taken in order. Find resultant by analytical method.

e) Two concurrent forces of magnitude 100N have their resultant as 100N. Calculate the angle between the forces.

f) Explain Law of frictions.

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

a) Define centriod of plain figure.
b) State or locate the centre of semicircle and semisphere.
c) State law of conservation of momentum.
d) State Newton's 1st law of motion.
e) State equation for angular motion and given meaning of each term.
f) Define power and its S.I. unit

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

a) Find the centre of gravity of an equal angle section 100 X 100 X10mm and locate on figure.

b) Find the centriod of shaded area as shown figure.

c) A body falling freely under gravity passes two points 9m aparts vertically in 0.2sec. Find from what height above the upper point did it start to fall?

d) A bullet weighing 3N leaves the barrel of a rifle with a muzzle velocity of 750m/s. If the length of parallel is 100cm. Find the impulse and impulsive force.

e) A particle is rotating at 300 RPM. If the radius of rotation is 1.5m calculate i) angular Velocity ii) Linear velocity.

f) The shaft of an electric motor rotates at 1500 rpm at a particular instant. In 8 second the speed uniformly decreases to 500 rpm. Find the angular retardation.

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

a) How many litres of water can be raised in 10 minutes to a height of 30m by means of pump of 2.5KW power and efficiency 80%?

b) Water having volume of 1500 liters is lifted to a height of 6m and is delivered at velocity of 4m/sec. What is the energy possessed by water?

c) A machine having following observation. Find the law of machine.

Load (N)	100	200	300	400	500	600
Effort (N)	10	18	25	28	33	39

d) For a lifting M/C UR=50.6. An effort of 90N lifts load of 1800N and an effort of 135N requires a load of 3150N. Determine law of M/C and Maximum efficiency of machine.

e) Define i) Mechanical Advantages ii) Velocity Ratio
iii) Efficiency iv) Reversible machine.

f) Draw the nature of graphs for a lifting machine.
i) Load Vs effort ii) Load Vs idea effort. iii) Load Vs Mechanical Advantage
iv) Load Vs effort lost in friction.

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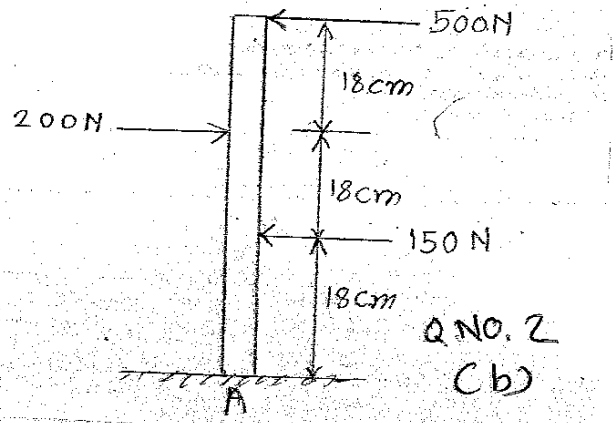

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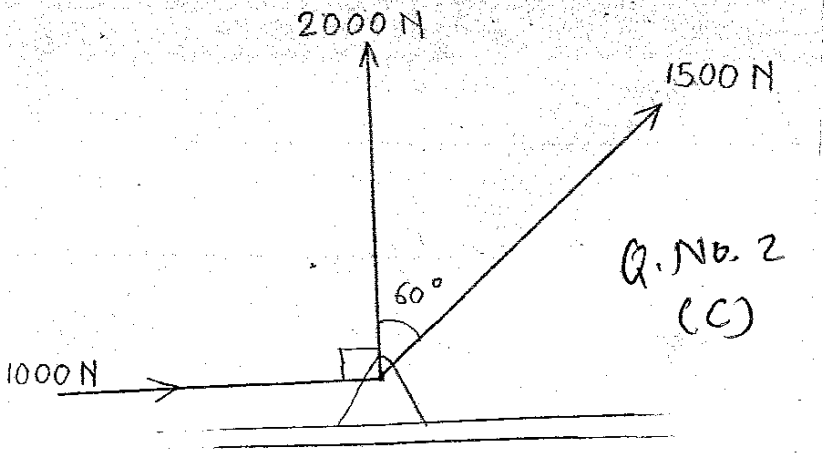
(b)



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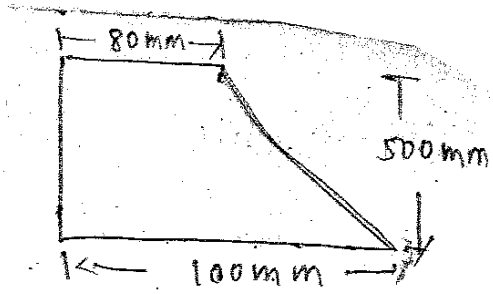

