GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

(An Autonomous Institute of Govt. of Maharashtra)

EVEN TERM END EXAM APRIL/MAY -2017

EXAM SEAT NO. | | | | | | |

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

COURSE CODE:**SME307** COURSE NAME: **MASS & HEAT TRANSFER OPERATIONS.**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **25/04/2017**

Instruction:-

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

Marks

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

a) Write an equation for heat flow through a composite wall with units.

b) Define Radiation.

c) Name the three mode of heat transfer.

d) Define Latent heat.

e) Define evaporator economy.

f) Define counter-current flow.

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

a) Explain overall heat transfer coefficient.

b) Differentiate between film wise & drop wise condensation.

c) Derive an expression for heat flow through a cylinder.

d) State and explain Kirchoff's Law.

e) Explain the different types of evaporator used in process industries.

f) Draw a neat sketch of horizontal tube evaporator.

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

a) Describe Fouries law. Define conduction and convection.

b) Describe any two methods of feeding the multiple effect evaporator system.

c) A pipe of 11.5cm O.D. is covered with two different layers of 5cm & 3cm thickness & 0.053 kcal/hr m^0C & 0.75 kcal/hr m^0C thermal conductivity respectively. Outside temperature of pipe is 200^0C & that of the outer surface of lagging is 38^0c.Calculate the heat loss in kcal/hr per unit length of pipe.

P.T.O.

Marks

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

a) Define the term "Less volatile" in the binary mixture.

b) Define solubility in the context of crystallization.

c) State Raoult's Law.

d) Define moisture content on dry basis.

e) Define crystallization.

f) Define free moisture content.

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

a) Describe process of crystal formation in brief.

b) Draw a neat and well labeled diagram of fractionating column used in distillation process.

c) Explain tray dryer with diagram.

d) Explain packed tower column for absorption.

e) Write down three steps involved in Liquid-Liquid extraction process and the names of extraction equipments.

f) Explain azeotropes in brief.

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

a) State the purpose of rectifying and stripping section in fractioning column.

b) State the advantages of packed towers in absorption.

c) State any four qualities to be considered while selecting a solvent for extraction.

d) Compare Continuous dryer and Batch dryer with suitable examples.

e) Explain vacuum crystallizer uses in sugar industry.

f) Explain differential distillation.

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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EVEN TERM END EXAM April/ May 2017

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **SME305**

COURSE NAME :- **SUGAR FACTORY EQUIPMENT**

MAX. MARKS : **80** TIME : **3 HRS.** DATE: - **21 / 04 / 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) State the function of leveler.

b) Explain in short clear juice heater.

c) Explain in short Fibrizer.

d) State the function of lime slacker.

e) Explain in short tray less clarifier.

f) State the principle of clarifier.

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

a) Explain the term plate type juice heater.

b) What is mean by dynamic juice heater, explain the same?

c) State constructional details of Sulphitation tank.

d) Write stoppage during crushing season.

e) Explain working of vacuum filter.

f) Explain the term Rapi / door 4-4-4 with diagram.

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

a) Explain the term water and juice-weighing scale in detail.

b) Explain construction and working of Sulphur furnace with neat sketch.

c) Explain the term MAPCON system in juice clarification in detail.

PTO

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

a) Write the tube plate thickness of evaporator body.

b) What is the diameter of centre downtake of evaporator?

c) Write the function and RPM of mechanical circulator for A massecuite pan.

d) Write any four advantages of continuous centrifugal machine.

e) What is the speed of sugar elevator belt?

f) What is the function of sugar grader?

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

a) Explain how to start evaporator set.

b) Write the advantages of continuous pan.

c) Draw neat sketch of vertical crystallizer.

d) Explain water trial of batch type pan.

e) Explain the construction of water cooled crystallizer.

f) Explain the construction of grass hopper.

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

a) Draw neat sketch and explain different parts of evaporator body.

b) Draw neat sketch of lowhead pan and write design specification of batch type pan.

c) Explain construction and working of batch type centrifugal machine.

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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EVEN TERM END EXAM April/ May 2017

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **SME302**

COURSE NAME :- **BASIC SUGAR ENGINEERING**

MAX. MARKS : **80** TIME : **3 HRS.** DATE: - **19 / 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 properties of system.

c) State the first and second law of Thermodynamics.

d) What is thermal Equilibrium?

e) Define perfect Gas.

f) State Boyle's Law and Charle's Law.

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

a) Write the relation between cycle and engine.

b) Write the conditions of reversibility of thermodynamic cycle.

c) Derive the Equation of perfect gas and state various ideal gas processes.

d) A liquid mass 4Kgs is heated from 15^0C to 100^0C. Calculate the specific heat of the liquid, if 714 KJ is required to be accomplish from this

e) Give the statement of Clausius and Kelvin Planks regarding second law of thermodynamics.

f) Derive Gas equation of Perfect Gas and give its significances.

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

a) Draw P-V & T-Q diagram for Rankine cycle and explain different process.

b) State the types of thermodynamics cycles and explain any one in brief.

c) Define air cycle and write the assumptions of thermodynamic air cycle.

P.T.O.

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

a) List out cane preparatory devices.

b) Write the objective of magnetic separator.

c) Define hydraulic loading.

d) Define dry saturated steam.

e) Write application and advantages of superheated steam.

f) State the types of draught.

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

a) Explain the function and construction of cane carrier.

b) Explain the construction of Fibrizer with neat sketch.

c) Explain Mess chart groove with neat sketch.

d) Draw neat sketch showing the steam distribution in sugar industry.

e) Write the factors, which effect the mill operation.

f) Define bagasse and write physical and chemical properties of bagasse.

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

a) Describe three rollers mill unit with neat sketch.

b) Draw and explain Temperature Entropy Chart in detail.

c) i) Write difference between water tube boiler and fire tube boiler.

ii) Write the parameters of boiler feed water.

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EVEN TERM END EXAM April/ May 2017

EXAM SEAT NO. | | | | | | |

LEVEL : - **SECOND** PROGRAM : **COMMON**

COURSE CODE :- **CCF/CCE202/X106**

COURSE NAME :- **COMMUNICATION SKILLS**

MAX. MARKS : **40** TIME : **2HRS.** DATE: - **20 / 04 / 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 (Answer the following questions in 3-5 sentences).** (08)

a) Write importance of oral communication for engineers.

b) Write four examples of oral communication.

c) State the advantages of written communication.

d) Define the term artefacts.

e) Write two advantages of LCD projector.

f) Explain panel interview.

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

a) Explain communication process with suitable diagram.

b) Explain mechanical and physical barriers.

c) Write strengths of media aided presentation.

d) Explain 'Media plays an important role in the communication processes'.

e) Write four advantages and disadvantages of oral communication.

f) Write short note on mock interview.

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

a) Write any four principles of effective communication.

b) Write an application for the post of Design Engineer in Tata Motors, Pune. Give your resume.

P.T.O

c) Prepare a pie-chart which shows the distribution of sales of the car industry among six car companies :

General Motors	: 37%
Maruti	: 22%
Ford	: 04%
Tata	: 12%
Hyundai	: 13%
Fiat	: 12%

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EVEN TERM END EXAM APRIL/MAY -2017

EXAM SEAT NO. | | | | | | |

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

COURSE CODE: **SME303** COURSE NAME: **BASIC SUGAR TECHNOLOGY**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **20/04/2017**

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) Define Bagasse

b) Define fibre

c) What is clarified juice?

d) Write importance of refractometer in sugar industry.

e) Write brix & PH of mixed juice.

f) What is primary juice & secondary juice?

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

a) Explain compound imbibition system.

b) Define the term plane polarized light & explain the same.

c) State and explain optical method of sugar analysis.

d) State the composition of cane juice.

e) Explain the role of amino acid in sugar manufactry processes.

f) Write note on phosphoric acid & its preparation.

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

a) Draw neat sketch of Hand refractometer & state its working principle & construction.

b) Draw neat sketch of polarimeter & explain its construction & working principle.

P.T.O.

c) Explain the role of Time, Temperature, PH & quality of cane in manufacturing processes.

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

a) Write temperature & PH of clear juice.

b) Define PH

c) State retention time required for sulphitation tank.

d) Define Imbibitions.

e) Define mixed juice.

f) Why raw juice is heated upto 70^0C in first step?

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

a) Draw neat sketch showing compound imbibition system.

b) State the reaction taking place during clarification

c) Explain the working of sulphitation tank.

d) Explain the procedure of preparation of milk of lime.

e) Explain filtrate treatment.

f) Explain precaution to be taken while operating clarification process.

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

a) Draw neat diagram showing steam consuming units of sugar factory.

b) Explain main objects of clarification.

c) Explain importance of milk sanitation.

d) Explain procedure of preparation of SO_2 gas

e) Explain syrup clarification

f) Explain double sulphitation process.

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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EVEN TERM END EXAM April/ May 2017

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **SME408**

COURSE NAME :- **SUGAR FACTORY MAINTENANCE**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **21 / 04 / 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 o 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 preventive maintenance?

b) Write the function of maintenance department.

c) Write the RPM of mill.

d) Which devices used for lubrication?

e) Write the function of cane carrier.

f) Write any four reasons of failure of machinery.

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

a) Describe stoppages during crushing season in sugar factory.

b) Explain equipment history card.

c) Write the need of lubrication.

d) Explain the factors, which effect the mill efficiency.

e) Explain the maintenance of feeder table.

f) Explain normal problems of mills.

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

a) Describe the factors affecting off-season maintenance of sugar factory.

b) Describe equipment card with specification details.

c) Explain correct lubrication as a tool for preventive maintenance.

P.T.O.

Section – II	Marks

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

a) State what are the type of juice heater.

b) What are the chemical used in cleaning procedure of evaporator?

c) What is mean by periodical schedule?

d) State the function of pug mill and transient heater.

e) What are the types of centrifugal machine?

f) What is mean by dust catcher? What is its purpose?

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

a) Explain off-season maintenance of clarifier.

b) State and explain trouble shooting of pump.

c) What are the method used for removing of scale? Explain.

d) List out precautions and maintenance during scheduled and annual shutdown of evaporator.

e) Explain various troubles shooting at pan station.

f) Explain maintenance of guideline for grasshopper and elevator.

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

a) Explain off-season maintenance of lime slacker unit.

b) Explain annual maintenance of SO_2 gas generation unit.

c) Explain the maintenance of crystallizer during season.

d) Explain the term overhandling and repairs.

e) What is mean by annual maintenance? Explain the same?

f) Explain the off-season maintenance of batch type machine.

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EVEN TERM END EXAM APRIL/MAY-2017

EXAM SEAT NO. | | | | | | |

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

COURSE CODE:**CCF103/CCE103/X109/X103**

COURSE NAME: **CHEMISTRY OF ENGINEERING MATERIALS.**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **24/04/2017**

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 if necessary.
7) Use of Mobile is strictly prohibited.

Marks

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

a) Write fundamental particles of atom with respect to charge & mass.

b) Define atom. Why the structure of atom is neutral?

c) Define Conductor & Electrolyte.

d) Distinguish between metallic conduction & Electrolytic condition.(any two points).

e) Write impurities in water.

f) Write any two reactions of hard water with soap.

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

a) Write the formation of NaCl molecule. Which is the type of bond?

b) With diagram explain electrolysis of $CuSO_4$ solution by using Pt electrodes.

c) Which is the method used for coating irregularly shaped articles & explain it with diagram?

d) Write classification of corrosion. Which film is called as protective type & why?

e) Write disadvantages of hard water for textile industry & dying industry.

f) Explain with diagram ion exchange method to remove total hardness of water.

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

a) State & explain Hund's rule of maximum multiplicity.

b) Calculate the time in seconds in which 0.3gms of copper is deposited from $CuSo_4$ solution when a current of 0.5 amp is passed. The chemical equivalent (eq.wt.)of Cu being 31.6.

c) Write factors affecting atmospheric corrosion.

d) Distinguish between hard water & soft water.(any four points)

e) With chemical reactions explain sterilization of water by using bleaching powder.

f) What are the disadvantages of scale formation in boilers?

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

a) Define the terms 1) Mineral 2) Ore.

b) Write any four application of monel metal alloy.

c) Give any four function of lubricant.

d) Write with example classification of composite materials.

e) State two constituents of paint and give one function of each.

f) Give the characteristics of good insulator.

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

a) Write chemical reactions involved in the zone of reduction of blast furnace.

b) Distinguish between calcination and roasting.

c) Define alloy. Give the classification of alloy. State the purposes of making alloy

d) Explain with diagram gravity separation method.

e) Define oil paint . Write characteristics of good oil paint.

f) What is lubrication ? Explain the Fluid film lubrication with diagram.

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

a) Define lubricant. Suggest the suitable lubricant for

   i) Gears

   ii) Cutting tools

   iii) Concrete mixture machine

b) Give four points of difference between paint and varnish.

c) Define polymerization. Give the types of polymerization. State the characteristics of thermosoftening plastic.

d) Write any four uses of rubber based on it's different properties.

e) Define adhesive. Write characteristics of good adhesives.

f) How is thermocole prepared? Write the uses and properties of thermocole.

