

GUJARAT TECHNOLOGICAL UNIVERSITY**BE- SEMESTER-I & II (NEW) EXAMINATION – WINTER 2020****Subject Code:2110006****Date:18/03/2021****Subject Name:Elements of Mechanical Engineering****Time:10:30 AM TO 12:30 PM****Total Marks:56****Instructions:**

1. Attempt any EIGHT questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Use of steam table is allowable.

Q.1	Objective Questions	Mark
	Select the correct answer	07
1.	Cut-off ratio is related to (a)Carnot cycle (b) Otto cycle (c) Diesel cycle (d) Rankine cycle	
2.	The Universal gas Constant is equal to (a) M/R (b) R/M (c) M*R (d) All of the above	
3.	The law $PV = C$ is related to process which is (a)Adiabatic (b) Isobaric (c) Isochoric (d) Isothermal	
4.	Dryness fraction(x) of superheated steam is (a)equal to 0 (b) greater than 1 (c) less than 1 (d) equal to 1	
5.	The unit of pressure is (a)Pascal (b) N/m^2 (c) bar (d) all of the above	
6.	The compression ratio for Diesel engine is in the following range: (a)12 to 22 (b) 5 to 10 (c) 10 to 12 (d) None of the above	
7.	The sealing ring for pressure cooker is made from (a)Leather (b) Rubber (c) Plastic (d) Aluminum	
Q.2	Define the following terms:	07
1.	Elasticity	
2.	Hardness	
3.	Boiling point	
4.	Melting point	
5.	Prime mover	
6.	One ton refrigeration	
7.	Open system	
Q.3	(a) Differentiate between Brake and Clutch	03
	(b) Write a short note on: Engineering materials	04
Q.4	Explain with neat sketch the working of belt drives and gear drives	07
Q.5	(a) Compare petrol engines with diesel engines.	03
	(b) Write a short note on "Wind Energy".	04

Q.6	Draw air standard Otto cycle on p-V and T-s diagrams. Derive its efficiency equation with usual notations.	07
Q.7	(a) Classify the compressors.	03
	(b) Write a short note on: Split air conditioner	04
Q.8	Explain with neat sketch construction and working of Centrifugal pump.	07
Q.9	(a) List the boiler mountings and accessories.	03
	(b) Draw neat and labeled diagram of Cochran Boiler	04
Q.10	With neat sketch explain the construction and working of (1) Fusible plug (2) Pressure gauge	07
Q.11	(a) Prove that $C_p - C_v = R$ with usual notations.	03
	(b) Write a short note on: Throttling calorimeter	04
Q.12	Calculate the total amount of heat required to produce 5 kg of steam at a pressure of 5 bar and temperature of 250 °C from the water at 25 °C. Take specific heat of steam = 2.1 kJ/kg-K. and the specific heat of water = 4.187 kJ/kg-K.	07
Q.13	(a) Explain the terms: Sensible heat, Latent heat and Super heat	03
	(b) Write a statement of zeroth, first, second law of Thermodynamic.	04
Q.14	The following readings were recorded during the test on single cylinder four stroke diesel engine. (1) Cylinder diameter = 300 mm (2) Stroke length = 450 mm (3) Mean effective pressure = 6 bar (4) Speed of engine = 300 r.p.m. (5) Net brake load = 1500 N (6) Effective brake drum diameter = 1.8m. Calculate: (1) Indicated Power (2) Brake Power (3) Mechanical efficiency.	07