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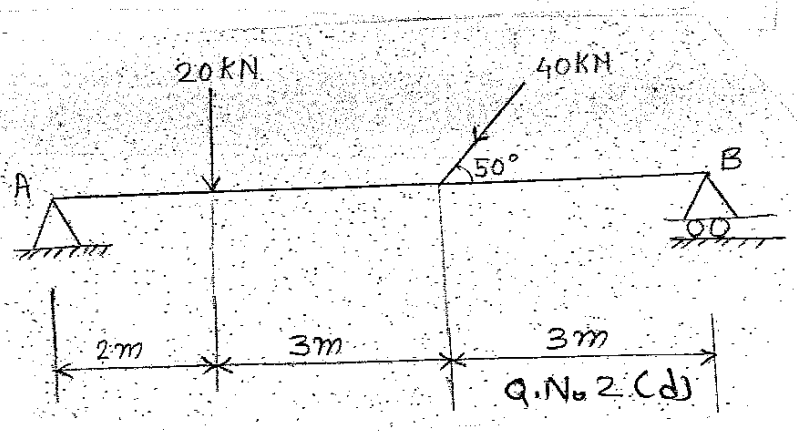

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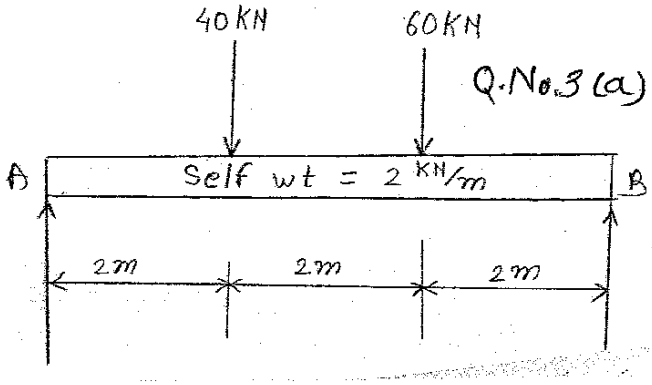

Q.No. 3 (a)

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EVEN TERM END EXAM APRIL/MAY. -2016

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **SUGAR MANUFACTURING**
COURSE CODE :- **SME305/SM205/S206**
COURSE NAME :- **SUGAR FACTORY EQUIPMENT**
MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **25 / 04 / 2016**

Instruction :-

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

Marks

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

a) List out the equipments used in the juice section of a sugar Industry.

b) What is the purpose of clear juice heater?

c) Give the specification of fibrizer for a 2500 T.C.D. plant.

d) Give the specification of Juice Heater tube.

e) How much quantity of air required for complete combustion of one kg sulphur?

f) What is P.R.D.S. system in sugar Industry?

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

a) Describe the structure and working of the rotary vacuum filter.

b) Describe the construction of vapour line juice heater with sketch.

c) Describe the working of syrup Sulphitation tower in detail.

d) Draw neat sketch of sulphur burner.

e) Explain how to start juice heater on vapour.

f) Describe the construction and working of mud-mixture.

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

a) Explain in detail construction and operation of Rapi Dorr 444 with Diagram.

b) Give in detail working principle, operation and construction of lime slaker with diagram.

c) Explain cleaning and testing of juice heater.

P.T.O.

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

a) State use of transient heater.

b) Give temperature of superheated wash water.

c) Give Inlet and Outlet temperature of spray water.

d) Which type of condensers are used in sugar industry?

e) Which crystallizer are used for Cm/c treatment?

f) State type of entrainment catcher.

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

a) Draw neat sketch of molasses conditioning tank.

b) Explain working of water cooled crystallizer.

c) Explain construction of evaporator.

d) Draw neat sketch of quadruple effect evaporator with vapour bleeding.

e) Explain testing and trial of batch pan.

f) Explain working of spray pond.

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

a) Describe condensate removal and receivers of evaporator with sketch.

b) Describe with sketch method of starting vacuum pan.

c) Describe process cycle and sequence of operation of batch type machine.

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EVEN TERM END EXAM APRIL/MAY -2016

EXAM SEAT NO. | | | | | | |

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

COURSE CODE: **SME403/SM303/S302** COURSE NAME: **SUGAR TECHNOLOGY-II**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **04/05/2016**

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 entrainment.

b) Give the size of slurry.

c) How much minimum vacuum required for pan boiling?

d) State A m/c % cane B m/c % cane.

e) State the brix and purity of C m/c

f) Which zone is prefered for true seeding method?

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

a) Explain true seeding method.

b) State causes of false grain formation

c) Give composition of molasses.

d) Explain cobenzens diagram.

e) Draw neat sketch of entrainment catcher.

f) Explain slurry preparation.

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

a) Describe three massecuite boiling scheme with flow chart.

b) Describe precaution to be taken during A m/c boiling.

c) Calculate capacity of pan required for 3000 TCD plant.

P.T.O

Section – II

Marks

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

a) Define Massecuite

b) Define Time cycle of machine

c) Define Inversion

d) Define Fermentation

e) Define Safety factory

f) Define Detoreation

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

a) Explain the term massecuite treatment with cooling & Reheating.

b) What are the principles involved in crystallization explain short.

c) What are the types of centrifugal machine, explain in short.

d) Explain principles involved in centrifugal operation.

e) Explain the purpose of drying & grading of sugar.

f) State guideline for storage condition of sugar.

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

a) What are the precaution to be taken during crystallization & cooling of massecuite.

b) What are the temperature range of cooling & reheating of A-B-C massecuite.

c) What are the factors affecting the time cycle of machine explain.

d) State advantage & disadvantage of Batch over continuous machine.

e) Explain importance of keeping quality of sugar & moisture of sugar.

f) What are the standard norms of expert quality sugar/ specification?