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EVEN TERM END EXAM APRIL/MAY-2017

EXAM SEAT NO. | | | | | | |

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

COURSE CODE: **SME306** COURSE NAME: **MECHANICAL & FLUID FLOW OPERATION**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **24/04/2017**

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 if necessary.
7) Use of Mobile is strictly prohibited.

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

a) Define work

b) Define Ideal screen.

c) Define unit operation

d) Define crushing efficiency.

e) Define Heat.

f) What is meant by Vortex formation?

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

a) Explain setting zones in Continuous thickener, with help of a neat diagram.

b) Define screening. Write application of screening in industries.

c) Mention any four purposes for which liquids are agitated. Draw simple diagram of a typical agitated vessel.

d) Compare Crushing & Grinding operation.

e) Define 1) Diffusional separation.

2) Mechanical separation.

f) State Bond's law & define work index.

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

a) Describe the construction & working of vibrating screen, with help of diagram. Also explain principle involved in the vibrating screen.

b) What is meant by baffles? Explain the necessity of baffling in an agitated vessel. Explain any two paddles type impeller with help of diagram.

c) Describe the construction & working of a Ball- Mill, with the help of diagram. Mention any two advantages of Ball-Mill.

P.T.O.

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

a) Write fundamental law governing the working of clarifiers.

b) Write principle of operation of hydraulic jig.

c) State the types of filtration.

d) Define filtrate.

e) What is ideal fluid?

f) Define steady flow.

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

a) Explain construction of Rake classifier.

b) Draw neat sketch of plate & frame filter press.

c) What is compressible fluid and incompressible fluid?

d) Write the properties of fluid.

e) What is laminar flow and turbulent flow?

f) Write advantages of centrifugal pump.

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

a) Explain construction and working of rotary drum filter.

b) Describe Reynold's experiment in brief.

c) Describe construction and working of reciprocating pump.

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EVEN TERM END EXAM April/ May 2017

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **MECHANICAL /SUGAR MANUFACTURING**
COURSE CODE :- **MEE309/ME209/SM207**
COURSE NAME :- **ELECTRICAL TECHNOLOGY**
MAX. MARKS : **80** TIME : **3 HRS.** DATE: - **05 / 05 / 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) Define Electric potential and state its unit.

b) State i) Kirchoff's current law. ii) Kirchoff's voltage law.

c) Define balanced and unbalanced load.

d) State any two uses of digital energy meter.

e) Define the terms i) Frequency ii) Time-period.

f) Find the relation between line and phase value of voltage in case of star connected load.

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

a) Write difference between each of following.
Primary and Secondary measuring instrument.

b) Define and state the SI units of electric power and electrical energy.

c) A 230V, 100W incandescent lamp is connected across single phase 230V AC supply. Calculate i) The current drawn by the lamp ii) Resistance of the lamp.
iii) How many units of electrical energy does the lamp of 100watt consume when it is kept on for 10 hours?

d) State any four advantages of polyphase circuits over single phase circuit.

e) State and explain laws of electromagnetic induction.

f) Define Earthing and explain any one method of earthing in detail.

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

a) Draw a balanced delta connected load (resistive). State the relation between the line and phase value of voltages and currents in it.

b) With neat sketch, explain the construction and working of Megger in detail.

c) Derive the expression for the equivalent resistance if the resistances are connected in series.

P.T.O.

d) Describe the working of a purely inductive circuit on an a.c. supply.

e) Draw a series RC circuit connected to an a.c. source and draw vector diagram and label the current and voltages in it.

f) Define Reactance, impedance with their units. Also draw impedance triangle.

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

a) State emf equations for single phase transformer.

b) What is meant by ideal and practical single phase transformer?

c) State principle of dielectric heating process.

d) State applications of DC motors (any four)

e) Give at least four applications of stepper motor.

f) State the methods to change the direction of rotation of 3-phase induction motor.

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

a) Draw no load current characteristic for practical transformer and explain no load losses.

b) 2 KVA, 230V / 115V single phase transformer has iron losses 50 Watt and 350W copper losses at full load condition. Calculate the % efficiency and % regulation if the secondary voltage at full load is 110volt and the power factor is 0.8 lagging.

c) Draw labelled diagram of dielectric furnace unit and state four applications.

d) State and elaborate requirements for the good illumination scheme for typical area (any one)

e) Draw and explain in short by equations the speed-torque characteristics of DC shunt and DC series motor.

f) State the need for starter in 3-phase squirrel cage induction motor and explain with neat sketch any one such starter.

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

a) Sketch constructional features of any one type of 1 phase transformer. State two advantages and disadvantages of the same.

b) State types of heating processes, sketch any one the constructional diagram. Explain its working and advantages, disadvantages.

c) State the applications as per the types of electric furnaces each at least two.

d) Explain with neat sketch principle of working of servo motor and its applications.

e) Explain the significance of rotating magnetic field in 3-phase induction motor. What is meant by slip speed?

f) Give the important function of star-Delta starter for 3-phase induction motor. Draw the circuit diagram and comment on the star-delta starter types.

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EVEN TERM END EXAM April/ May 2017

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **SME502**

COURSE NAME :- **SUGAR INPLANT TRAINING**

MAX. MARKS : **100** TIME : **3 HRS.** DATE :- **02 / 05 / 2017**

Instruction :-

1) Figure to the right indicate marks.
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 o request.
5) Assume additional suitable data necessary.
6) Use of Mobile is strictly prohibited.

Marks

Question No.1 is compulsory and attempt any FOUR from Question No.2 & Question No.7

Q.1 Give your observations while working in the Sugar Factory (ON any TEN) (20)

a) Different varieties of sugar cane.
b) No of Mills and No. of Boilers.
c) Steam temperature and pressure.
d) Capacity of cane weigh bridges and mixed juice tank.
e) Pol, moisture and quantity of Bagasse.
f) R.P.M. of Prime Movers.
g) Moisture contain in sugar and filter cake.
h) R.P.M. of clarifier.
i) pH of Sulphited juice and clear juice.
j) Temperature of imbibition water and its quantity.
k) Brix and purity of syrup.
l) Give the names of cane preparatory devices.

Q.2 a) Describe the method of testing of clarifier and give any four causes of high mud level. (10)

b) Draw neat sketch of milk of lime preparation unit, storage, grit separator unit, describe preparation of milk of lime. (10)

Q.3 a) Explain multiple effect evaporation with diagram. (10)

b) Describe syrup Sulphitation tank in detail. (10)

Q.4 a) Give short note on working of juice heater. (10)

b) Describe the working of ETP. (10)

Q.5 a) Describe treatment of "C massecuite" in the crystallizer. (10)

b) Give the name of clarifying agents with details. (10)

Q.6 a) Explain the merits and demerits of Batch and continuous pan. (10)

b) What are the types of groove; explain in short with sketch. (10)

Q.7 a) Draw ray diagram 3 massecuite boiling scheme with Brix and purity. (10)

b) Describe sugar Hopper, elevator and Grader with sketch. (10)

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

(An Autonomous Institute of Govt. of Maharashtra)

EVEN TERM END EXAM APRIL/MAY -2017

EXAM SEAT NO. | | | | | | |

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

COURSE CODE: **CCF110/CCE110/X111/R112** COURSE NAME: **APPLIED MECHANICS**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **02/05/2017**

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) Define concurrent force system with any one of field example.

b) State polygon law of forces.

c) Explain funicular polygon with its use.

d) State any two laws of friction.

e) Explain the relationship between angle of friction & angle of Repose.

f) Draw free body diagram of body resting on rough inclined surface.

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

a) Resolve the 200N force along 30^0 & 20^0 on either side with neat sketch.

b) Find resultant in magnitude & direction of forces 1kN, 2kN, 3kN, 4kN, 5kN and 6kN acting from center of hexagon towards its angular points respectively. (solve by analytical method)

c) Solve Q.No.2 (b) by graphical method.

d) An electric bulb of 5N weight is hanging from ceiling. Its wire is pulled by a force acting horizontally such that the wire makes an angle of 60^0 with ceiling. Find the magnitude of pulled force & tension in the wire.

e) Find the support reaction of beam ABCD supported at 'A' & 'C' & portion CD is overhang. The given span is AB=BC=2m & CD=1.5m. The UDL of 20kN/m is acting on 'B' to 'D' with downward point load of 50kN acting at point D free end.

f) The body of weight 100N will begin to slide when horizontal plane is raised gradually upto 22^0. What is horizontals force required to drag the same body.

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

a) The forces 50N, 30N, 20N & 15N are acting on four sides of 10cm square box respectively on clockwise direction. Find resultant from force & locate from 50N side.

b) Three forces are acting along three side of an equilateral triangle of side 2m with forces 15N, 20N & 10N respectively. Find resultant from force of side 10N.

c) A solid sphere of radius 10cm weighing 1.2KN is hung with steel cable 50cm from vertical smooth wall to its center. Find the contact force between wall & solid sphere & tension in cable.

P.T.O

d) Beam AB of span 6m is hinged at A & roller support at B carrying vertically downward point load of 12kN at 2m from support A & inclined point load of 10kN inclined at 30^0 anticlockwise from horizontal at 4m from support A, Also udl of 5kN/m is acting over entire span. Calculate support reaction by analytical method.

e) Solve Q.No.3 (d) by graphical method.

f) A ladder of 3.5m with weight 150N is rested on smooth vertical wall & rough horizontal surface with 18^0 inclination to horizontal. What is force (pull) required at horizontal contact surface to keep ladder in equilibrium when man weighing 750N stands on its mid length. Take coefficient of friction between rough horizontal surface is 0.25.

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

a) Define Rectilinear motion.

b) Differentiate displacement & distance.

c) Define angular velocity.

d) Define energy.

e) Define work done by torque.

f) State law of machine with meaning of each notation.

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

a) A composite section as shown in figure in which a equilateral triangle is rested on a square. Determine centroidal position of the section from reference axes X& Y

b) A circular disc of 500mm diameter is cut off from a sheet of radius 500mm find the centroid of the remainder portion from reference axes X&Y as shown in figure.

c) A car staring from rest & increases speed from 0 to 10m/s with constant acceleration 0.5 m/sec^2 runs at this speed for a time of 30 seconds & finally comes to rest, with deceleration of $0.3m/sec^2$. Find the total distance travelled by car.

d) A wheel moves from 200rpm to 150 rpm in 10 seconds find the retardation & time required to come to stop.

e) A bullet weighing 1N is fired with velocity 400m/sec. into a wooden block weighing 100N. If the bullet remains embedded in the block, calculate the velocity of the block after impact.

f) In a simple lifting machine 100N is lifted by an effort of 8N at an efficiency 62.5%. Find the effort lost in friction & the load lost in friction.

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

a) Determine center of gravity of a solid composite body as shown in figure from the base of body.

b) A stone is dropped into well. Its sound is heard after 3 seconds. The velocity of sound is 320 m/sec. find the depth of well.

c) A wheel starts from the rest & accelerates at 15 red/sec^2 until it reaches a speed of 300 rpm. With this speed it rotates for 3 minutes & then retards uniformly for 150 seconds & stops. Find total number of revaluations made.

d) In a simple lifting machine the effort required to lift a certain load is 150N. When efficiency is 65%. Find ideal effort of machine.

e) A simple lifting machine lifts a load of 400N & 600N by efforts of 60N & 80N respectively. Find law of machine & efficiency at a load of 800N if velocity ratio of machine is 22.

f) 300 cubic meters of water is to be raised to a tank of height 10 meters in 10 minutes. Calculate the power of the pump required in kilowatt.

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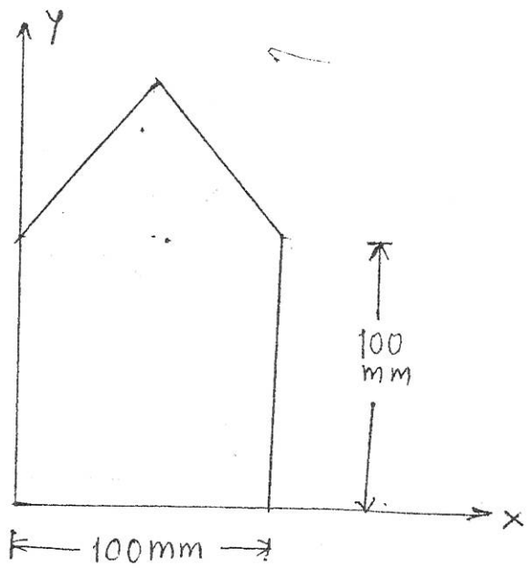
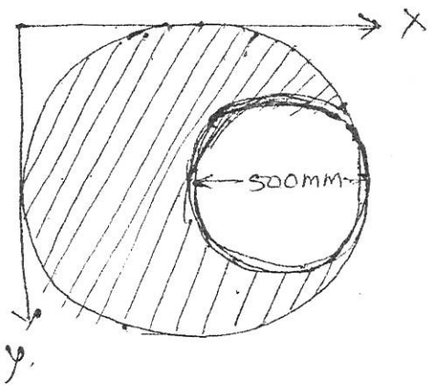
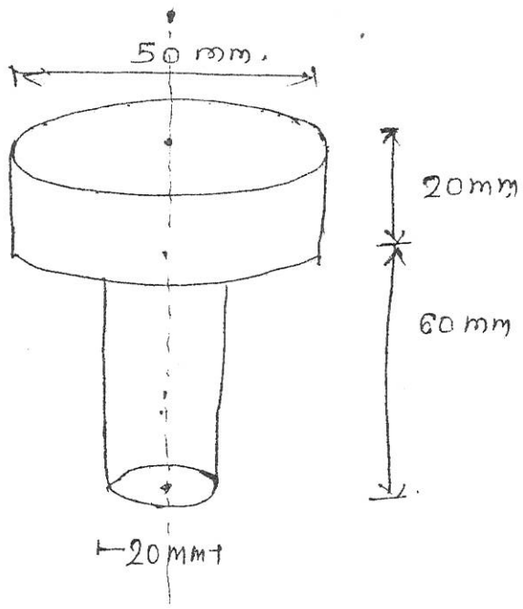
Q.5)
a)



Q.5)
b)



Q.6) a)



GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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EVEN TERM END EXAM April/ May 2017

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **SME406**

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

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **03 / 05 / 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 o 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 formula for power absorbed steam consumption of turbo alternator.
b) Calculate cane requirement for 3500 TCD plant for one season.
c) State importance of Trash plate.
d) Explain in short importance of imbibition.
e) State function of lime preparation unit.
f) Explain the term Raw juice.

