IIUC bot

Ai Powered Telegram bot for IIUCIANS

Follow and support us on facebook
https://www.facebook.com/iiucbot

Join our facebook group
https://www.facebook.com/groups/iiucbot.help.and.discussion

Use IIUC BOT to collect notes and previous questions
https://t.me/iiucbotgroup

Follow us on LinkedIn
https://www.linkedin.com/company/iiucbot/

International Islamic University Chittagong

Department of Electrical and Electronic Engineering

B. Sc. Engineering in EEE

Final Exam, Spring 2022

Course Code: **ME-2301** Course Title: **Fundamental of Mechanical Engineering**

Time: 2 hours 30 minutes Full Marks: 50

(i) The figures in the right-hand margin indicate full marks

(ii) Course Outcomes and Bloom's Levels are mentioned in additional Columns

Course Outcomes (COs) of the Questions	
CO1	Provide current knowledge, ideas, and the conceptual framework of Mechanical engineering.
CO2	Demonstrate proficiency in solving basic mechanical Engine design problems.
CO3	Design of basic Mechanical Engine for application-specific troubleshooting, identifying problems, and providing solutions for the sustainable development of the society.

Bloom's Levels of the Questions						
Letter Symbols	R	U	App	An	E	C
Meaning	Remember	Understand	Apply	Analyze	Evaluate	Create

Part A

[Answer the questions from the followings]

1.	a)	Mention the advantages of Nuclear Power over its drawbacks.	CO3	U	5
1.	b)	Draw a schematic diagram of a Boiler Plant. Write down the advantage of an Economizer?	CO3	Ap, R	5
2.	a)	Characterize the following terms: I. System. ii. Zeroth Law of Thermodynamics. iii. Equilibrium of State. iv. Applications of Thermodynamics.	CO2	An	5
2.	b)	Design a graphical presentation of the system, boundary, and surroundings and classify the system on the boundary.	CO2	An	5
		Or,			
2.	a)	Renewable energy differs from nonrenewable energy-Explain statement according to its properties.	CO2	C	5
2.	b)	A stationary mass of gas is compressed without friction from an initial state of $0.5m^3$ and 0.105 MPa to a final state of 0.25 m3 and 0.105MPa, the pressure remaining constant during the process. There is a transfer of 46.1 KJ of heat from the gas. Determine the internal energy change of the gas? $Q_{1-2}= U_2-U_1+W_{1-2}$, $W_{1-2}= P(V_2-V_1)$	CO2	E	5

Part B

[Answer the questions from the followings]

3.	a)	Identify the main components of the I.C Engine with a Diagram.	CO3	An	5
3.	b)	Petrol Engine is a four-stroke Cycle SI engine- Justify it.	CO3	E	5
4.	a)	Define: i) Humidity. ii) Wet bulb temperature. iii) Dew point temperature. iv) Relative humidity.	CO2	Un	4

4.	b)	7 kg of air at 35^0C dry bulb temperature and 50% relative humidity is mixed with 4 kg of air at 15^0C dry bulb temperature and 15^0C dew point temperature. Calculate specific humidity and the dry bulb temperature of the mixture	CO2	E	6
5.	a)	Describe units of refrigerant. Compare a Heat Engine, Refrigeration, and Heat Pump.	CO3	R, An	5
5.	b)	3000 kg of fruits are supplied to cold storage at 240 C. The cold storage is maintained at -60 C and the fruits get cooled to the storage temperature in 14 hours. The latent heat of freezing is 105 KJ/Kg and the specific heat of fruit is 1.25. Estimate the refrigeration Capacity of the plant.	CO3	E	5
		Or,			
5.	a)	Write down the factors which affect Air Conditioning.	CO3	Ap	5
5.	b)	A theater of 1200 seating capacity is to be air-conditioned for summer conditions with the following data: 5 Outdoor Conditions 300C DBT and 55% RH Required Conditions 200C DBT and 60% RH Amount of air supplied 0.25 m3/min/person Find the sensible heat, latent heat removed from the air per minute, And sensible heat factor for the system.	CO3	E	5