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EVEN TERM END EXAM APRIL/MAY. -2016

EXAM SEAT NO. | | | | | | |

LEVEL : - **SECOND** PROGRAM : **COMMON**
COURSE CODE :- **CCE202/0101/0102**
COURSE NAME :- **COMMUNICATION SKILL**
MAX. MARKS : **40** TIME : **2 HRS.** DATE :- **06 / 05 / 2016**

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

Marks

Q.1 Attempt any **FOUR** (Answer the following questions in 3-5 sentences) (08)

a) Draw a well labelled diagam illustrating the process of communication.

b) Enlist any four examples in which written communication is used.

c) Enlist four advantages of oral communication.

d) Explain two principles of effective written communication.

e) Define Haptics.

f) Enlist any four advantages of OHP.

Q.2 Attempt any **FOUR** (Answer the following question in 12-14 sentences) (16)

a) State i) Mechanical Barrier ii) Organizational Barriers.

b) Explain with sutiable example i)Upward communication.ii)Horizontal communication.

c) Enlist four tips for prepared speech.

d) State any four precautions one should take when making a presentation.

e) State and explain any four interview techniques.

f) State the guidelines on preparing presentation i) Thinking about audience ii) Good slide show design.

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

a) Explain types of communication. i) Verbal- Non-verbal ii) Oral – Written.

b) Following is the opinion of 100 parents about the new pattern of board exam of students X. In this problem the data is given in %.

i) In favour of new pattern – 60 ii) Against new pattern – 30 iii) No comments -10

Prepare a pie-chart.

c) Write an application along with your resume to Modern Automobile Factory, Pune-8 for the post of Junior Engineer.

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EVEN TERM END EXAM APRIL/MAY. -2016

EXAM SEAT NO. | | | | | | |

LEVEL : - **FIFTH** PROGRAM : **SUGAR MANUFACTURING**
COURSE CODE :- **SME502/SM404/S404**
COURSE NAME :- **SUGAR INDUSTRY INPLANT TRAINING**
MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **07 / 05 / 2016**

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

Marks

Question NO. 1 is compulsory and attempt any FOUR from Q.2 to Q.7

Q.1 Give your observations whiel working in the Sugar Industry (any **TEN**) (20)

a) What is gradation and what are the grades of sugar?
b) State Crushing capacity of plant and total crushing in the season.
c) Write Boiler feed water temperaure pH.
d) Imbibition water temperature, Quantity.
e) Hydraulic pressure on mills.
f) Sanitation at mills.
g) Length of evaporator tube.
h) Write use of Economizer.
i) Give the types of subsider used in sugar factory.
j) What is molasses conditioning?
k) Write short note on methods of Graining.
l) Give RPM of batch type machine.
m) Give RPM of continuous machine.
n) Give Am/c % cane.
o) State purity of syrup.

Q.2 a) Write in brief clarification process adopted in sugar manufacturing industry. (10)
b) Write a brief note on centrifugal machines used in sugar factory with sketch. (10)

Q.3 a) Draw neat sketch of Jet condensor and barometric condensor. Differentiate betweeb them. (10)
b) Describe in detail the Vapour Bleeding in sugar industry. (10)

Q.4 a) Describe the working of a batch type Pan with diagram. (10)
b) Describe in detail Lime preparation unit and Grit seperator, storage tanks etc. (10)

Q.5 a) State routine and special analysis of different samples done in sugar factory Laboratory. (10)
b) Give your comments on usefullness of Analysis in Laboratory. (10)

Q.6 a) Describe different types of the crystallizers used in sugar industry. (10)
b) Describe different types of Pans. (10)

Q.7 Write notes on any **TWO** (20)
a) Type of furnaces. b) Oliver Vacuum filter.
c) Cane preparatory Units. d) Sulphur Burnes.

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EVEN TERM END EXAM APRIL/MAY. -2016

EXAM SEAT NO. | | | | | | |

LEVEL :- **THIRD** PROGRAM : **SUGAR MANUFACTURING**
COURSE CODE :- **SME303/SM203**
COURSE NAME :- **BASIC SUGAR TECHNOLOGY**
MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **09 / 05 / 2016**

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

Marks

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

a) Define Bagesse.
b) Define M.J.
c) Define A.W.
d) Define Refractive Index.
e) Define plane polarised light.
f) Define brix.

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

a) Explain simple and compound imbibition.
b) Explain applications and importance of refractometer to Sugar Industry.
c) Explain optical method of sugar analysis.
d) Explain the cause of colour formation in sugar manufacturing.
e) Explain role of cane quality in sugar manufacturing.
f) Explain importance of phospheric acid in sugar processes.

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

a) Explain importance of time, temp and pH in sugar manufacturing processes.
b) Explain the term Nicol Prism and plane polarised light.
c) State and explain the composition of cane juice.

P.T.O.

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

a) State the devicess used for cane preparation.

b) Write the importance of mill sanitation.

c) What is hydrated lime and quick lime?

d) Write the temperature of SO_2 gas used for sulphitation.

e) How much quantity of air required for complete burning of 1 kg sulphur?

f) State the speed of sulphur burner melter stirrer.

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

a) Explain steam consuming units of sugar factory.

b) Explain compound imbibition system with diagram.

c) State the main objective of clarification process.

d) State the chemical used in clarification procesds with their specifications.

e) Draw neat sketch of juice sulphitor.

f) Explain the purpose of syrup sulphitation.