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

a) State and explain criteria for site selection of plant.
b) Calculate the M.T. of fibre/Hr. handled by mill plant 760 X 1800mm size of five milling tendom having Fibrizer and speed of mill 9 mtr/ minute and crushing 3500TCD.
c) Explain the term availability of cane and location of plant lay out.
d) Calculate the capacity of juice weighing scale for 6000TCD plant.
e) Draw net sketch of compound imbibition system.
f) Calculate the capacity of lime slacker from data given below
Cr. 2200 TCD
Lime consumption 0.17%cane

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

a) Calculate the capacity of milling tendom by Hugot formula having following data
No. Of roll -12 fibre % cane 14% RPM of turbine = 9000
Size of mill – 84 X 1700mm.
Reduction Ratio – 1500:1

b) Calculate H.P. of pump if head from suction into delivery is 30m and loss of head in pipe is 4 mtr. And it is medium size pump.
Plant capacity 4000 TCD M.J. % cane 93%

c) State and explain factors that affects mill capacity in details.

P.T.O.

Section – II	Marks

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

a) State the velocity of juice in juice heater.

b) Write formula to calculate heating surface of evaporator body.

c) Write S/V ratio for continuous pan.

d) Write formula for gravity factor for centrifugal machine.

e) Write total length and width of gross hopper.

f) Write RPM of batch type and continuous type centrifugal machine.

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

a) Write composition, tube length, ID & OD of juice heater tube.

b) Calculate quantity of syrup generated by evaporator for 5000 TCD plant

Inlet Brix = 14^0, Outlet Brix = 60^0, Clear juice %= 100%.

c) Calculate specific evaporation coefficient

Average Brix of juice = 34.60 & Temperature = 100^0C.

d) Draw neat sketch of Low head pan.

e) Calculate capacity of Pan required for 3000 TCD plant

A m/c % cane = 25%, B m/c % cane = 10% C m/c% cane = 8%

f) State the factors on which capacity of centrifugal machine depends.

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

a) Calculate the capacity of continuous clarifier and vacuum filter for 2500 TCD plant.

b) Calculate heating surface of quadruple effect evaporator and heating surface of individual body.

Capacity = 2500TCD, Clear Juice % cane = 100

Brix % clear juice =15

Brix % syrup = 60.

c) Write design specification of batch type pan.

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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EVEN TERM END EXAM APRIL/MAY -2017

EXAM SEAT NO. | | | | | | |

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

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

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **09/05/2017**

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) Resolve into partial fraction $\frac{1}{x^2 - x}$

b) If $A = \begin{bmatrix} 2 & -1 & 1 \\ 3 & -4 & 0 \end{bmatrix}$ & $B = \begin{bmatrix} 0 & 2 \\ -3 & 1 \\ 4 & -1 \end{bmatrix}$ is the matrix AB is non singular.

c) Evaluate i) ${}^{7}P_{3}$ ii) ${}^{4}C_{3}$

d) Solve the equations by matrix method

$3x + y = 1$

$5x + 2y = 3$

e) Expand the following binomial upto 4th term of the expansion $(1+2x)^{1/2}$

f) Expand $(x+y)^5$ by using binomial theorem.

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

a) Find k if $\begin{vmatrix} 2-k & 7 \\ 3 & -4 & 13 \\ 8 & -11 & 33 \end{vmatrix} = 0$

b) Resolve into partial fraction $\frac{x^3 + x}{x - 9}$

c) If $A = \begin{bmatrix} 2 & 4 & 4 \\ 4 & 2 & 4 \\ 4 & 4 & 2 \end{bmatrix}$ show that A^2-8A is a scaler matrix.

d) Resolve into partial fraction $\frac{x^2 + x + 1}{(x-1)^3}$

e) If $A = \begin{bmatrix} 2 & -3 \\ 3 & 4 \end{bmatrix}$, $B = \begin{bmatrix} 4 & 5 \\ 3 & -2 \end{bmatrix}$, $c = \begin{bmatrix} 3 & -1 \\ 0 & 6 \end{bmatrix}$ Find 3A+4B-2C

f) Find x and y if $\left\{4\begin{bmatrix} 1 & 2 & 0 \\ 2 & -1 & 3 \end{bmatrix} - 2\begin{bmatrix} 1 & 3 & 1 \\ 2 & -3 & 4 \end{bmatrix}\right\}\begin{bmatrix} 2 \\ 0 \\ -1 \end{bmatrix} = \begin{bmatrix} x \\ y \end{bmatrix}$

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

a) Solve the equations by Cramer's rule

$x + y + z = 3$

$x - y + z = 1$

$x + y - 2z = 0$

P.T.O

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

c) If $A=\begin{bmatrix}1 & -3\\ 2 & -1\end{bmatrix}$ & $B=\begin{bmatrix}1 & 0 & 1\\ 2 & -1 & 3\end{bmatrix}$ *verify that* $(AB)^T = B^T A^T$

d) Resolve into partial fraction $\frac{2x+3}{x^2-2x-3}$

e) Show that $\left(\sqrt{3}+1\right)^5 - \left(\sqrt{3}-1\right)^5 = 152$

f) Solve the equation using matrix method

$x+y+x=2$

$y+z=1$

$x+z=3$

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

a) Prove that $\cos ec^2\theta - \cos^2\theta.\cos ec^2\theta = 1$

b) Without using calculator find $\sin 15^0$

c) If $\sin A = \frac{1}{2}$, *find* $\sin 3A$

d) Prove that $\cos 2\theta = 1-2\sin^2\theta$

e) Prove that $\sin\left(\theta+\frac{\pi}{6}\right) - \sin\left(\theta-\frac{\pi}{6}\right) = \cos\theta$

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

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

a) Prove that $\frac{\cos ecA}{\cos ecA-1} + \frac{\cos ecA}{\cos ecA+1} = 2\sec^2 A$

b) Prove that $\sin(A+B) = \sin A\cos B + \cos A\sin B$

c) Simplify $\frac{\cos^2(180^0-\theta)}{\sin(-\theta)} + \frac{\cos^2(270^0+\theta)}{\sin(180^0+\theta)}$

d) Prove that $\frac{\cos 3\theta}{\cos\theta} + \frac{\sin 3\theta}{\sin\theta} = 4\cos 2\theta$

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

f) Prove that $\cos^{-1}\left(\frac{4}{5}\right) + \cos^{-1}\left(\frac{12}{13}\right) = \cos^{-1}\left(\frac{33}{65}\right)$

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

a) If A & B are obtuse angles such that $\sin A = \frac{5}{13}$ & $\cos B = \frac{-4}{5}$. Find tan(A+B)

b) prove that $\cos 3\theta = 4\cos^3\theta - 3\cos\theta$

c) Prove that $\frac{1-\tan 2\theta.\tan\theta}{1+\tan 2\theta.\tan\theta} = \frac{\cos 3\theta}{\cos\theta}$

d) Prove that $\frac{\sin 8x-\sin 5x}{\cos 7x+\cos 6x} = \sin x + \cos x.\tan\frac{x}{2}$

e) Prove that $\tan^{-1}(x)+\tan^{-1}(y) = \tan^{-1}\left(\frac{x+y}{1-xy}\right)$ *if* $xy<1$

f) Prove that $\tan^{-1}(1)+\tan^{-1}(2)+\tan^{-1}(3) = \pi$

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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EVEN TERM END EXAM APRIL/MAY -2017

EXAM SEAT NO. | | | | | | |

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

COURSE CODE: **CCF107/X105/R109/CCE107**

COURSE NAME: **ENGINEERING DRAWING -I**

MAX. MARKS: **80** TIME: **4 HRS.** DATE: **04/05/2017**

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 **TWO** **Marks (08)**

a) On a plan of a field, a line of 1m long is represented on a drawing by a line of 5cm. construct a diagonal scale to read upto 2m and mark the length of 1m, 6 decimetres & 4cm on it.

b) Illustrate & write down application of following lines
   i) Ruled line with zigzag.
   ii) Short dashed medium.

c) Construct a scale of 1cm=0.4m to show metres & decimetres and large enough to measure upto 5m. Show a distance of 4m & 6 decimetres on it.

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

a) Construct an ellipse when the distance of focus from directrix is equal to 60mm & eccentricity=2/3.

b) The length of a top view of a straight line AB parallel to V.P & inclined at 40^0 to HP is 60mm. Its end A is 10mm above H.P is and 25mm infront of V.P. Draw front & Top views & determine the true length of the line AB.

c) Draw the projections F.V & T.V of a 75mm long straight line, inclined at 60^0 to V.P and its one end 15mm in front of it, parallel to and 25mm above H.P.

d) The top view of a 75mm long line measures 55mm. The line is in V.P, its one end being 25mm above the H.P. Draw its projections (F.V. and T.V)

e) End A & B of a line AB is 15mm & 55mm respectively infront of the V.P Elevation length of line is 60mm. it is parallel to XY line & 15mm above it. Draw Two views of the line & find its true length & inclination with V.P

f) The distance between the projectors through the ends of a line 75mm long is 60mm. Its end M is 15mm above HP & 20mm infront of V.P. Draw its two views when it is parallel to V.P. Determine its inclination with H.P.

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

a) Draw an Archemedian spiral of one convolution, the maximum & minimum radii being 80mm & 20mm respectively.

b) Draw a Helix on a cylinder of 50mm diameter of two turns, given pitch equal to 40mm.

c) A disc of diameter 50mm rolls without slip on a plane inclined at an angle of 15^0 to the horizontal. Trace & name the locus of point P on the circumference of the disc.

d) Draw in involute of a hexagon of side 20mm for one complete turn.

P.T.O

e) Draw a hyperbola with asymptotes OB=140 & OA=130 intersecting at an angle of 70^0 and passing trough point P on the curve 36mm from OB & 20mm from OA.

f) A stone is thrown upwards from a building 6m high & in its highest point of flight, it just crosses palm tree 12m high. Trace the path of the projectile, if the distance between the building and the palm tree be 3m. Take suitable scale.

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

a) A circular plate 50mm diameter has its center 30mm above HP & 35mm infront of VP. Draw the three views of the plate when the surface is perpendicular to VP & inclined at 45^0 to HP.

b) A rhombus having diagonals 60mm & 30mm respectively is resting on a corner in VP. The longer diagonal is parallel to HP & inclined to VP such that front view appears as a square. Determine the angle made by the rhombus with VP.

c) A pentagonal plane of side 30mm is resting on HP on one of its side with the corner opposite to that side, 25mm above HP side on HP is perpendicular to VP. Draw three views of the pentagonal plane & find its inclination with HP.

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

a) A cone of 50mm diameter & axis 70mm long is resting on HP on a point of its circumference of base such that its axis is parallel to VP & apex is 50mm above HP. Draw its projections.

b) A pentagonal prism base 20mm side & axis 55mm long, is standing on a corner of its base on HP with its axis inclined at 45^0 to HP & parallel to VP. Draw its projections.

c) A hexagonal pyramid base 25mm sides & axis 60mm long has a corner of base in the HP. Its axis makes an angle of 30^0 with HP & parallel to VP. Draw its projections.

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

a) A hexagonal pyramid base 30mm side & axis 70mm long has its base on HP with an edge of base parallel to VP. A section plane perpendicular to VP & inclined at 45^0 to HP cuts the axis of pyramid 30mm from the apex.
Draw-
   i) Front view (02 marks)
   ii) Sectional top view (03 marks)
   iii) True shape of section. (03 marks)

b) A cylinder of 50mm diameter & axis 70mm long has its axis perpendicular to HP. It is cut by a section plane perpendicular to VP & inclined at 45^0 to HP & intersecting the axis 40mm above the base.
Draw-
   i) Front view (02 marks)
   ii) Sectional top view (03 marks)
   iii) True shape of section (03 marks)

c) A square prism base 40mm side & axis 80mm long, stands vertically on HP with the edges of the base equally inclined to VP. A section plane perpendicular to VP & inclined at 60^0 to HP cuts the axis of prism 15mm from its top end.
Draw-
   i) Front view (02 marks)
   ii) Sectional Top view (03 marks)
   iii) True shape of section. (03 marks)

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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EVEN TERM END EXAM April/ May 2017

EXAM SEAT NO. | | | | | | |

LEVEL : - **FOURTH** PROGRAM : **SUGAR MANUFACTURING**
COURSE CODE :- **SME402**
COURSE NAME :- **SUGAR TECHNOLOGY-I**
MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **27 / 04 / 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 o request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Section – I Marks

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

a) Why Raw Juice is heated upto 72^0 C to 75^0 C & sulphured juice is heated upto 101^0 C to 103^0 C?

b) What are the types of juice heaters?

c) What are the RPH of the clarifier stirror?

d) Why flash tank is used before sulpited juice enters in the clarifier?

e) What is the retention time of clarifier?

f) What is the screening area of 8' X 16' size vacuum filter?