International Islamic University Chittagong

Department of Electrical and Electronic Engineering

B. Sc. Engineering in EEE

Semester End Exam, Spring 2023

Course Code: **ME-2301** Course Title: **Fundamental of Mechanical Engineering**

Time: 2 hours 30 minutes Full Marks: 50

(i) The figures in the right-hand margin indicate full marks

(ii) Course Outcomes and Bloom's Levels are mentioned in additional Columns

Course Outcomes (COs) of the Questions	
CO1	Provide current knowledge, ideas, and the conceptual framework of Mechanical engineering.
CO2	Demonstrate proficiency in solving basic mechanical Engine design problems.
CO3	Design of basic Mechanical Engine for application-specific troubleshooting, identifying problems, and providing solutions for the sustainable development of the society.

Bloom's Levels of the Questions						
Letter Symbols	**C1**	**C2**	**C3**	**C4**	**C5**	**C6**
Meaning	Remember	Understand	Apply	Analyze	Evaluate	Create

Part A

[Answer the questions from the followings]

1.	a)	Is Nuclear power plant suitable for Developing Countries? Justify according to nuclear power's advantages and drawbacks.	**CO3**	**C5**	5
1.	b)	Draw a schematic diagram Benson Boiler and label the parts. Explain its working procedure with advantages.	**CO2**	**C2**	5
2.	a)	Characterize the following terms: i. System. ii. Zeroth Law of Thermodynamics. iii. Equilibrium of State. iv. Applications of Thermodynamics.	**CO2**	**C4**	**5**
2.	b)	3000 J of heat is added to a system and 2500 J of work is done by the system. What is the change in the internal energy of the system?	**CO3**	**C3**	**5**

OR

2.	a)	Point out the following terms: i) Black surface ii) Radiation heat transfer. iii) Convection heat transfer. iv) Fourier's law of heat conduction.	**CO2**	**C2**	**5**
2.	b)	The roof of an electrically heated home is 6 m long, 8 m wide, and 0.25 m thick, and is made of a flat layer of concrete whose thermal conductivity is k = 0.8 W/m°C. The temperatures of the inner and the outer surfaces of the roof one night are measured to be 15°C and 4°C, respectively, for a period of 10 hours. Determine (a) the rate of heat loss through the roof that night and (b) the cost of that heat loss to the home owner if the cost of electricity is $0.08/kWh	**CO3**	**C5**	**5**

Part B

[Answer all the questions from the followings]

3.	a)	Define: i) Humidity. ii) Wet bulb temperature. iii) Dew point temperature. iv) Relative humidity.	CO2	C2	5
3.	b)	7 kg of air at 40^0C dry bulb temperature and 50% relative humidity is mixed with 4 kg of air at 15^0C dry bulb temperature and 15^0C dew point temperature. Calculate specific humidity and the dry bulb temperature of the mixture.	CO3	C3	5

OR

3.	a)	Sketch the winter air conditioning system and describe its working principle.	**CO3**	**C4**	5
3.	b)	An air conditioning plant is required to supply 50 m3 of air per minute at a DBT of 20^0C and 54% R.H. The outside air is at a DBT of 30^0C and 60% R.H. Determine the mass of water drained and the capacity of the cooling coils. Assume the air conditioning plant first to dehumidify and then tool the air.	**CO3**	**C5**	5
4.	a)	Define COP, hence show that; COP of the heat pump = COP of refrigerant + 1	**CO3**	**C1/ C4**	1 4
4.	b)	A machine working on a Carnot Cycle operates between 300K and 255K. Determine the COP. When it is operated as i). A Refrigerator ii). A Heat Pump iii). Heat Engine	**CO3**	**C5**	5
5.	a)	Write a short note on: i). Piston & Piston Ring ii). Connecting Road iii). Engine Block.	**CO3**	**C2**	5
5.	b)	Define Stroke. Explain the four-stroke Cycle Petrol Engine with the necessary diagram.	**CO3**	**C1/ C4**	1 4