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

a) Describe reaction taking place during clarification process.

b) Describe the differetn methods of sulphitation.

c) Describe preparation of milk of lime with neat sketch.

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EVEN TERM END EXAM APRIL / MAY 2016

EXAM SEAT NO. | | | | | | |

LEVEL : - **FOURTH** PROGRAM : **SUGAR MANUFACTURING**
COURSE CODE :- **SME402/SM302/S205**
COURSE NAME :- **SUGAR TECHNOLOGY -I**
MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **09 / 05 / 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) List out types of clarifier used in sugar factory.

b) Give vacuum required for evaporation.

c) Define syrup.

d) Define clear juice.

e) Why sulphur juice is heated upto 100^0C?

f) State rentation time of the Rapi Dorr 444.

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

a) List out probable problems while operating juice heater.

b) Explain mode of raw juice heating.

c) State possible causes of high mud level in clarifier.

d) Explain working of decanter.

e) Draw neat sketch showing working of vacuum filter.

f) State the reasons for the deposition of scale.

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

a) Draw the neat labelled diagram of juice heater.

b) State the precautions to be taken in clarifier during shut down.

c) Draw neat sketch of clarifier.

d) State the Rillieux principle.

e) Explain syrup sulphitation with neat sketch.

f) Explain vapour bleeding arrangement of quadruple effect evaporator.

P.T.O.

Section – II

Marks

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

a) Define solubility.

b) What is the term "Entrainment"and how it is avoided?

c) What is circulation in Pan and its advantage?

d) State factors affecting boiling point elevation.

e) What is the temperatures and pressure applied to the first body of evaporators calendria?

f) What should to the temperature of Hot water (Outlet) and Cold water (Inlet)

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

a) Describe the vacuum creation at Pan.

b) Describe working of falling film evaporator with sketch.

c) Explain decomposition of sucrose.

d) Give different types of "Catchalls" in the evaporators and Pans. What is the use of "catchalls"?

e) Explain circulation of massecuite.

f) Describe vacuum and condensing equipment i.e. "condensor" and how its creates vacuum"?

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

a) Draw a neat diagram of a Batch Type vacuum pan and explain detailed working of the vacuum pan.

b) Describe factors affecting role of crystallization.

c) Describe different zones of supersaturation. With the neat sketch.

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EVEN TERM END EXAM APRIL / MAY 2016

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **SME506**

COURSE NAME :- **COGENERATION TECHNOLOGY**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **10 / 05 / 2016**

Instruction :-

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

Section – I

Marks

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

a) Define primary energy sources with examples.

b) Define commercial energy sources with examples.

c) Define renewable energy sources with examples.

d) Write scope of co-generation.

e) State rationale (aim) for cogeneration from bagasse.

f) Write the disadvantages of bio-gas power plant

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

a) Explain future potential of bagasse based cogeneration in India.

b) Explain alternate fuels orather than bagasse used.

c) Write benefits of co-generation.

d) Explain wind energy also explain wind power plant along with neat sketch.

e) Explain nuclear power plant along with schematic line diagram.

f) Describe Air polution.

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

a) Describe in detail energy needs for growing economy and its inmact on environment.

b) Define Tidal energy also explain tidal power plant along with schematic line diagram.

c) i) State environmental benefits of bagasse based cogeneration.
ii) State the principle of cogeneration and state "why co-generation"?

P.T.O.

Section – II

Marks

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

a) Write the basic difference between bottoming cycle and topping cycle cogeneration system.

b) State the technical options for cogeneration.

c) Write the classification of cogeneration system.

d) Write the function of backpressure turbine.

e) Write the benefits of blowdown.

f) Define boiler efficiency.

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

a) Explain load pattern of cogeneration system.

b) Draw different configurations for backpressure steam turbine.

c) Explain the process of blow down of boiler.

d) List out strategies for better energy security of the nation.

e) Explain the need of energy audit.

f) Write the characteristic of boiler water.

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

a) Explain in brief reciprocating engine cogeneration system.

b) Explain in brief steam turbine as prime mover for cogeneration system.

c) Calculate boiler efficiency and evaporation ratio.

i) Type of boiler – Coal fired boiler.

ii) Quality of steam generated (output) = 8TPH

iii) Steam pressure/ Temperature = 10kg/cm^2 (g) /180^{0}C

iv) Enthaply of steam (dry and saturated) = 665 Kcal/Kg at 10kg/cm^2 (g) pressure

v) Feed water temp = 85^{0}C

vi) Enthalpy of feed water = 85 Kcal/Kg.

vii) Quantity of coal consumed (Input) = 1.6 TPH

viii) G.C.V. of coal = 4000 Kcal/Kg.