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

a) State the Relliun principle.

b) Explain the Mud Mixer and Mud Trough of a vacuum filter.

c) Explain the vapour bleeding arrangement in the multiple effect evaporators.

d) Explain the liquidation of the Evaporator set before cleaning.

e) Explain the working of the "juice Heater".

f) Explain major precaution taken for clear juice in the clarifier during shutdown of sugar plant for general cleaning.

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

a) Give detail working of the Evaporator. How to start the Evaporator set? Explain probable difficulties while operating the Evaporator set.

b) Describe the scale formation in the Evaporator. Explain indetail the process of scale removal, liquidation and cleaning of the Evaporators.

c) Describe the working of the "Vacuum filter" indetail.

P.T.O.

Section – II	Marks

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

a) Which types of pan are used for A m/c boiling?

b) Define solubility.

c) Define Boiling Point Elevation.

d) What are reducing sugar?

e) Define saturated solution.

f) How much minimum vacuum required for boiling?

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

a) Draw neat sketch of vapour cell.

b) Explain decomposition of sucrose during evaporation.

c) Explain multi jet condenser with sketch.

d) Explain classification of vacuum pan.

e) Explain four zones of super saturation.

f) Explain effect of hydrostatic head.

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

a) Calculate water evaporated in kg/Hr for 2500 TCD plant, clear juice % cane = 100, Inlet Bx= 15^0, outlet- Bx=60^0.

b) Give advantages of continuous pan.

c) Explain factors affecting boiling point elevation.

d) Explain factors affecting Rate of crystallization.

e) Explain with sketch circulation of m/c in pan.

f) Draw well labelled diagram of falling film evaporator.

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EVEN TERM END EXAM APRIL/MAY -2017

EXAM SEAT NO. | | | | | | |

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

COURSE CODE: **SME506** COURSE NAME: **COGENERATION TECHNOLOGY**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **27/04/2017**

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 secondary energy resources with example.

b) State advantages of solar energy.

c) State advantages of bio-gas plant.

d) Define cogeneration.

e) Define filter cake.

f) What is spent wash?

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

a) Explain green house effect and the carbon cycle.

b) Write advantages and disadvantages of thermal power plant.

c) Comparison between conventional and non- conventional energy sources.

d) Explain need of co-generation.

e) Explain combined heat and power production in sugar industry.

f) Why bagasse co-generation is helpful?

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

a) Describe in details classification of energy resources along with examples.

b) Describe with sketches hydroelectric power plant.

c) Describe economical, social & environmental benefits of bagasse co-generation.

P.T.O

Section – II

Marks

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

a) Write the types of Fuels

b) What are low Pressure and high pressure boiler?

c) Write the purpose of Blow down

d) Define Energy audit

e) Define Energy management

f) Write the types of Boiler.

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

a) Explain technical operation for co-generation.

b) Explain the steam turbine co-generation system.

c) Explain the various types of turbine.

d) What are the energy efficiency/ saving opportunity in Indian sugar industry?

e) Draw schematic system diagram of boiler.

f) State & explain importance of boiler water treatment.

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

a) State importance parameter for co-generation & explain heat to power ratio.

b) Explain the term availability of cane, fuel and generation of steam with respect to co-generation.

c) Describe with sketch any one boiler and its working

d) Explain pressure, temperature & steam requirement in bagasse based co-generation.

e) Difference between external water treatment & internal water treatment of boiler.

f) Explain the energy conservation & steam saving majors in Indian sugar Industry.

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

(An Autonomous Institute of Govt. of Maharashtra)

EVEN TERM END EXAM APRIL/MAY-2017

EXAM SEAT NO. | | | | | | |

LEVEL: **FIRST.** PROGRAM: **CE/EE/SM/MT.**

COURSE CODE:**CCF108/CCE108/X107/R110** COURSE NAME: **ENGINEERING DRAWING-II**

MAX. MARKS: **80** TIME: **4 HRS.** DATE: **28/04/2017**

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 if necessary.
7) Use of Mobile is strictly prohibited.

Marks

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

a) Sellers thread.
b) Square nut.
c) Cup-headed bolt.
d) Slotted nut.
e) Eye foundation bolt.
f) Single riveted single strap butt joint.

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

a) Fig.no.01 shows pictorial view of an object.
Draw following views by using first angle method of projection.
i) Front view in the direction of X. (05marks)
ii) Top view. (05marks)
iii) Left hand side view. (05marks)
Give all dimensions. (01marks).

b) Fig.no.02. Shows pictorial view of bracket. Draw following views by using first angle method of projection.
i) Front view in the direction of X. (05marks)
ii) Top view. (05marks)
iii) Left hand side view. (05marks)
Give all dimensions. (01marks)

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

a) Fig.no.03 Shows pictorial view of an object. Draw following views by using first angle method of projection.
i) Sectional front view, in the direction of X, section along AA. (06marks)
ii) Top view. (05marks)
iii) Left hand side view. (05marks)

b) Fig.no.04 Shows pictorial view of an object. Draw following views by using first angle method of projection.
i) front view, in the direction of X. (05marks)
ii) Top view. (05marks)
iii) Sectional left hand side view, section along BB. (06marks)

P T O (1)

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

a) Fig. no.01 shows the front view and L.H.S.V. of an object. Draw the following views of the objects
   i) Front view. (02marks)
   ii) L.H.S.V. (02marks)
   iii) Top view. (missing view) (04marks)

b) Fig. no.02 show the front view and top view of the object. Draw the following views.
   i) Sectional front view A-A. (04marks)
   ii) Top view. (02marks)
   iii) R.H.S.V.(02marks)

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

a) Fig.no.03 shows the F.V. and T.V. of an object draw Isometric view taking '0' as origin.(16marks)

b) i) Fig.no.04 shows the F.V. and T.V. of an object draw Isometric projection taking '0' as origin.(14marks)
   ii) Construct the Isometric scale for the length 100mm.(2mark)

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

a) Draw the development of lateral surface of a pentagonal prism with edge of base 40mm and height 90mm, kept on the H.P. on its base with on edge of base parallel to V.P., When its cut by on AIP inclined at 30^0 to H.P. and bisecting the axis of the prism.

b) A cylinder having base diameter 50mm and axis length 70mm has its base in H.P. A square hole of side 25mm is drilled centrally having its sides equally inclined with H.P. and its axis being perpendicular to V.P. and bisecting the axis of the cylinder. Draw the DLS of the cylinder with the hole.

c) A square pyramid 50mm edge of base axis 60mm length is resting on its base in the H.P.with edge of base equally inclined to V.P. A square hole with side 25mm is cut through the square pyramid such that its axis intersect the axis of the pyramid ,22mm above the base. The axis of hole is perpendicular to V.P. All the faces of square hole are equally inclined with H.P. Draw the DLS of the pyramid.

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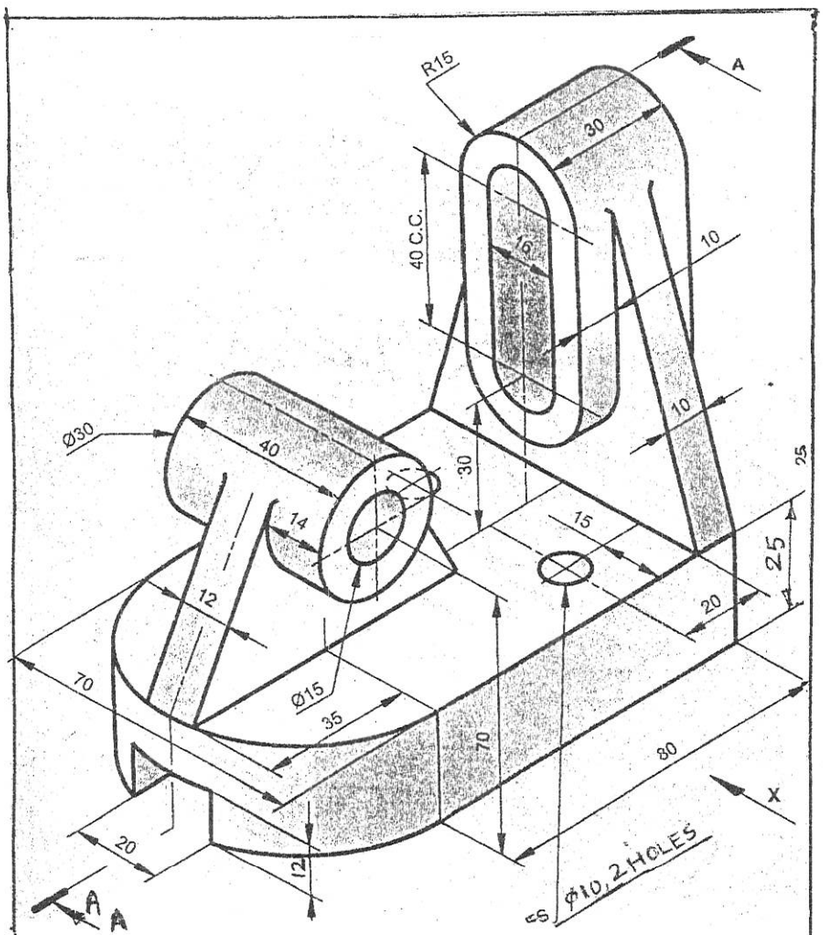
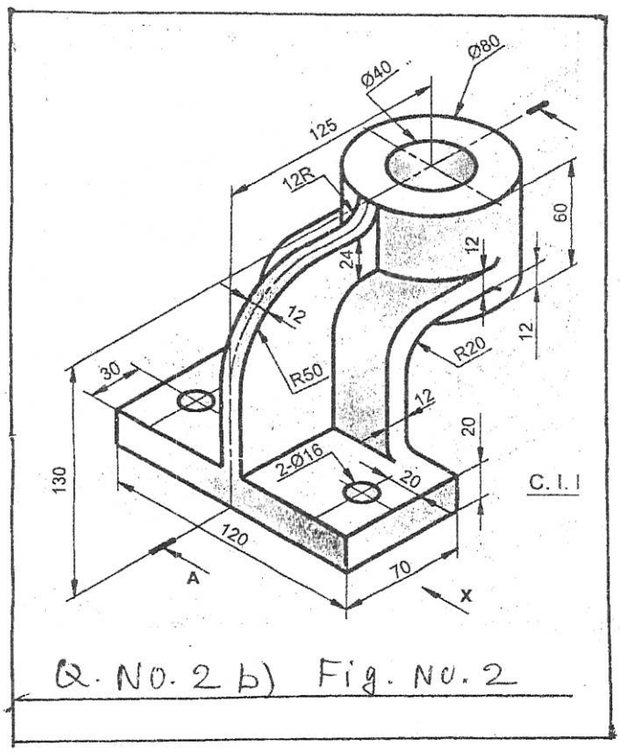
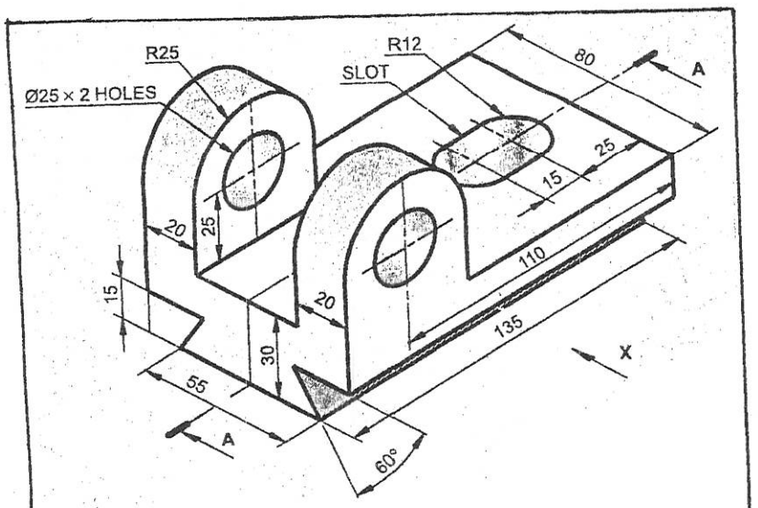