International Islamic University Chittagong
Department of Electrical and Electronic Engineering

Final Examination Spring-2020	Program: B.Sc. Engg. (EEE)
Course Code: **ME-2301**	Course Title: **Fundamental of Mechanical Engineering**
Time: **5 hours** (Writing **4 hours 30 minutes** + **30 minutes** submission time)	Full Marks: **50** (**Written** 30 + **Viva**/**Viva-Quiz**-20)

[Answer each of the questions **(1-5)** from the followings; Figures in the right margin indicate full marks.**]**

SET-A

1(a).	Why cop of AC is more than refrigerator? Is a higher COP better for conducting refrigerator or AC.	**CO1**	**R,An**	**03**
1(b).	Illustrate the application of thermodynamics.	**CO2**	**U**	**02**
1(c).	Deduce relation between thermodynamic process & cycle.	**CO2**	**An**	**01**
2(a).	Why boiler blow-down is required?	**CO2**	**An**	**02**
2(b).	"Boiler mountings and accessories are prime need for the boiler operation" analyze it.	**CO1**	**An**	**02**
2(c).	Point out the main difference of fire tube and water tube boiler.	**CO1**	**An**	**02**
3(a).	Do you believe nuclear fusion will soon be a reliable power source?	**CO2**	**An**	**01**
3(b).	How to increase the Rankin cycle efficiencies with proper T-S diagram.	**CO3**	**C**	**03**
3(c).	Draw the schematic diagram of Hg-water Binary Vapor cycle.	**CO1**	**Ap**	**02**
4(a).	What is TOR? Draw the block diagram of vapor compression and vapor absorption refrigeration cycle.	**CO2**	**R,Ap**	**03**
4(b).	A refrigeration system has got temperature of 200^0C and -100^0C for the compressor and the evaporator sides respectively. Find its COP. If compressor work is 4.5 Kw, find the refrigeration capacity in ton.	**CO3**	**Ap**	**03**
5(a).	How convection process is occurred? How many types of convection process are there?	**CO2**	**An,R**	**02**
5(b).	Consider a person standing in a breezy room at 20°C. Determine the total rate of heat transfer from this person if the exposed surface area and the average outer surface temperature of the person are 1.6X m^2 and 29°C, respectively, and the convection heat transfer coefficient is 6 $W/m^2 \cdot$ °C . Convection can be viewed as combined conduction and fluid motion.[X=Last digit of your matric ID]	**CO3**	**Ap**	**03**
5(c).	Can air conditioning facilitates contribute in spreading coronavirus?	**CO1**	**R**	**01**
6.	Viva/Viva-Quiz: The time of viva/viva-quiz will be declared in google classroom.	**CO4**	**R**	**20**

International Islamic University Chittagong
Department of Electrical and Electronic Engineering

Final Examination Spring-2020	Program: B.Sc. Engg. (EEE)
Course Code: **ME-2301**	Course Title: **Fundamental of Mechanical Engineering**
Time: **5 hours** (Writing **4 hours 30 minutes** + **30 minutes** submission time)	Full Marks: **50** (**Written** 30 + **Viva**/**Viva-Quiz**-20)

[Answer each of the questions **(1-5)** from the followings; Figures in the right margin indicate full marks.**]**