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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EVEN TERM END EXAM APRIL/MAY -2016

EXAM SEAT NO. | | | | | | |

LEVEL: **FIRST** PROGRAM: **ME/EE/SM**

COURSE CODE: **CCE108/X107/R110** COURSE NAME: **ENGINEERING DRAWING-II**

MAX. MARKS: **80** TIME: **4 HRS.** DATE: **12/05/2016**

Instruction:-

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

Marks

Q.1 Draw any **two** proportionate free hand sketches of the following. **(08)**

a) Lewis foundation bolt

b) Single riveted lap joint

c) Sellers thread & buttress thread

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

a) Fig.2.1 is an isometric view of an object. Draw the following views by using first angle method of orthographic projection.

i) Front view in the direction of arrow 'X' (04 Marks)

ii) Top view (04 Marks)

b) Refer Fig.No.2.2 and draw following views by using first angle method of orthographic projection.

i) Front view in the direction 'X' (04 Marks)

ii) Side view looking from left (04 Marks)

c) Fig.2.3 show pictorial view of an object. Draw the following views by using first angle method.

i) Front view in the direction 'X' (04 Marks)

ii) Top view (04 Marks)

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

a) Draw the following views from the pictorial view shown fig.3.1

i) Sectional front view – section along A-A (06 Marks)

ii) Top view (05 Marks)

iii) Side view looking from left (05 Marks)

Use First angle method.

P.T.O

b) Fig.3.2 show pictorial view of an object. Draw the following views by using first angle method.

i) Front view in the direction 'X' (05 Marks)

ii) Top view (05 Marks)

iii) Sectional side view –section along A-A (06 Marks)

Q.4 Attempt the **Following** **(08)**

a) Fig.4.1 shows two views of an object. Draw its missing top view.

Q.5 Draw any one of the following **(16)**

A) i) Fig. 5.1 shows F.V & T.V. of an object. Draw isometric view. (14 Marks)

ii) Draw isometric scale for 100mm (02 Marks)

B) i) Fig.5.2 shows F.V & S.V of an object. Draw isometric view. (14 Marks)

ii) Draw isometric scale for 75mm (02 Marks)

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

a) The elevation of a steel chimney 600mm in a diameter fitted to an inclined root is shown in fig.6.1. The axis of cylindrical chimney is 150mm from the ridge develop the lateral surface of the chimney (Use suitable scale) (08 Marks)

b) A hexagonal pyramid, base 30mm side & axis 75mm long is resting on H.P with side of base parallel to V.P it is cut by a section plane, perpendicular to the V.P & inclined at 45^0 to the H.P & bisecting the axis. Draw development of lateral surface. (08 Marks)

c) Draw the development of lateral surface of a pentagonal prism with edge of base 40mm & height 90mm, kept on the H.P on its base with an edge of base parallel to V.P when it is cut by AIP inclined at 30^0 to H.P & bisecting the axis of the prism. (08 Marks)

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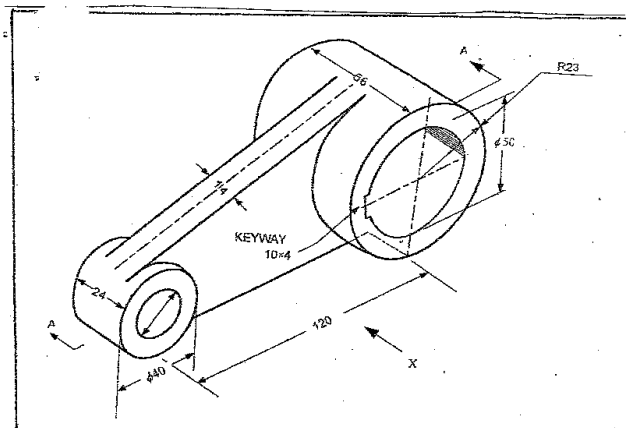