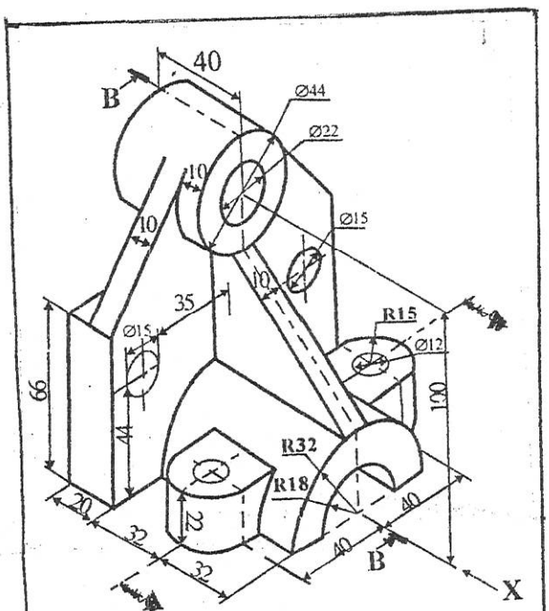
Q. NO. 2 a) Fig. NO. 1



Q. NO. 2 b) Fig. NO. 2

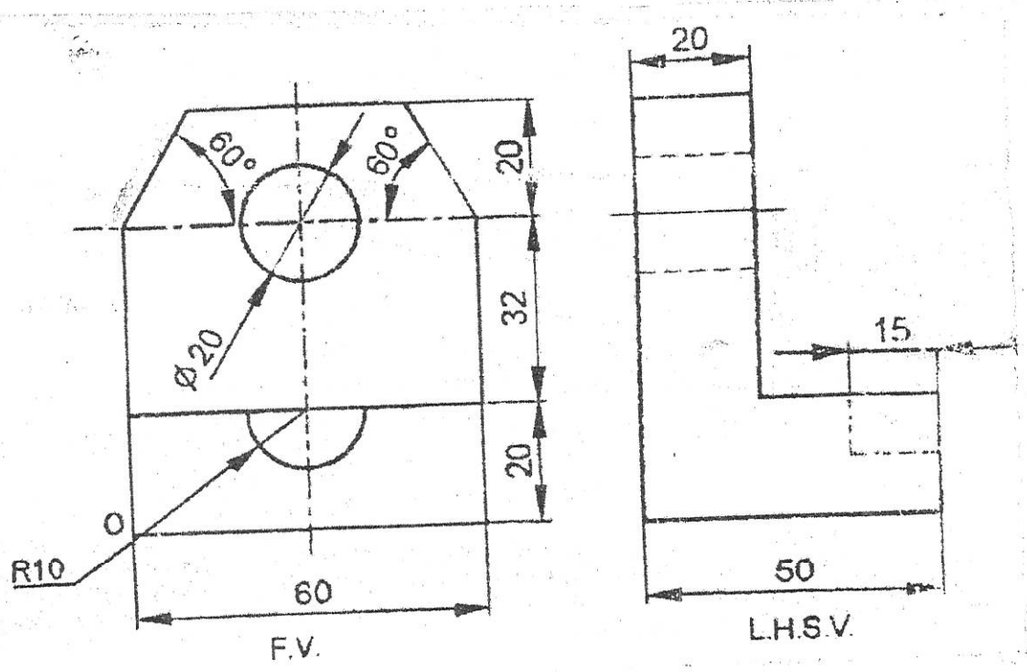


Q. NO. 3 a) Fig. NO. 3



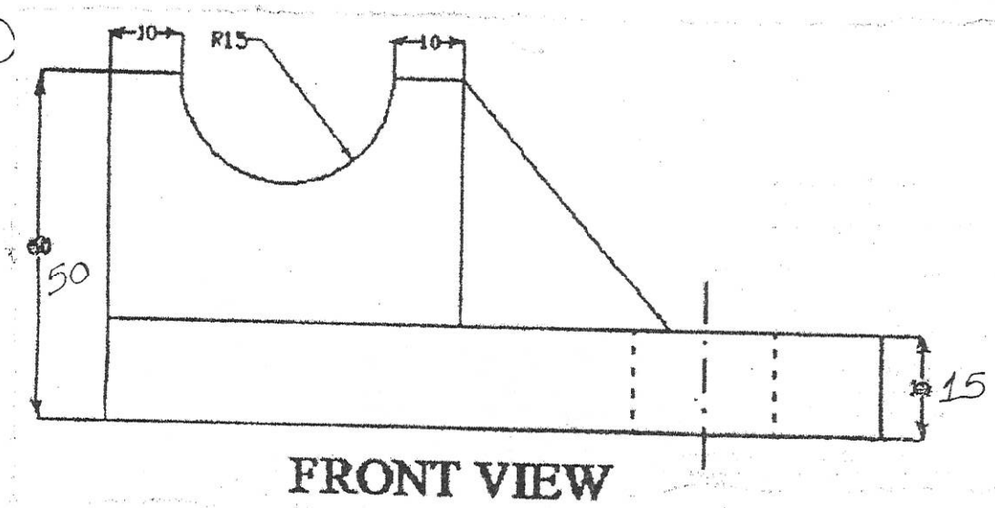
Q. NO. 3 b) Fig. NO. 4

Q.(4)(a)

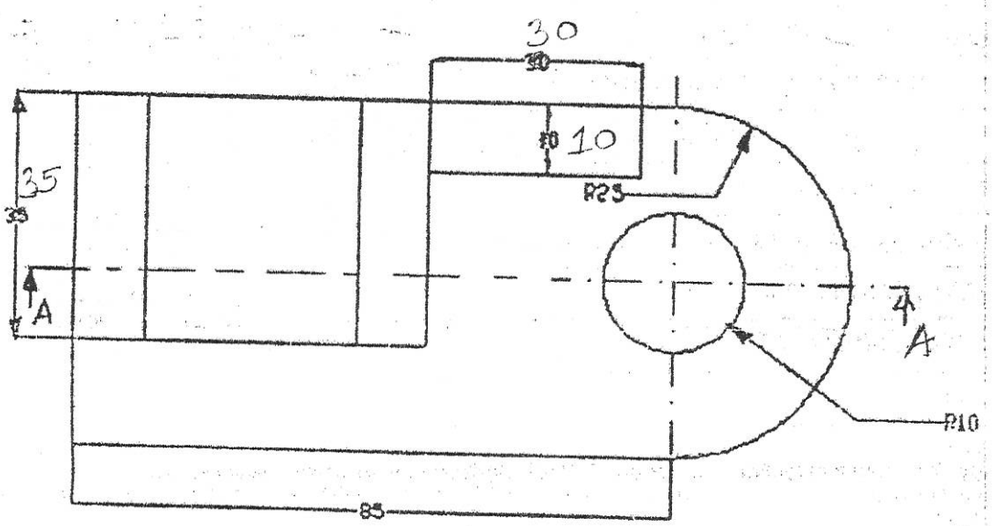


Q.4 (a) Fig No -1

Q④(b)



FRONT VIEW



TOP VIEW

Q.4(b) Fig. No-2

Q5 (a)

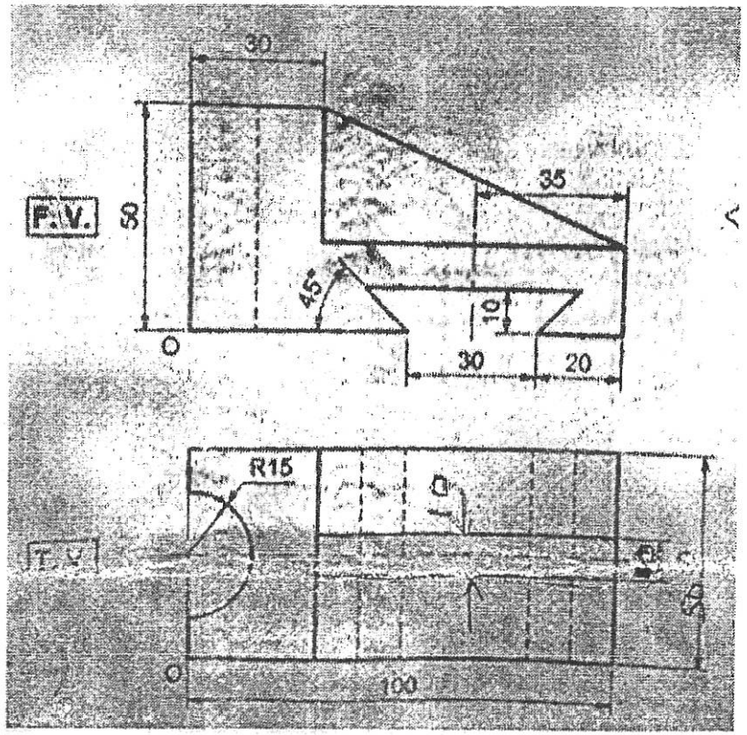


Fig. No. 3
Q. 5 @

Q5 (b)

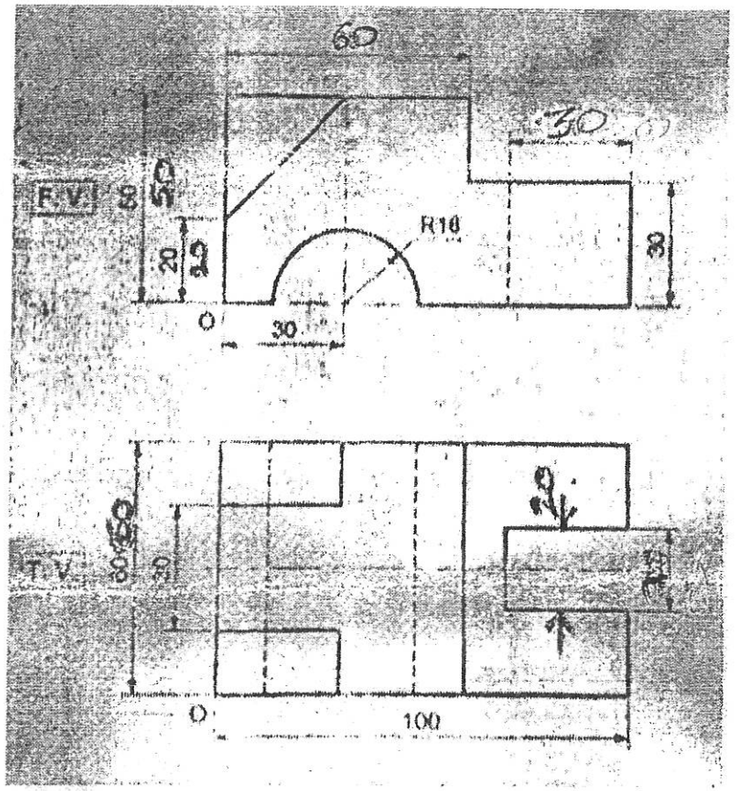


Fig NO. 4
Q. 5 (b)

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EVEN TERM END EXAM APRIL/MAY -2017

EXAM SEAT NO. | | | | | | |

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

COURSE CODE: **SME404** COURSE NAME: **BY PRODUCTS OF SUGAR INDUSTRIES**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **29/04/2017**

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 Bagasse, pitch, True fibre & fibre.
b) Calculate bagasse available/ produced by a factory of 5000 TCD sugar plant for 6 months. (Assume Bag% cane29%)
c) Define Molasses, Brix of molasses & pol % molasses, Molasses % cone.
d) Uses of final Molasses, explain.
e) Define filter cake or mud. What is the normal filter cake % cane?
f) Give uses of filter cake.

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

a) Give detailed composition of Bagasse.
b) Give detailed composition of final Molasses.
c) Give detailed composition of press cake or mud.
d) Write a note on co-generation using Bagasse.
e) Describe the manufacturing process of "cattle feed from final Molasses".
f) Calculate GCV & NCV of the bagasse having the moisture % 50% & Pol % 3%

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

a) Describe Bagasse Handling & storage system in 2500 TCD sugar plant.
b) Describe with flow chart the manufacturing of particle board from bagasse.
c) Explain manufacturing process of "wax formation" from filter cake or mud.

Section – II **Marks**

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

a) Define anaerobic treatment.
b) Define aerobic.
c) Define raw sugar.
d) Define BOD.
e) Give purity of raw sugar.
f) Define TDS.

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

a) Explain clarification process of raw sugar manufacturing.
b) Draw flow chart of Jaggery Manufacturing process.
c) State treated effluent levels for sugar industry.
d) Give composition of spent wash.
e) List out pollution prevention measures.
f) Draw neat diagram of ETP.

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

a) Describe Khandsari sugar manufacturing process with neat flow chart.
b) Describe pollution effect on waste water, solid waste, air, Molasses.
c) Describe steps to be taken at different stations to reduce the pollution.

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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EVEN TERM END EXAM April/ May 2017

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **SME503**

COURSE NAME :- **SUGAR INDUSTRY MANAGEMENT**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **25 / 04 / 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 o 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 public sector company.

b) Define co-operative company.

c) Define manufacturing industry.

d) Define entrepreneurship.

e) Define organization.

f) Define management.

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

a) Explain factory act 1948 with respect to welfare provisions.

b) Name the functional areas and levels of management.

c) Explain controlling function of management.

d) What are the types of organization? Explain any one.

e) Explain importance of motivation in industry management.

f) Describe the role of personal manager in human resource management.

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

a) State the provisions in the Workman's compensation act 1923.

b) Explain the term coordinating and forecasting.

c) Write the steps of organization and principles of organization.

d) What are the forms of ownerships? Explain any one.

e) Describe importance of human resource planning.

f) Name the types of training & Training program and explain any one.

P.T.O.