SET-B

1(a).	Complete the relationship of system, surroundings and boundary.	**CO1**	**Ap**	**02**
1(b).	Illustrate the application of thermodynamics.	**CO2**	**U**	**02**
1(c).	Deduce relation between thermodynamic process & cycle.	**CO2**	**An**	**02**
2(a).	Why boiler blow-down is required?	**CO2**	**An**	**02**
2(b).	How can advanced nuclear energy systems research help the world reach its goal of reducing carbon emissions?	**CO3**	**An**	**02**
2(c).	How important are the following: safety, rules, and procedures when dealing with nuclear energy?	**CO3**	**U**	**02**
3(a).	How can one get the optimum bleeding point in a steam turbine for regeneration?	**CO2**	**An**	**02**
3(b).	How to increase the Rankin cycle efficiencies with proper T-S diagram.	**CO3**	**C**	**02**
3(c).	Draw the schematic diagram of Hg-water Binary Vapor cycle.	**CO1**	**Ap**	**02**
4(a).	Develop a relation of refrigeration and heat pump with block diagram.	**CO2**	**C**	**03**
4(b).	A refrigeration system has got temperature of 200^0C and -100^0C for the compressor and the evaporator sides respectively. Find its COP. If compressor work is 4.5 Kw, find the refrigeration capacity in ton.	**CO3**	**Ap**	**03**
5(a).	Define thermal conductivity? What are the factors affecting the thermal conductivity?	**CO2**	**An,R**	**02**
5(b).	Consider a person standing in a breezy room at 20°C. Determine the total rate of heat transfer from this person if the exposed surface area and the average outer surface temperature of the person are 1.6 m^2 and 29°C, respectively, and the convection heat transfer coefficient is 6X $W/m^2 \cdot °C$. Convection can be viewed as combined conduction and fluid motion. .[X=Last digit of your matric ID]	**CO3**	**Ap**	**03**
5(c).	Can air conditioning facilitates contribute in spreading coronavirus?	**CO1**	**R**	**01**
6.	Viva/Viva-Quiz: The time of viva/viva-quiz will be declared in google classroom.	**CO4**	**R**	**20**

International Islamic University Chittagong
Department of Electrical and Electronic Engineering

Final Examination Spring-2020	Program: B.Sc. Engg. (EEE)
Course Code: **ME-2301**	Course Title: **Fundamental of Mechanical Engineering**
Time: **5 hours** (Writing **4 hours 30 minutes** + **30 minutes** submission time)	Full Marks: **50** (**Written** 30 + **Viva**/**Viva-Quiz**-20)

[Answer each of the questions **(1-5)** from the followings; Figures in the right margin indicate full marks.**]**

SET-C

1(a).	Explain the following terms: Isolated system, Open system and Closed system and give example where ever possible.	**CO1**	**Ap**	**02**
1(b).	How important are the following: safety, rules, and procedures when dealing with nuclear energy?	**CO2**	**U**	**02**
1(c).	Deduce relation between thermodynamic process & cycle.	**CO2**	**An**	**02**
2(a).	Why boiler blow-down is required?	**CO2**	**An**	**02**
2(b).	How can advanced nuclear energy systems research help the world reach its goal of reducing carbon emissions?	**CO3**	**An**	**02**
2(c).	Demonstrate the advantage and disadvantage of renewable energy.	**CO3**	**U**	**02**
3(a).	How can one get the optimum bleeding point in a steam turbine for regeneration?	**CO2**	**An**	**01**
3(b).	How to increase the Rankin cycle efficiencies with proper T-S diagram.	**CO3**	**C**	**03**
3(c).	Draw the schematic diagram of Hg-water Binary Vapor cycle.	**CO1**	**Ap**	**02**
4(a).	Develop a relation of refrigeration and heat pump with block diagram.	**CO2**	**C**	**03**
4(b).	A refrigeration system has got temperature of 50^0C and -20^0C for the compressor and the evaporator sides respectively. Find its COP. If compressor work is 8X KW, find the refrigeration capacity in ton.[X=Last digit of your matric ID]	**CO3**	**Ap**	**03**
5(a).	'The development of effective temperature control, refrigeration has revolutionized almost every aspect of industry' Explain it on your own view.	**CO2**	**An,R**	**02**
5(b).	The roof of an electrically heated home is .6x m long, .8x m wide, and 0.25 m thick, and is made of a flat layer of concrete whose thermal conductivity is k 0.8 W/m°C The temperatures of the inner and the outer surfaces of the roof one night are measured to be 25°C and 0°C, respectively, for a period of 10 hours. [X=Last digit of your matric ID] Determine: (a) The rate of heat loss through the roof that night and (b) The cost of that heat loss to the home owner if the cost of electricity is $0.2/kWh.	**CO3**	**Ap**	**03**