FIG. NO. 2·1

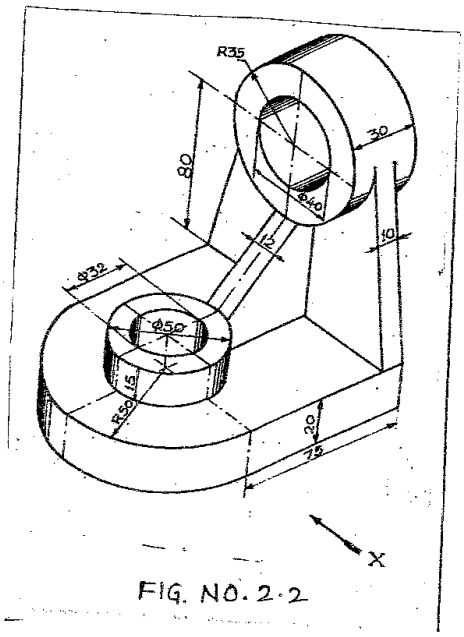

FIG. NO. 2·2

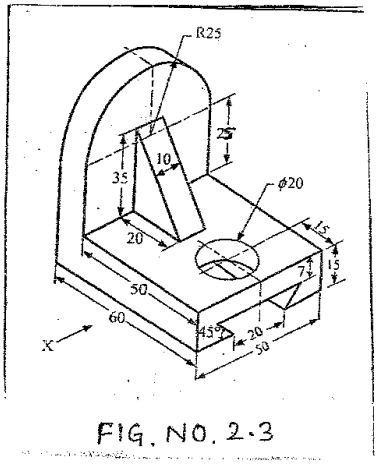

FIG. NO. 2·3

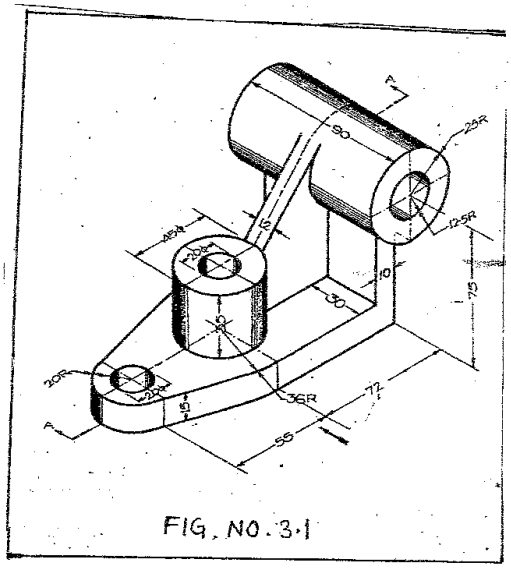

FIG. NO. 3·1

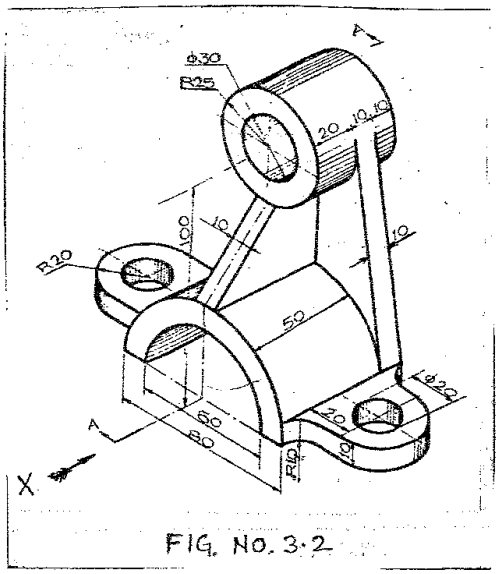

FIG. NO. 3·2

P.T.O.

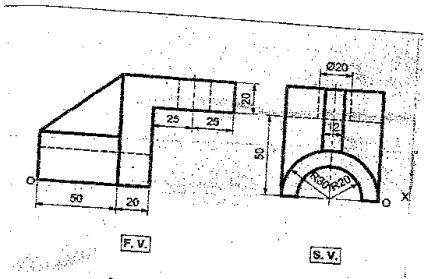

Fig. 4.1

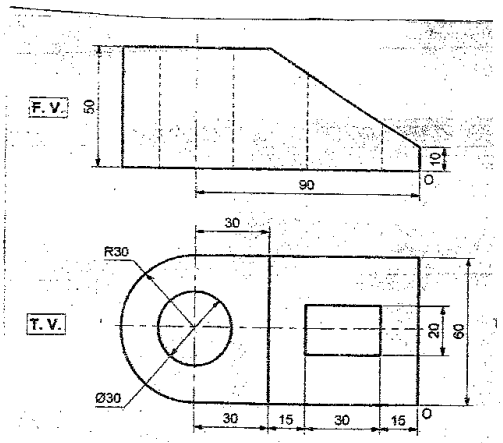

Fig. 5.1

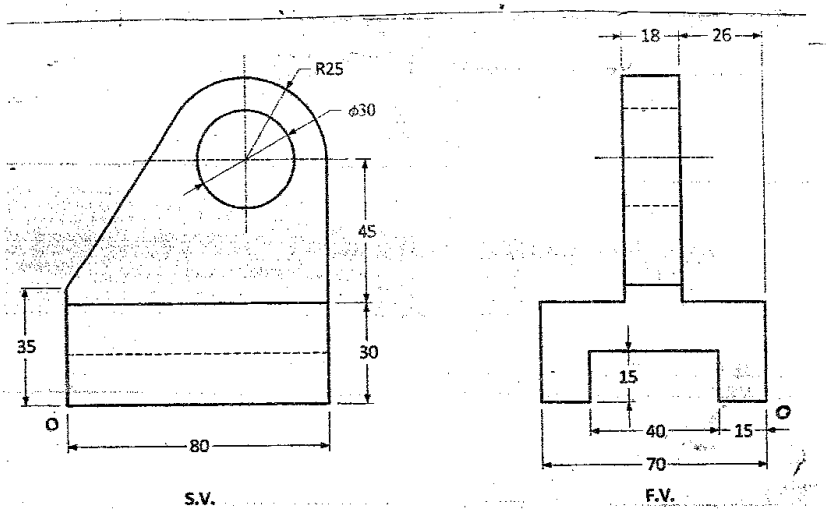

Fig. 5.2

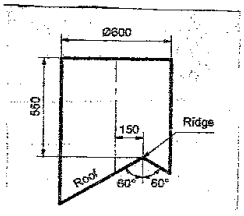

Fig. 6.1

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EVEN TERM END EXAM APRIL / MAY 2016

EXAM SEAT NO. | | | | | | |

LEVEL : - **FOURTH** PROGRAM : **SUGAR MANUFACTURING**
COURSE CODE :- **SME406**
COURSE NAME :- **CAPACITY DESIGN AND CALCULATION**
MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **12 / 05 / 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) Calculate the cane requirement for 2500 TCD plant for one crushing season.

b) State the types of layout.

c) List out cane preparatory devices.

d) Give compositon of lime and sulphar % cane.

e) State the formula for power absorbed by compressing of bagasse.

f) State the formula for power absorbed by steam consumption of the turbo alternator.