Section – II	Marks

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

a) Define budgets.

b) State various types of taxes.

c) Write any four duties of storekeeper.

d) Write the composition of molasses.

e) What is material management?

f) State the different grades of sugar.

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

a) Write the functions of financial management.

b) What are the types of working capital and factor controlling the working capital?

c) State the objectives of inventory management.

d) Explain the criteria used for ABC classification of goods.

e) Write the advantages of centralized store.

f) List out the points to be remember while purchasing goods.

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

a) Write the assumptions of EOQ model & give the graphical representation of inventory cycle.

b) Describe the objectives and functions of purchase department.

c) Describe sugar storage conditions in brief.

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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EVEN TERM END EXAM APRIL/MAY -2017

EXAM SEAT NO. | | | | | | |

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

COURSE CODE: **SME308** COURSE NAME: **CHEMICAL PROCESSES TECHNOLOGY**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **26/04/2017**

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) Define unit operation

b) Write down the properties if NH_3

c) Name the types of chemical processing.

d) List out the methods used for manufacturing of HCL.

e) Define exothermic process.

f) Write down the uses of washing soda.

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

a) Explain unit processes.

b) Explain reversible and Irreversible reaction.

c) Write down properties and uses of sulphuric acid.

d) Draw a flow sheet of manufacturing process of washing soda.

e) List out uses of caustic soda.

f) Explain the manufacturing process of hydrochloric acid by sulphate method.

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

a) Explain the manufacturing process of NH_3

b) Describe unit operations.

c) Describe manufacturing process of sulphuric acid.

P.T.O

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

a) Write the composition of Denatured alcohol.

b) List raw materials for different fertilizers.

c) Write reaction involved in the manufacturing of NPK.

d) Mention any two industrial application of water Gas.

e) Write any two properties of Nitrogen.

f) Which are the raw materials required for the manufacturing of pulp.

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

a) With the help of a neat flow sheet, explain manufacturing of alcohol from corn.

b) Compare wet & electric furnace process of phosphoric acid.

c) Explain Claude's process for the manufacture of oxygen.

d) Explain the production of triple superphosphate with the help of a neat flow sheet.

e) Explain the manufacturing of hydrogen from the natural gas with the neat flow diagram.

f) Explain Sulphate process for manufacturing of pulp with flow sheet.

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

a) Describe the manufacturing process of Urea, with reaction involved in it. Also mention any two application of Urea

b) Describe the manufacturing process of carbon-di-oxide from fermentation processes with flow sheet. Give any two properties of CO_2.

c) Describe the manufacturing process of Ethyl acetate with help of neat flow sheet and also write any two properties of ethyl acetate.

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EVEN TERM END EXAM APRIL/MAY -2017

EXAM SEAT NO. | | | | | | |

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

COURSE CODE: **CCF101/CCE101/X102/X108/R103/R104**

COURSE NAME: **ENGINEERING PHYSICS**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **26/04/2017**

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) Define stress and state its types.

b) State stoke's law of viscosity. Write formula for the same.

c) Define i) Density ii) compressibility

d) What is effect of temperature and impurity on surface tension of liquid?

e) Write any two characteristics of linear SHM.

f) Define i) nanometer ii) nanoparticle.

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

a) Explain stress-strain curve for a wire under continuously increasing load.

b) Define viscosity and velocity gradient. State Newton's law of viscosity.

c) Derive an expression for surface tension by capillary rise method.

d) Write any four applications of surface tension.

e) Distinguish between free oscillations and forced oscillations (any four points)

f) Define nanostructured material and write its three examples.

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

a) Write any four applications of viscosity.

b) State significance of angle of contact.(any four points)

c) Distinguish between transverse wave and longitudinal wave (any four points)

d) Define the following terms.

i) Periodic motion

ii) Forced oscillations

iii) Wave

iv) Resonance

e) State any four applications of nanotechnology in space.

P.T.O

f) A wire of length 2m extends by 3mm when a force of 1.8N is applied to it calculate

i) Stress produced in it if $Y=2x10^{11}N/m^2$

ii) Area of wire

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

a) Define echo & reverberation

b) Define ultrasonic wave.

c) State any two properties of X-rays.

d) State Ohm's law.

e) State Snell's law of refraction.

f) What is meant by LASER?

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

a) State any four requirements of good acoustics of building.

b) Explain the production of X-rays using collidge tube.

c) Derive Einstein photoelectric equation.

d) Derive expression for equivalent resistance when number of resistance are connected in series.

e) State four properties of LASER.

f) Explain with neat ray diagram, refraction through glass prism.

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

a) Three resistances are 1, 2 & 3 Ohms. Find the ratio of their effective resistance when connected in series to that connected in parallel.

b) State any four characteristics of photoelectric effect.

c) Derive prism formula.

d) What is Planck's hypothesis? Define threshold frequency of radiation.

e) State applications of LASER (any four)

f) Explain the production of ultrasonic wave using magnetostriction method.

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EVEN TERM END EXAM APRIL/MAY -2017

EXAM SEAT NO. | | | | | | |

LEVEL: **THIRD** PROGRAM: **COMMON**

COURSE CODE: **EEE305/IEE301/ETE301/ITE301/EE201/IX201/EJ201/IT201/IE201/IF201/201**

COURSE NAME: **APPLIED MATHEMATICS**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **08/05/2017**

Instruction:-

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

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

a) Evaluate $\int \left[e^{2\log x} + e^{x\log a}\right] dx$

b) Find $\int \frac{\sin\sqrt{x}}{\sqrt{x}} dx$

c) Evaluate $\int \frac{dx}{3+2x-x^2}$

d) Evaluate $\int_1^2 \frac{dx}{3x-2}$

e) Evaluate $\int_1^e \log x dx$

f) Find mean value of y=cosx over the range from $x = \frac{-\pi}{2}$ *to* $x = \frac{\pi}{2}$

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

a) Evaluate $\int \frac{dx}{(x^2+4)(x+1)}$

b) Evaluate $\int \frac{dx}{3\sin 2x + 2\cos 2x}$

c) Evaluate $\int \frac{x+2}{\sqrt{x^2+5x+6}} dx$

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

e) Evaluate $\int_1^3 \frac{\sqrt[3]{x+5}}{\sqrt[3]{x+5}+\sqrt[3]{9-x}} dx$

f) Using integration find the area of the circle $x^2 + y^2 = 16$

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

a) Evaluate $\int_{\pi/6}^{\pi/3} \frac{1}{1+\sqrt[n]{\cot x}} dx$

b) Evaluate $\int \frac{3\sin x + 4\cos x}{2\sin x - \cos x} dx$

P.T.O

c) Evaluate $\int \cos\sqrt[3]{x}\, dx$

d) Evaluate $\int \frac{dx}{4\cos^2 x + 9\sin^2 x}$

e) Find R.M.S value of the I=10sin100πt over a complete period.

f) Find the area enclosed by the parabola $y = x^2 - 5x + 15$ and the line $y - 3x = 3$.

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

a) From the differential equation whose solution is y=acos3t+bsin3t

b) State order and degree of $y = \frac{dy}{dx} + \frac{c}{dy/dx}$

c) Show that $y^3 \sec^2 x\, dx + (3y^2 . \tan x - \sec^2 y)dy = 0$ is exact.

d) Find x and y satisfying the equation $(2+i)x + (i-3)y = 4$

e) Find the value of $i^{49} + i^{68} + i^{89} + i^{110}$

f) Find the complex conjugate of $\frac{3+5i}{1+2i}$

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

a) Solve: $\frac{dy}{dx} - \frac{2}{x}y = x^2 e^x$, if y=0 when x=1

b) Solve: $(e^x + 2x^2 y + y^3)dx + (a^y + 2x^2 y + 3xy^2)dy = 0$

c) Solve : $x^2 y dx = (x^3 + y^3)dy$

d) Express $1+i$ *in* $(x+iy)$ form.

e) Simplify using De Moivre's Theorem $\frac{(\cos 2\theta + i\sin 2\theta)^3 (\cos 3\theta - i\sin 3\theta)^4}{(\cos\theta + i\sin\theta)^2 (\cos 2\theta - i\sin 2\theta)^{-3}}$

f) If $\cos(x+iy) = \alpha + i\beta$ show that *i)* $\frac{\alpha^2}{\cos^2 x} - \frac{\beta^2}{\sin^2 x} = 1$ *ii)* $\frac{\alpha^2}{\cosh^2 y} + \frac{\beta}{\sinh^2 y} = 1$

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

a) Solve $\frac{dy}{dx} = \sin(x+y)$

b) Solve $\frac{dy}{dx} = \frac{xy}{(1-x)(1+y)}$

c) If the slope of the curve is $x^2 + 2x + 1$, find its equation if it passes through the point (1, 1)

d) Find 2 values of $(1-i)^{1/2}$

e) Using Euler's formula, prove the following

i) $\sin 2\theta = 2\sin\theta\cos\theta$

ii) $\cosh^2 x + \sinh^2 x = \cosh 2x$

f) Show that $\sqrt{3+i}$ is a cube root of $8i$

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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EVEN TERM END EXAM April/ May 2017

EXAM SEAT NO. | | | | | | |

LEVEL : - **FIRST** PROGRAM : **MECHANICAL/SUGAR**
COURSE CODE :- ***CCF108/CCE108/X107/R110**
COURSE NAME :- **ENGINEERING DRAWING-II**
MAX. MARKS : **80** TIME : **4 HRS.** DATE: - **08 / 05 / 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 **TWO** (08)

a) Draw proportionate free hand sketch for eye foundation bolt.

b) Draw free hand sketch for square thread.

c) Sketch two views of double riveted lap joint with Zig-Zag riveting.

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

a) Refer Fig. 1 and draw i) F.V. ii) T.V. & iii) Side view from left.
Use first angle method.

b) Fig. 2. Show pictorial view of an object. Draw three views of object.
Use first angle method.

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

a) Pictorial view of an object is shown in Fig.5 Using first angle method draw.
i) Sectional F.V.
ii) T.V.
iii) Left hand side view.

b) Using first angle method, draw
i) Sectional F.V.
ii) T.V.
iii) Left hand side view.
Refer Fig. 6

P.T.O.

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

a) Fig. (I) Shows front view and top view of an object. Draw following views.

i) Sectional Front view (section along A-A) (03)
ii) Top view. (02)
iii) Missing Left hand side view. (03)

b) Fig. (II) Shows the top view and front view of a bracket. Draw the following view.

i) Front view. (02)
ii) Top view. (02)
iii) Missing sectional Left hand side view. (04)

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

a) Fig. (III) Shows Elevation and plan of an object. Draw isometric view. Take '0' as origin. Use Natural scale.

b) Fig. (IV) Show Elevation and plan of an object. Draw isometric projection construct an Isometric scale. Take '0' as origin.

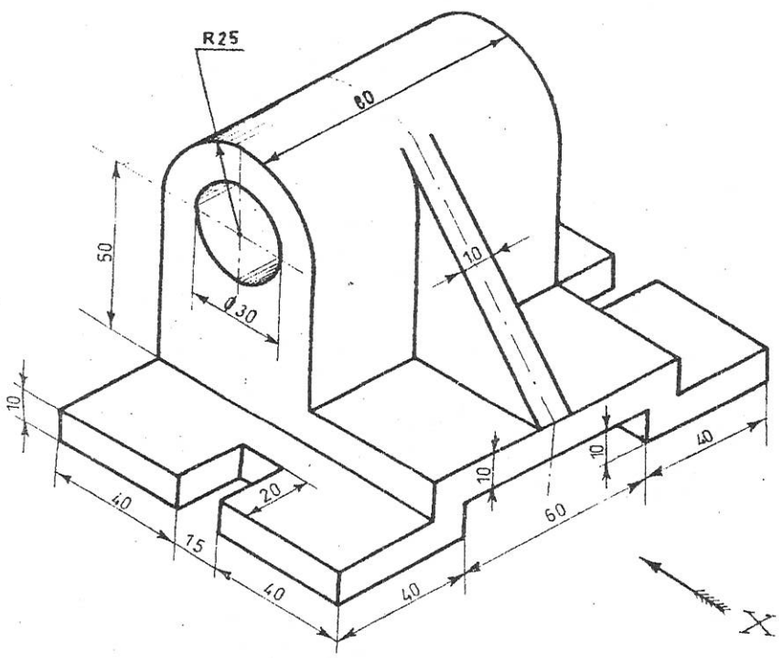
Q.6 Attempt any **TWO** (16)

a) A pentagonal prism side of base 50mm &axis length 100mm is kept on H.P. on its base with a side of base perpendicular to V.P. A square hole of side 55mm is drilled with its axis perpendicular to V.P., parallel to H.P. and bisecting the axis of the pentagonal prism. Draw the development of lateral surface. Assume the faces of the hole equally inclined to H.P.

b) A square pyramid 50mm edge of base and axis 60mm is resting on its base in H.P. with edges of base equally inclined to V.P. A square hole with side 25mm is cut through the square pyramid such that its axis intersects the axis of pyramid, 22mm above the base. The axis of hole is perpendicular to V.P. all the faces of square hole are equally inclined with H.P. Draw the development of lateral surface of pyramid.

c) Draw the development of lateral surface of the cylinder having a square hole cut in it as shown in Fig. (V)