5(c).	Can air conditioning facilitates contribute in spreading coronavirus?	**CO1**	**R**	**01**
6.	Viva/Viva-Quiz: The time of viva/viva-quiz will be declared in google classroom.	**CO4**	**R**	**20**

International Islamic University Chittagong
Department of Electrical and Electronic Engineering

Final Examination Spring-2020	Program: B.Sc. Engg. (EEE)
Course Code: **ME-2301**	Course Title: **Fundamental of Mechanical Engineering**
Time: **5 hours** (Writing **4 hours 30 minutes** + **30 minutes** submission time)	Full Marks: **50** (**Written** 30 + **Viva**/**Viva-Quiz**-20)

[Answer each of the questions **(1-5)** from the followings; Figures in the right margin indicate full marks.**]**

SET-D

1(a).	Deduce relation between thermodynamic process & cycle.	**CO2**	**An**	**02**
1(b).	State the third law of thermodynamics. Give its limitations and importance.	**CO2**	**R,C**	**02**
1(c).	How can we differentiate the heat transfer and thermodynamics in practical application?	**CO1**	**E**	**02**
2(a).	For adjustable load how can we draw a cogeneration process?	**CO2**	**An**	**02**
2(b).	Discuss the function of Safety, Stop, and Feed check valves?	**CO1**	**U**	**02**
2(c).	Briefly explain the boiler mounting and accessories.	**CO3**	**C**	**02**
3(a).	Is nuclear power plant safe for our environment? Why should we be concerned about health issues from nuclear or coal plants that are far from my home?	**CO3**	**C**	**02**
3(b).	Are wind turbines a threat to birds or bats?	**CO2**	**C**	**02**
3(c).	Do we really need nuclear in order to deal with global warming?	**CO1**	**R**	**02**
4(a).	How can one get the optimum bleeding point in a steam turbine for regeneration?	**CO2**	**R**	**02**
4(b).	A refrigeration system has got temperature of 200^0C and -100^0C for the compressor and the evaporator sides respectively. Find its COP. If compressor work is 4.5Kw, find the refrigeration capacity in ton.	**CO3**	**An**	**02**
4(c).	Difference between the refrigeration and heat pump?	**CO1**	**An**	**02**
5(a).	What are the basic units of mechanical refrigeration systems?	**CO2**	**R**	**01**
5(b).	The roof of an electrically heated home is .3x m long, .2x m wide, and 0.25 m thick, and is made of a flat layer of concrete whose thermal conductivity is k 0.8 W/m°C. The temperatures of the inner and the outer surfaces of the roof one night are measured to be 25°C and 0°C, respectively, for a period of 10 hours.[X=last digit of your matric ID] Determine: (a) The rate of heat loss through the roof that night and (b) The cost of that heat loss to the home owner if the cost of electricity is $0.2/kWh.	**CO3**	**C**	**03**
5(c).	Can air conditioning facilitates contribute in spreading coronavirus?	**CO2**	**R**	**02**
6.	Viva/Viva-Quiz: The time of viva/viva-quiz will be declared in google classroom.	**CO4**	**R**	**20**

International Islamic University Chittagong
Department of Electrical and Electronic Engineering
B. Sc. Engineering in EEE
Semester End Exam, Autumn 2024

Course Code: **ME-2301** Course Title: **Fundamentals of Mechanical Engineering**
Time: 2 hours 30 minutes Full Marks: 50

(i) The figures in the right-hand margin indicate full marks
(ii) Course Outcomes and Bloom's Levels are mentioned in additional Columns

Course Outcomes (COs), Program Outcomes (POs) and Bloom's Levels (BL) of the Questions		
CO	**CO Statements**	**PO**
CO1	Provide current knowledge and conceptual framework of Mechanical engineering.	POa
CO2	Demonstrate proficiency in solving basic mechanical Engine design problems.	POc
CO3	Design of basic Mechanical Engine for application-specific troubleshooting, identifying problems and solutions for the sustainable development of the society.	POf