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

a) State the matter to be kept in mind while planning the layout.

b) Draw neat sketch of roller shell of the mill with dimension.

c) Calculate the M.T. of fibre/hour handelled by a milling plant of 800mm X 1600mm of five mill tandom having fibrizor, the mill speed is 12m/min, crushing 2400 M.T./day.

d) Calculate the H.P. of the pump if head from section into delivery is 30m and loss of head in pipe is 4m and it is medium size pump. Plant capacity 3000 TCD, M.J. % cane = 95%.

e) Calculate capacity of lime slaker for 2500 TCD plant.

f) Calculate capacity of sulphur burner for 2500 TCD plant.

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

a) Explain criteria for the selection of the site for a sugar factory.

b) Describe factors influencing capacity of mill.

c) Calculate the capacity of juice weighing scale and imbibition water weighing scale for 5000 TCD plant.

P.T.O.

Section – II	Marks

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

a) Explain in short function of vacuum filter.

b) Calculate quantity of water evaporated from data given below Inlet Bx-15; outlet Bx-18; quantity of juice -200MT.

c) What is mean by multiple effect evaporation?

d) Explain in short function of hopper.

e) Explain function of juice heater.

f) Explain the term clarifier in short.

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

a) Calculate the capcity of vacuum filter for 3000 TCD plant.

b) Calculate the capacity of countinuous clarifier for 4000 TCD plant from data given below i) Retention Time – 2.5Hr ii) Clear juice % cane 98%.

c) Calculate the number of tubes and H.S. required for 2000 TCD plant for juice heater.

d) Explain the term specific evaporation.

e) Calculate the quantity of vapour generated in evaporator body for 4000 TCD Plant. Inlet Bx-15 Out let Bx 62, M.J. % cane – 98%.

f) Calculate the number of pan required for 3000 TCD plant from data given below for A m/c. i) A m/c % cane – 30% ii) Capacity of pan – 40MT/Strike iii) Boiling time 2.5 Hr. Assume data if required.

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

a) Design vapour cell assumbly from data given: H.S. -1000m^2, Evaporation rate 50kg/m^2/Hr. Calculate Number of tubes & Tube plant diameter.

b) State and explain the factors that affects design and performance of vacuum pan.

c) Calculate capacity of Hopper and grader from data given below

Crushing /day – 4000 TCD; Recovery % cane – 13%.

Assume data if any required.

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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EVEN TERM END EXAM APRIL/MAY -2016

EXAM SEAT NO. | | | | | | |

LEVEL: FOURTH | PROGRAM: SUGAR MANUFACTURING

COURSE CODE: SME408 | COURSE NAME: SUGAR FACTORY MAINTENANCE

MAX. MARKS: 80 | TIME: 3 HRS. | DATE: 18/04/2016

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) What is mean by season and off season of sugar factory?

b) Write the use of equipment card.

c) State the purpose of lubrication.

d) State the RPM of mill tandom

e) State the function of cane canier.

f) List out the cane preparatory devices.

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

a) List out factors affecting off season maintenance of sugar factory

b) Write safety recommendations of hydraulic system.

c) Explain general hints regarding lubrication.

d) Explain equipment history card.

e) Explain elements common to effective maintenance.

f) Write procedure of preventative maintenance in sugar factory.

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

a) Describe maintenance of mill section during shutdown.

b) Describe lubrication of system engine.

c) Describe equipment card with specification detail.

Section – II Marks

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

a) What is purpose of absorbtion tower in reaction tank?

b) Write the composition of bross tube.

c) Write tube length of evaporator body.

d) How much pressure is applied to check the calendria of pan

e) Write the RPM of batch type centrifugal machine.

f) Define syrup.

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

a) What are the precautions to be taken during maintenance of annual period?

b) Explain the procedure of tube testing of evaporator body.

c) What are types of cleaning explain any one type.

d) What are the various trouble shooting of pan statron.

e) Explain off season maintenance of crystalizer.

f) What are the types of centrifugal machine, how to repair & maintain it in off season explain any one.

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

a) Explain the off seasoned maintenance & pumps valves.

b) Explain maintenance of Gross Hopper in off season.

c) Draw net sketch of evaporator body set with label.

d) Explain off season maintenance of pan.

e) Explain off season maintenance of Juice heater.

f) Explain off season maintenance of sulphur burner.

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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EVEN TERM END EXAM APRIL/MAY. -2016

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **SUGAR MANUFACTURING**
COURSE CODE :- **SME302/SM202/S202**
COURSE NAME :- **BASIC SUGAR ENGINEERING**
MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **20 / 04 / 2016**

Instruction :-

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

Marks

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

a) What is thermodynamics?

b) Define open system with example.

c) What is thermal equilibrium?

d) Define working substance.

e) Define air cycle of thermodynamic.

f) State Charle's law.

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

a) Write the assumptions of thermodynamic cycles.

b) Write the conditions of reversibility of thermodynamic cycle.

c) What is perfect gas equation? Give its significance.

d) Apply first law of thermodynamics to Boiler.

e) Give the statement of Clausius & Kelvin Planks. Regarding second law of thermodynamics.

f) Write the relation between cycle and engine.

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

a) State the types of thermodynamic cycle and explain any one in brief.

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

c) State first law of thermodynamics and apply this law to condenser.

P.T.O.

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

a) List out cane preparatory devices.

b) Define mill ratio.

c) Write GCV and NCV for dry Bagasse.

d) What is the function of superheater?

e) What is water tube boiler and fire tube boiler?

f) Write the function of magnetic separator.