P.T.O



Q. No. 2 (a)

Fig. 1

Q. No. 2 (b)

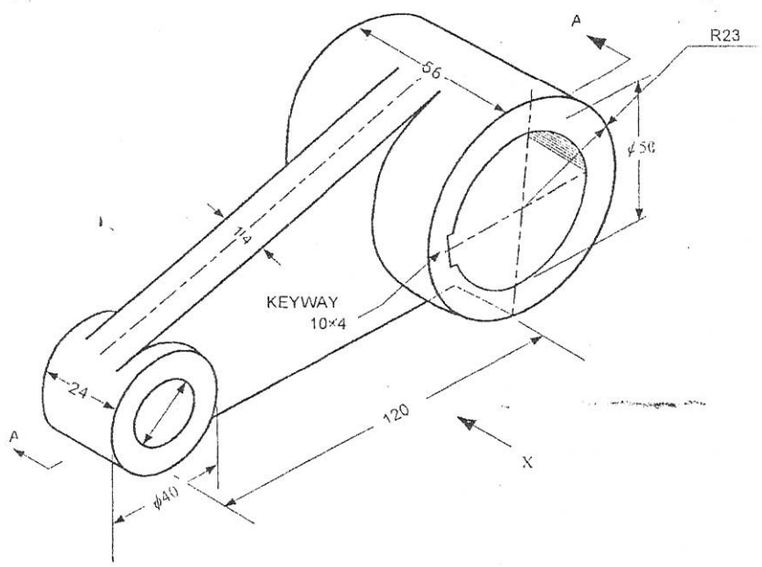


Fig. 2

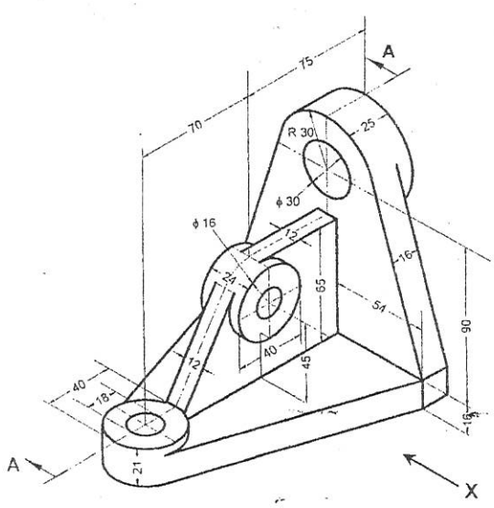


Fig. 5

Q. No. 3 (a)

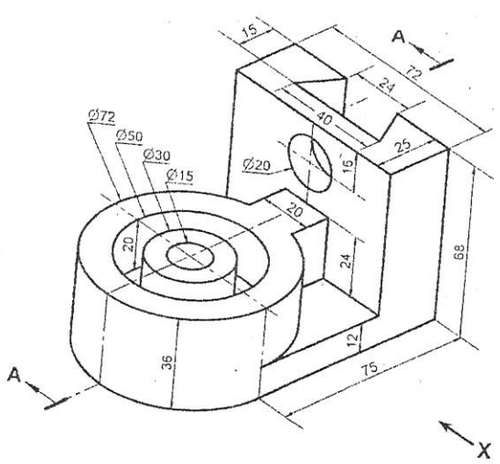
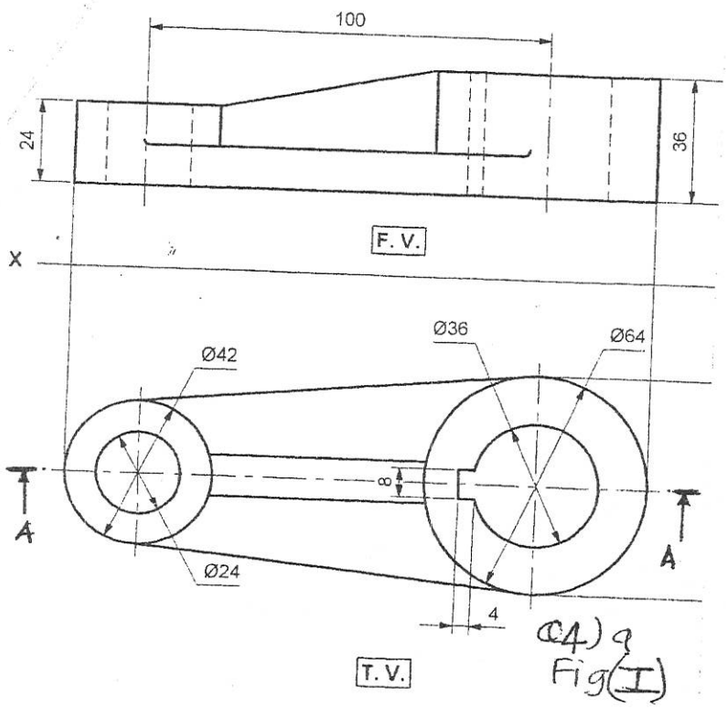


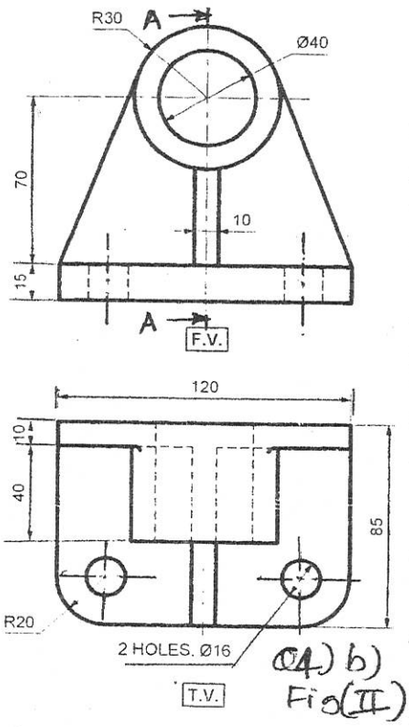
Fig. 6

Q. No. 3 (b)

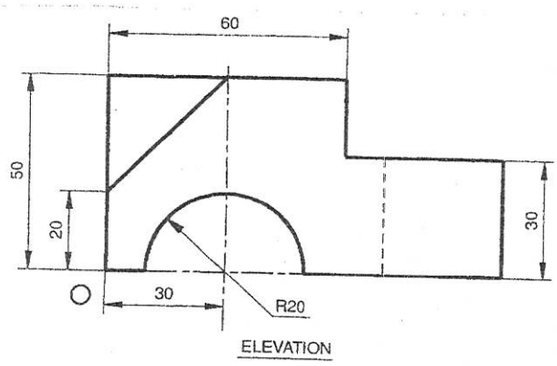
P. T. O.

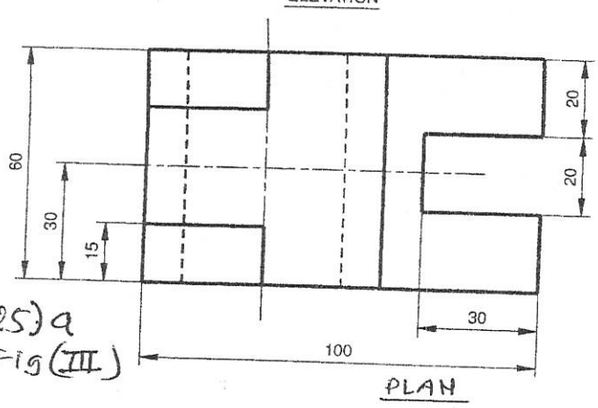


Q4) a
Fig (I)

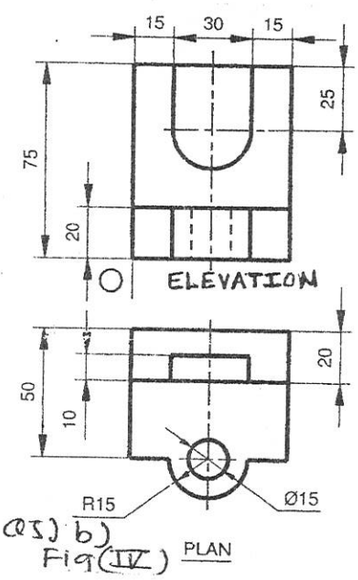


Q4) b)
Fig (II)

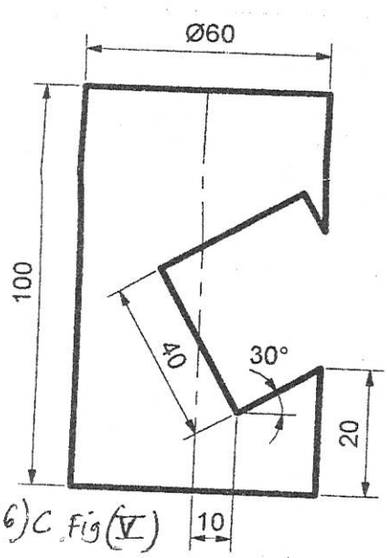




Q5) a
Fig (III)



Q5) b)
Fig (IV)



Q6) C Fig (V)

GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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EVEN TERM END EXAM APRIL/MAY -2017

EXAM SEAT NO. | | | | | | |

LEVEL: **THIRD** PROGRAM: **COMMON**

COURSE CODE:

CEE301/MEE301/SME301/MTE301/CE201/ME201/SM201/MT201/C201/M201/1201/2201

COURSE NAME: **APPLIED MATHEMATICS**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **08/05/2017**

Instruction:-

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

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

a) Evaluate $\int \left[e^{2\log x} + e^{x\log a}\right] dx$

b) Find $\int \frac{\sin\sqrt{x}}{\sqrt{x}} dx$

c) Evaluate $\int \frac{dx}{3+2x-x^2}$

d) Evaluate $\int_1^2 \frac{dx}{3x-2}$

e) Evaluate $\int_1^e \log x dx$

f) Find mean value of y=cosx over the range from $x = \frac{-\pi}{2}$ to $x = \frac{\pi}{2}$

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

a) Evaluate $\int \frac{dx}{(x^2+4)(x+1)}$

b) Evaluate $\int \frac{dx}{3\sin 2x + 2\cos 2x}$

c) Evaluate $\int \frac{x+2}{\sqrt{x^2+5x+6}} dx$

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

e) Evaluate $\int_1^3 \frac{\sqrt[3]{x+5}}{\sqrt[3]{x+5}+\sqrt[3]{9-x}} dx$

f) Using integration find the area of the circle $x^2 + y^2 = 16$

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

a) Evaluate $\int_{\pi/6}^{\pi/3} \frac{1}{1+\sqrt[n]{\cot x}} dx$

b) Evaluate $\int \frac{3\sin x + 4\cos x}{2\sin x - \cos x} dx$

c) Evaluate $\int \cos\sqrt[3]{x}\ dx$

d) Evaluate $\int \frac{dx}{4\cos^2 x + 9\sin^2 x}$

e) Find R.M.S value of the I=10sin100πt over a complete period.

f) Find the area enclosed by the parabola $y = x^2 - 5x + 15$ and the line $y - 3x = 3$.

P.T.O

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

a) Form the differential equation by eliminating arbitrary constants if $y = A\cos 3x + B\sin 3x$

b) Solve $\sqrt{1-y^2}\,dx = \sqrt{1-x^2}\,dy$

c) state order and degree of the differential equation $\sqrt{1+\frac{dy}{dx}} = \frac{d^2y}{dx^2}$

d) Find range of the following data: 49, 13, 11, 12, 42, 29, 18, 27.

e) Find the probability of getting a sum of 3 when 2 unbiased dice is thrown.

f) The velocity of a body is given by $v = t(3+5t)$. How much distance does it travel in 4sec if it was initially at rest?

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

a) Solve: $\cos^2 x\frac{dy}{dx} + y = \tan x$

b) Solve: $v\frac{dv}{dx} = g - kv^2$ Where g and k are constants.

c) Solve: $(x+y+1)^2\frac{dy}{dx} = 1$

d) Calculate mean deviation about mean of the following data

Marks	3	4	5	6	7	8
No. of student	1	3	7	5	2	2

e) Calculate variance

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

f) A husband and wife appeared for an interview for two vacancies in an office. The probability of husbands' selection is $\frac{2}{7}$ and that of wife selection is $\frac{1}{4}$. Find the probability that

i) Both of them are selected.

ii) Only one of them is selected.

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

a) If A and B are two events such that P(A)=0.8, P(B)=0.6, P(A∩ B)=0.5, find i) P(AUB) ii) $p(\frac{A}{B})$ iii) $p(\frac{B}{A})$

b) Solve: $(2xy + y - \tan y)dx + (x^2 - x\tan^2 y + \sec^2 y)dy = 0$

c) Solve: $y\,dx = xdy + \sqrt{xy}\,dx$

d) Find the equation of curve whose slope at any point is equal to $\frac{2y+x+1}{x}$ and which passes through the point (1, 0).

e) The mean weight of 150 students is 60kg. The mean weight of boys is 70kg with a S.D of 10kg. For the girls, the mean weight is 55kg. and the S.D is 15kg. Find the number of boys and the combined S.D.

f) The following table shows the marks obtained by 100 students in an examination. Calculate mean and variance.