Bloom's Levels (BL) of the Questions						
Letter Symbols	**C1**	**C2**	**C3**	**C4**	**C5**	**C6**
Meaning	Remember	Understand	Apply	Analyze	Evaluate	Create

Part A

[Answer the questions from the followings]

1.	a)	What are the primary causes of the energy crisis in Bangladesh? Provide some recommendations to address the energy crisis in Bangladesh.	**CO2**	**C3**	2+3
1.	b)	Draw schematic diagram of Benson Boiler and label the parts. Explain its working procedure with advantages.	**CO2**	**C1, C6**	5
2.	a)	Characterize the following terms: i. Fourier's law of heat conduction. ii. Newton's law of cooling. iii. Emissivity. iv. Blackbody.	**CO2**	**C3**	5
2.	b)	3.5 kg of liquid water initially at 20°C is to be heated to 98°C in a teapot equipped with a 1100 W electric heating element inside shown in figure 2.1. The teapot is 0.5 kg and has an average specific heat of 0.9 kJ/kg °C. Taking the specific heat of water to be 4.1 kJ/kg °C and disregarding any heat loss from the teapot, determine how long it will take for the water to be heated.	**CO3**	**C6**	5

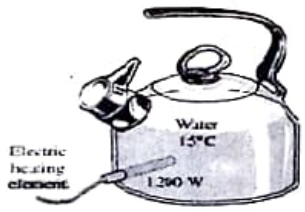

Figure: 2.1

Or

2.	a)	Design a graphical presentation of system, boundary and surrounding and classify system on the boundary.	**CO2**	**C3**	5
2.	b)	A stationary mass of gas is compressed without friction from an initial state of $0.5m^3$ and 0.105 MPa to a final state of 0.25 m3 and 0.105MPa, the pressure remaining constant during the process. There is a transfer of 46.1 KJ of heat from the gas. Determine the internal energy change of the gas? $Q_{1\text{-}2}= U_2\text{-}U_1+W_{1\text{-}2}$, $W_{1\text{-}2}= P(V_2\text{-}V_1)$	**CO3**	**C6**	5

Part B

Answer any two questions from the following:

3.	a)	Show that the relative humidity is 100% for Saturated air	CO3	C3	5
3.	b)	The humidity ratio of atmospheric air at 28° C dry bulb temperature and 760 mm of mercury is 0.016 kg kg of dry air. Estimate: i). Relative humidity ii). Wet-bulb Temperature iii). Dew point Temperature iv). Enthalpy v). Specific volume.	CO3	C6	5
		OR			
3.	a)	Sketch the winter air conditioning system and describe its working principle.	CO3	C3	5
3.	b)	A theater of 1200 seating capacity is to be air-conditioned for summer conditions with the following data: Outdoor Conditions 300C DBT and 55% RH Required Conditions 200C DBT and 60% RH Amount of air supplied 0.25 m3/min/person Find the sensible heat, latent heat removed from the air per minute And sensible heat factor for the system.	CO3	C6	5
4.	a)	Define COP. Hence how that COP of heat pump = COP of refrigerant + 1.	CO2	C4	5
4.	b)	10000 kg of fruits are supplied to cold storage at 20° C. The cold storage is maintained at -5° C and the fruits get cooled to the storage temperature in 12 hours. The latent heat of freezing is 105 KJ/Kg and the specific heat of fruit is 1.25. Estimate the refrigeration Capacity of the plant.	CO2	C5	5
5.	a)	Estimate the advantages of Lubrication of I.C Engine. Write a short note on: i). Piston & Piston Ring ii). Connecting Road iii). Engine Block.	CO2	C2	2+3
5.	b)	Define Stroke. Explain the four-stroke Cycle Petrol Engine with the necessary diagram.	CO3	C3	5