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

a) Explain construction and working of feeder table.

b) Explain under feed roller with neat diagram.

c) Draw neat sketch of fibrizer.

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

e) Write different drives for milling tendom and explain any one.

f) Draw steam cycle used in sugar factory.

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

a) Describe Messchaert groov with neat sketch.

b) State types of furnace and explain any one with neat sketch.

c) Explain Mollier chart with neat sketch.

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B-1 CR-23 (1)

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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EVEN TERM END EXAM APRIL / MAY 2016

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **SME401/SM301**

COURSE NAME :- **SUGAR ENGINEERING**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **22 / 04 / 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 should be the length of the inclined portion of cane carrier?

b) Write the capacity formulae for conventional mill?

c) What is the function of the mill?

d) How much Kg of air required for production of SO_2 gas from 1kg of sulphur?

e) Write the industrial safety Equipments used in sugar Industry.

f) Why dry air is to be supplied to the sulphur furnace?

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

a) Explain the size of the mill.

b) Explain indetail the drive of mills.

c) Write the actual contents and permissible units prescribed by pollution Board for the effluent water form sugar Industry.
i) pH ii) BOD iii) COD iv) Dissolved solids v) suspended solids vi) Oils and Grease.

d) State the importance of temperature control in sulphur furnace.

e) Describe unit operations in Sugar Industry where controllers are essential.

f) Specify the cold water requiring units and why?

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

a) Discuss the general effects of operating conditions in milling efficiency.

b) Describe water management in the 2500 TCD sugar Industry. What is influent water and its treatment?

c) i) Describe purpose of Instruments in sugar Industry.
ii) Calculate air compressor capacity for Sulphur Burner used in sugar Industry (TCD-2500 Sulphur consumption 0.04%on cane)

P.T.O.

Section – II

Marks

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

a) Mention the factors on which steam generated from Bagasse depends.

b) State the purpose of external treatment of water used in Boiler.

c) Define G.C.V. and N.C.V.

d) State the importance of Bagasse storage.

e) Differentiate live steam and exhaust steam.

f) State the effect of silica present in boiler water.

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

a) Give the characteristics of feed water used for High Pressure Boiler.

b) State the significance of De superheating.

c) State importance of hydraulic test in Boiler.

d) Explain the process of blowing down the boiler.

e) Find out quantity of steam available from bagas-se in 2500 TCD sugar plant.

f) Write characteristics of steam used in turbine.

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

a) Describe the working of condensing steam turbine.

b) Define Heating surface of Boiler and state the major factors affecting Heating surface of Boiler.

c) i) State the function of transformer used in Sugar Industry.

ii) State use of condensate in sugar Industry also mention characteristics of Condensate Water.

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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EVEN TERM END EXAM APRIL/MAY. -2016

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **SUGAR MANUFACTURING**
COURSE CODE :- **SME307/SM307/S307**
COURSE NAME :- **MASS & HEAT TRANSFER**
MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **22 / 04 / 2016**

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

Marks

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

a) Define Radiation.

b) Write the factors affecting the value of convective heat flux.

c) State the principle of evaporation by steam.

d) Define conduction.

e) Name various types of evaporator.

f) State Fourier's Law.

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

a) Define heat and thermal conductivity and write and equation for heat flow through a cylinder.

b) State Kirchoff's and Boltzmann Law.

c) Explain counter current flow with neat sketches.

d) Define economy and capacity of the evaporator.

e) Explain forced convection.

f) An evaporator operating at atmospheric pressure is fed at a rate of 10,000 Kg/Hr of weak liquor containing 4% caustic sode and is to be concentrate to contain 25% solid caustic soda. Find capacity of evaporator.

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

a) Explain i) Parallel flow in Heat Exchanger ii) Natural convection

b) A furnace is constructed with 0.20 meter of fire brick, 0.10m of insulating brick and 0.20m of building brick. The inside temperature is 1200K and outside temperature is 330K. If the thermal conductivities of fire brick, insulating brick and Building brick are 1.4 w/mK, 0.21w/mK and 0.7w/mK respectively Find

i) Heat loss per unit area. ii) Temperature drop over fire brick.
iii) Temperature at the junction of fire brick and insulating brick.

P.T.O.

c) An evaporator operating at atmospheric pressure is fed with 10000 kg/hr of weak liquor containing 5% solute and is to be concentrated to obtain 20% solute solution. The steam is available at pressure corresponding to saturation temperature of 126^0C and Boiling point rise is 6^0C. Calculate
i) Quantity of water evaporator per hour ii) Steam consumption per hour
iii) Economy.

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

a) Define Molecular diffusion.

b) Define Liq-Liq Extraction.

c) Define solubility of solute.

d) Define Dry bulb temperature.

e) State Raoult's Law.

f) Define Boiling point.

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

a) Explain crystal formation.

b) Name different Drying Equipments.

c) State the limitation of Mc Cabe Thiele Method.

d) Draw a neat diagram of simple distillation Unit.

e) State any one process in Liq-Liq extraction.

f) Explain Mechanically agitated vessel in detail.

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

a) Describe briefly Azeotropes with help of neat diagram.

b) Describe Drum dryer with help of diagram. Define drying.

c) State principle of crystallization and explain solubility curves in detail with respect to super saturation.

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