Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–I & II(OLD) EXAMINATION – WINTER 2022

Subject Code:110006 Date:03-03-2023

Subject Name:Elements of Mechanical Engineering

Time:10:30 AM TO 01:00 PM Total Marks:70

Instructions:

1. **Attempt any five questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

Q.1	**(a)**	An ideal gas is heated from 25˚C to145˚C. The mass of gas is 2 kg. Determine (i) Specific heats (ii) change in internal energy, (iii) change in enthalpy. Assume R = 267 J/Kg K and γ =1.4 for the gas.	**07**
	(b)	Describe in brief the various non-ferrous metals along with their applications.	**07**
Q.2	**(a)**	Derive the Carnot efficiency of vapour. Draw P-V diagram for the Carnot vapour cycle	**07**
	(b)	With neat sketch explain the working of window Air Conditioner.	**07**
Q.3	**(a)**	In an air standard Otto cycle the maximum and minimum temperatures are 1400˚C and 15˚C. The heat supplied per kg of air is 800 kJ. Calculate the compression ratio and cycle efficiency. Also calculate the ratio of maximum to minimum pressures in the cycle	**07**
	(b)	Explain with neat figure, the construction of Cochran Boiler	**07**
Q.4	**(a)**	Classify heat engines and pumps.	**07**
	(b)	A cylinder 2 stroke engine develops 30 kW at 2500 rpm. The mean effective pressure of each cylinder is 800 kPa and mechanical efficiency = 80%. Calculate brake power and mass flow rate of fuel if L/D =1.5, Brake thermal efficiency = 28% and calorific value of fuel = 44000kJ/kg.	**07**
Q.5	**(a)**	Compare (i) Two stroke and Four stroke engine (ii) brake and clutch.	**07**
	(b)	Derive the expression of work done by a single stage single acting reciprocating air compressor neglecting clearance volume. Consider adiabatic process for expansion of air.	**07**
Q.6	**(a)**	Specify the types of centrifugal pumps and explain any one in detail.	**07**
	(b)	Classify the types of couplings and with neat figure, discuss the working of any coupling of your choice.	**07**
Q.7	**(a)**	Derive the expression for ratio of driving tensions in a flat belt drive.	**07**
	(b)	A steel drum weighing 20 kg contains 25 kg of water at 20˚C. 0.7m^3 of steam at a pressure of 8 bar is passed into the drum. The temperature of water after mixing with the steam is 82˚C. find the quality of steam passed into the steel drum. Assume C_p for material of drum as 0.84 kJ/kg K.	**07**

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GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–I & II(OLD) EXAMINATION – WINTER 2022

Subject Code:110004 Date:09-03-2023

Subject Name:Elements of Civil Engineering

Time:10:30 AM TO 01:00 PM Total Marks:70

Instructions:

1. **Attempt any five questions.**
1. **Make suitable assumptions wherever necessary.**
2. **Figures to the right indicate full marks.**
3. **Simple and non-programmable scientific calculators are allowed.**

Q.1	**(a)**	Explain role of civil engineer.	**07**
	(b)	Write fundamental principle of surveying.	**07**
Q.2	**(a)**	Enlist various instruments used in chaining and describe with sketch any two of them.	**07**
	(b)	Enlist scheduling techniques and explain bar chart.	**07**
Q.3	**(a)**	The length of a chain line when measured with a 20m chain was found to be 1432 meters. But when a 30m chain which was 0.65 meter too short was used for the purpose, the line was found to be 1445 meter long. Find the error in 20m chain?	**07**
	(b)	State and explain the components of GIS**.**	**07**
Q.4	**(a)**	State various characteristics of contours in details.	**07**
	(b)	The details of observed bearings are mentioned below. Find out the included angles and also correct the angles if needed to be corrected.	**07**

Line	FB	BB
AB	20^0 30’	200^0 00’
BC	110^0 00’	290^0 30’
CD	195^0 00’	15^0 00’
DE	286^0 30’	106^0 00

Q.5	**(a)**	Differentiate between load bearing structure and framed bearing structure.	**07**
	(b)	Enumerate various principles of planning and explain privacy and Roominess in detail**.**	**07**
Q.6	**(a)**	Discuss use and properties of Wrought iron.	**07**
	(b)	Draw the neat sketch for the following (i) R.C.C lintel with chajja (ii) sectional plan of a ledged and battened door.	**07**
Q.7	**(a)**	Write a short note on different ways of transportation**.**	**07**
	(b)	Write a short note on watershed development.	**07**

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Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–I & II(OLD) EXAMINATION – WINTER 2022

Subject Code:110006 Date:03-03-2023

Subject Name:Elements of Mechanical Engineering

Time:10:30 AM TO 01:00 PM Total Marks:70

Instructions:

1. **Attempt any five questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

Q.1	**(a)**	An ideal gas is heated from 25˚C to145˚C. The mass of gas is 2 kg. Determine (i) Specific heats (ii) change in internal energy, (iii) change in enthalpy. Assume R = 267 J/Kg K and γ =1.4 for the gas.	**07**
	(b)	Describe in brief the various non-ferrous metals along with their applications.	**07**
Q.2	**(a)**	Derive the Carnot efficiency of vapour. Draw P-V diagram for the Carnot vapour cycle	**07**
	(b)	With neat sketch explain the working of window Air Conditioner.	**07**
Q.3	**(a)**	In an air standard Otto cycle the maximum and minimum temperatures are 1400˚C and 15˚C. The heat supplied per kg of air is 800 kJ. Calculate the compression ratio and cycle efficiency. Also calculate the ratio of maximum to minimum pressures in the cycle	**07**
	(b)	Explain with neat figure, the construction of Cochran Boiler	**07**
Q.4	**(a)**	Classify heat engines and pumps.	**07**
	(b)	A cylinder 2 stroke engine develops 30 kW at 2500 rpm. The mean effective pressure of each cylinder is 800 kPa and mechanical efficiency = 80%. Calculate brake power and mass flow rate of fuel if L/D =1.5, Brake thermal efficiency = 28% and calorific value of fuel = 44000kJ/kg.	**07**
Q.5	**(a)**	Compare (i) Two stroke and Four stroke engine (ii) brake and clutch.	**07**
	(b)	Derive the expression of work done by a single stage single acting reciprocating air compressor neglecting clearance volume. Consider adiabatic process for expansion of air.	**07**
Q.6	**(a)**	Specify the types of centrifugal pumps and explain any one in detail.	**07**
	(b)	Classify the types of couplings and with neat figure, discuss the working of any coupling of your choice.	**07**
Q.7	**(a)**	Derive the expression for ratio of driving tensions in a flat belt drive.	**07**
	(b)	A steel drum weighing 20 kg contains 25 kg of water at 20˚C. 0.7m^3 of steam at a pressure of 8 bar is passed into the drum. The temperature of water after mixing with the steam is 82˚C. find the quality of steam passed into the steel drum. Assume C_p for material of drum as 0.84 kJ/kg K.	**07**

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GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–I & II(OLD) EXAMINATION – WINTER 2022

Subject Code:110004 Date:09-03-2023

Subject Name:Elements of Civil Engineering

Time:10:30 AM TO 01:00 PM Total Marks:70

Instructions:

1. **Attempt any five questions.**
1. **Make suitable assumptions wherever necessary.**
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3. **Simple and non-programmable scientific calculators are allowed.**

Q.1	**(a)**	Explain role of civil engineer.	**07**
	(b)	Write fundamental principle of surveying.	**07**
Q.2	**(a)**	Enlist various instruments used in chaining and describe with sketch any two of them.	**07**
	(b)	Enlist scheduling techniques and explain bar chart.	**07**
Q.3	**(a)**	The length of a chain line when measured with a 20m chain was found to be 1432 meters. But when a 30m chain which was 0.65 meter too short was used for the purpose, the line was found to be 1445 meter long. Find the error in 20m chain?	**07**
	(b)	State and explain the components of GIS**.**	**07**
Q.4	**(a)**	State various characteristics of contours in details.	**07**
	(b)	The details of observed bearings are mentioned below. Find out the included angles and also correct the angles if needed to be corrected.	**07**

Line	FB	BB
AB	20^0 30’	200^0 00’
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CD	195^0 00’	15^0 00’
DE	286^0 30’	106^0 00

Q.5	**(a)**	Differentiate between load bearing structure and framed bearing structure.	**07**
	(b)	Enumerate various principles of planning and explain privacy and Roominess in detail**.**	**07**
Q.6	**(a)**	Discuss use and properties of Wrought iron.	**07**
	(b)	Draw the neat sketch for the following (i) R.C.C lintel with chajja (ii) sectional plan of a ledged and battened door.	**07**
Q.7	**(a)**	Write a short note on different ways of transportation**.**	**07**
	(b)	Write a short note on watershed development.	**07**

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GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–I & II(OLD) EXAMINATION – WINTER 2022

Subject Code:110006 Date:03-03-2023

Subject Name:Elements of Mechanical Engineering

Time:10:30 AM TO 01:00 PM Total Marks:70

Instructions:

1. **Attempt any five questions.**
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Q.1	**(a)**	An ideal gas is heated from 25˚C to145˚C. The mass of gas is 2 kg. Determine (i) Specific heats (ii) change in internal energy, (iii) change in enthalpy. Assume R = 267 J/Kg K and γ =1.4 for the gas.	**07**
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BE - SEMESTER–I & II(OLD) EXAMINATION – WINTER 2022

Subject Code:110004 Date:09-03-2023

Subject Name:Elements of Civil Engineering

Time:10:30 AM TO 01:00 PM Total Marks:70

Instructions:

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1. **Make suitable assumptions wherever necessary.**
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Q.1	**(a)**	Explain role of civil engineer.	**07**
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Q.2	**(a)**	Enlist various instruments used in chaining and describe with sketch any two of them.	**07**
	(b)	Enlist scheduling techniques and explain bar chart.	**07**
Q.3	**(a)**	The length of a chain line when measured with a 20m chain was found to be 1432 meters. But when a 30m chain which was 0.65 meter too short was used for the purpose, the line was found to be 1445 meter long. Find the error in 20m chain?	**07**
	(b)	State and explain the components of GIS**.**	**07**
Q.4	**(a)**	State various characteristics of contours in details.	**07**
	(b)	The details of observed bearings are mentioned below. Find out the included angles and also correct the angles if needed to be corrected.	**07**

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