Marks	1-10	11-20	21-30	31-40	41-50	51-60
No.of candidates	3	16	26	31	16	08

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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EVEN TERM END EXAM April/ May 2017

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **SUGAR MANUFACTURING**
COURSE CODE :- **SMF304/SME304**
COURSE NAME :- **INTRODUCTION TO SUGAR MANUFACTURING**
MAX. MARKS : **80** TIME : **3 HRS.** DATE: - **05 / 05 / 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) List out sugar manufacturing states in India. (SMF304-1)
b) Define Raw sugar. (SMF304-1)
c) Define plantation white sugar (SMF304-1)
d) State use of hand refractometer. (SMF304-2)
e) Write structural formula of sucrose. (SMF304-3)
f) Write structural formula of glucose. (SMF304-3)

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

a) Explain present status of world sugar industry. (SMF304-1)
b) Explain effect of colouring matter on process. (SMF304-1)
c) Draw neat sketch of sugar cane plant (SMF304-1)
d) State important factors which affects tillering of sugar cane? (SMF304-2)
e) State the factors which affects the maturity of sugar cane. (SMF304-2)
f) State the physical properties of sucrose. (SMF304-3)

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

a) Write composition of sugar cane and sugar cane juice. (SMF304-1)
b) Describe preharvesting maturity survey of cane. (SMF304-2)
c) Explain Biosynthesis of sugar in sugar cane plant. (SMF304-3)

P.T.O.

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

a) Define the term fibre. (SMF304-4)

b) Write function of Hopper. (SMF304-5)

c) State function of centrifugal machine. (SMF304-5)

d) Write function of Bx-hydrometer (SMF304-6)

e) Write function of polarimeter. (SMF304-6)

f) List out equipments used in sugar laboratory. (SMF304-6)

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

a) Which factors take in mind while planning layout. (SMF304-5)

b) State flow chart of Khandsari Sugar Manufacturing. (SMF304-4)

c) Write design specification of Evaporator. (SMF304-5)

d) Draw ray diagram of polarimeter optically. (SMF304-6)

e) Write principle of polarimeter. (SMF304-6)

f) Explain role of pH in sugar manufacturing. (SMF304-6)

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

a) Draw flow diagram of Jaggery manufacturing. (SMF304-4)

b) Explain processes of flow chart of sugar manufacturing. (SMF304-4)

c) Write the design specification of feeder table. (SMF304-5)

d) Draw neat sketch of Bx-hydrometer. (SMF304-6)

e) Explain the procedure of determination of Bx by hand refractometer. (SMF304-6)

f) Explain role of temperature in sugar manufacturing. (SMF304-6)

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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EVEN TERM END EXAM APRIL/MAY-2017

EXAM SEAT NO. | | | | | | |

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

COURSE CODE: **CEE313/MEE313/MTE312/SME312/ME214/MG228/R228.**

COURSE NAME: **HIGHER MATHS.**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **05/05/2017**

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 if necessary.
7) Use of Mobile is strictly prohibited.

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

a) Prove that $\Delta\nabla = E + E^{-1} - 2$

b) Show that $(\frac{\Delta^2}{E})x^3 = 6x, if\ h = 1.$

c) Write Lagrange's interpolation formula for $x = x_3$

d) If $u = f\left(\frac{x}{y}\right) + \sqrt{x^2 + y^2,}\ \ find\ \frac{\partial u}{\partial x}$

e) If u=f(v) where v is a homogeneous function of x, y of degree n, prove that $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = nv\, f^1(v).$

f) If x=ucosv, y=usinv find Jacobian, $J\left(\frac{x,y}{u,v}\right)$

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

a) Using Lagrange's interpolation formula, find the polynomial which takes the values as

x	0	1	2
y	1	4	6

b) Given :

x	10	15	20
f(x)	14	18	28

Estimate f(12) using Newton's forward interpolation formula.

c) Given :

x	0^0	30^0	60^0	90^0
$Cosx^0$	1	0.87	0.5	0

Find $cos75^0$ using Newton's backward difference interpolation formula.

d) If u= f(r) & $r^2 = x^2+y^2+z^2$, prove that, $\frac{\partial^2 y}{\partial x^2} + \frac{\partial^2 y}{\partial y^2} + \frac{\partial^2 y}{\partial z^2} = f''(r) + \frac{2}{r}f'(r)$

e) If u=sin $(\frac{xy+yz+zx}{x^2+y^2+z^2})$ prove that, $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} + z\frac{\partial u}{\partial z} = 0$

f) If $u=x+2y^2-z^3$, $v=x^2yz$, $w=2z^2-xy$, find $\frac{\partial(u,v,w)}{\partial(x,y,z)}$.

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

a) Given f(0)=3,f(1)=6,f(2)=11,f(3)=18, estimate f(1.5) using Lagrange's interpolation formula.

P.T.O

b) Find f(4.5) from the following data.

x	1	2	3	4	5
f(x)	2.38	3.65	5.85	9.95	14.85

c) Using Newton's forward difference interpolation formula find f(8) from the data

x	5	10	15	20
f(x)	50	70	100	145

d) If $x= r\cos\theta$, $y= r\sin\theta$, prove that $JJ^1=1$

e) If $z=x^2+\tan^{-1}(\frac{y}{x}) - y^2 tan^{-1}(\frac{x}{y})$, prove that, $\frac{\partial^2 z}{\partial x \partial y} = \frac{x^2-y^2}{x^2+y^2}$

f) Verify Euler's formula for the function $Z=\sin^{-1}[\frac{x^2+y^2}{x+y}]$

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

a) Find L(cos5t cost)

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

c) Find L $(2te^{2t})$

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

e) Find L^{-1} $(\frac{3s-12}{s^2+8})$

f) Solve $\frac{d^2x}{dt^2} + \frac{2dx}{dt} + 1 = 0$.

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

a) Evaluate $\int_0^\infty e^{-3t} t\cos 2t \, dt$ *by L.T.*method.

b) Find $L^{-1}\left(\frac{4s+5}{(s-1)^2(s+2)}\right)$.

c) Find $L^{-1}\left(\frac{1}{s(s^2+4)}\right)$ by Convolution theorem.

d) Solve $\frac{dy}{dt} + y = e^{-3t}, y(0) = 1$.

e) Solve $\frac{d^4y}{dx^4} + 4y = 0$.

f) Solve $(D^3 - 4D^2 + 13D)y = 0$

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

a) Find L $(te^{-t}\sin 3t)$

b) Find L^{-1} $\left(\frac{1}{(s^2+4)^2}\right)$ by Convolution theorem

c) Find $L^{-1}\left(\frac{s+3}{(s^2+4s+13)}\right)$ by Convolution theorem

d) Solve $\frac{dx}{dt} = 1 + e^t, x(0) = -1$.

e) Solve $\frac{d^3y}{dx^3} - \frac{d^2y}{dx^2} + 3\frac{dy}{dx} + 5y = 0$.

f) Solve $(D^4+2D^2+1)\, y=0$.

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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EVEN TERM END EXAM April/ May 2017

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **CE/ME/IE/SM/MT/E & TC**

COURSE CODE :- **MEE312/MTE311/IEE311/ETE311/MG227/R227**

COURSE NAME :- **NON CONVENTIONAL ENERGY SOURCES**

MAX. MARKS : **80** TIME : **3 HRS.** DATE: - **05 / 05 / 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) Enlist any four renewable energy sources.

b) How energy sources are classified?

c) Define: Power Coefficient.

d) State the basic principle of wind energy conversion.

e) State the categories in which biomass resources fall.

f) State different biomass conversion technologies.

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

a) Why alternative energy sources are necessary?

b) Define : i) Hour angle ii) Declination iii) Azimuth angle iv) Zenith angle.

c) Describe the prospects of alternative energy sources.

d) Draw a block diagram showing basic components of wind energy conversion system.

e) Differentiate between biomass and conventional fuel.

f) How Wind Mills are classified?

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

a) Explain with neat sketch, Deenbandhu biogas plant.

b) What factors are considered for selection of site of Wind Mill?

c) Explain with neat sketch solar pond.

P.T.O.

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

a) How should be the site, favorable for a tidal power plant?

b) What are the difficulties in tidal power plant?

c) State two advantages and disadvantages of geothermal energy over other energy forms.

d) State the principles of Energy conservation.

e) State the meaning of the term ' Simple Pay back Period'.

f) What is fuel cell? State the main components.

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

a) Explain single basin and double basin arrangement of tidal power plant.

b) Describe the working and main types and OTEC power plants.

c) Write four advantages and four limitations of small scale hydroelectric power generation.

d) Explain Geothermal energy power plant.

e) Draw a simple MHD generator and explain principle of MHD power generation.

f) Write various components of SHP and state their functions.

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

a) Write classification of small hydro power station. State type of turbine suitable for micro hydel plant and explain.

b) Explain the concept of waste heat utilization.

c) State the types of energy audit and explain in short.

d) Explain the meaning of Co-generation and its benefits in industries.

e) Discuss the energy conservation technologies.

f) Draw and explain Sankey diagram for energy audit of a factory.

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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EVEN TERM END EXAM APRIL/MAY -2017

EXAM SEAT NO. | | | | | | |

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

COURSE CODE: **CCF106/CCE106/X110/R108/0108**

COURSE NAME: **ENGINEERING MATHEMATICS**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **06/05/2017**

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) Find the centroid of a triangle whose vertices are (1, 4) (2, 3) (0, -1)

b) Find the distance between the parallel lines $3x+2y-8=0$ and $3x+2y-4=0$

c) Find the acute angle between the lines $3x-2y+4=0$ *and* $2x-3y-7=0$

d) Find the equation of a circle whose center is at origin and radius 5

e) Find the equation of a circle whose diameter is the line segment joining the points (9, 0) & (0, 6)

f) Starting with the approximations $x_0=y_0=z_0=0$, for solving a set of equations by Gauss-Seidel method. If the next approximation gives $x_1=0.85,\ y_1=1.0275$. Find z_1. Given that $z=\frac{1}{10}[25-2x+3y]$

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

a) Show that the points (-2, 1), (-1, 3) and (1, 7) are collinear.

b) Determine which of the two circles is greater: $x^2+y^2-3x+4y=0$ and $x^2+y^2-6x+8y=0$

c) Find the equation of a circle passing through the point (2, 5) and (-5, 4) and whose center lying on the line $2x-3y+5=0$

d) Find the equation of a line passing through the points of intersection of the lines $2x+3y=13,\ 5x-y=7$ and passing through (1, -1)

e) Find the equation of perpendicular bisector of the join of A(-2, 3) and B(8, -1)

f) Use Jacobi's method to solve the equations $5x+2y+z=12,\ x+4y+2z=15,\ x+2y+5z=20$ (Third iterations only)

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

a) Using Gauss Seidel method solve $10x=2y+2z+6,\ 10y=x+2z+7,\ 10z=x+y+8$ (upto Third iterations)

b) Using Jacobi's method solve $5x-y-2z=-3,\ 3x+5y-z=10,\ -2x-y+4z=8$ (three iterations only)

c) Use Regula-Falsi method to solve $x^3-3x+5=0$ (upto second approximation)

d) Find $\sqrt[3]{29}$ by Regula-Falsi method upto second iteration

e) Find the square root of 12 by the method of bisection (upto 4 approximations)

f) Solve $x^3-6x+2=0$ by Bisection method (upto four iterations)

P.T.O

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

a) Test whether the function is even or odd if $f(x) = x^3 + 5\sin x$

b) Evaluate $\lim_{x \to 3} \dfrac{x^3 - 27}{x - 3}$

c) Evaluate $\lim_{x \to 0} \dfrac{\sin 5x}{3x}$

d) Find $\dfrac{dy}{dx}$ *if* $y = \cos^2 x$

e) Find $\dfrac{dy}{dx}$ *if* $y = \log\left(x^2 + 2x + 5\right)$

f) Find the slop of tangent to the curve $y = x^3$ *at* $x = 4$

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

a) If $y = f(x) = \dfrac{x+1}{x-1}$, $x \neq 1$ then show that $x = f(y)$

b) Evaluate $\lim_{x \to \frac{\pi}{4}} \dfrac{\sin x - \cos x}{x - \pi/4}$

c) If $y = x^y$ *prove that* $\dfrac{dy}{dx} = \dfrac{y^2}{x(1 - y\log x)}$

d) Find the derivative of $x.\sin^{-1} x$

e) Find $\dfrac{dy}{dx}$ *if* $y = \log\left[x + \sqrt{x^2 + a^2}\right]$

f) Discuss the stationary (Maximum & Minimum values) of $x^3 - 6x^2 + 9x - 2$

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

a) If $f(x) = 16^x + \log_2^x$ then find $f(1/4)$ $f(1/2)$

b) Evaluate $\lim_{x \to 4} \dfrac{x^4 - 64x}{\sqrt{x^2 + 9} - 5}$

c) Differentiate w. r. t x; $\tan^{-1}\left(\dfrac{x}{\sqrt{1 - x^2}}\right)$

d) Find $\dfrac{dy}{dx}$ *if* $13x^2 + 2x^2y + y^3 = 1$

e) If $y = (\sin x)^{\log x}$ *find* $\dfrac{dy}{dx}$

f) If $x = a(\theta + \sin\theta)$, $y = a(1 - \cos\theta)$ *find* $\dfrac{dy}{dx}$

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