

JK LAKSHMIPAT UNIVERSITY, JAIPUR

INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination (Regular), November 2017

B. Tech in Chemical, Civil & Mechanical Engineering, Semester Ist

Roll No.....

CM101: Elements of Engineering

Time: 3 hours

Max. Marks: 100

Instructions to students:

1. Do not write anything other than your roll number on question paper.
2. Assume suitable data wherever required and mention it clearly.
3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.

Q.1A Objective type multiple choice questions (10 questions @ 1 mark)

10

- i. In diesel engine, the compression ratio in comparison to petrol engine is
 - (a) More
 - (b) Less
 - (c) Same
 - (d) None of these
- ii. An isolated system is one in which
 - (a) Mass may cross the system boundaries but not the energy
 - (b) Energy may cross the system boundaries but not the mass
 - (c) Neither mass nor energy crosses the system boundaries
 - (d) Both energy and mass may cross the system boundaries
- iii. In Otto cycle and Diesel cycle, heat is rejected at
 - (a) Constant pressure
 - (b) Constant volume
 - (c) Constant temperature
 - (d) Constant enthalpy
- iv. The unit of temperature in SI unit is
 - (a) Celsius
 - (b) Fahrenheit
 - (c) Kelvin
 - (d) Rankine
- v. Total heat of a substance is also called as
 - (a) Internal energy
 - (b) Entropy
 - (c) Heat capacity
 - (d) Enthalpy
- vi. In diesel engine, the air-fuel ratio in comparison to petrol engine is
 - (a) More
 - (b) Less
 - (c) Same
 - (d) Variable
- vii. The first law of thermodynamic is the law of
 - (a) Conservation of mass
 - (b) Conversion of energy
 - (c) Conservation of momentum
 - (d) Conversion of heat
- viii. The air-fuel ratio of the diesel engine is controlled by
 - (a) Fuel pump
 - (b) Injector
 - (c) Governor
 - (d) Carburetor
- ix. In Fahrenheit scale, the freezing point of water is given by
 - (a) 32 °F
 - (b) 112 °F
 - (c) 132 °F
 - (d) 212 °F
- x. In kelvin scale, 113° Fahrenheit is can be expressed as
 - (a) 308 K
 - (b) 318
 - (c) 328 K
 - (d) 338 K

Q.2A	Short answer type questions (2 questions @ 2.5 marks)	5
i.	Define the concept of entropy and enthalpy for a thermodynamic system.	
ii.	Define the zeroth Law and First Law of thermodynamic with suitable example.	
Q.2B	Define the swept volume and clearance volume for IC engine. Differentiate between two stroke petrol engine and four stroke petrol engine. (Any 6)	2+3
Q.3A	Define the compression ratio for IC engine. Differentiate between Internal combustion engine and external combustion engine. (Any 8)	1+4
Q.3B	What is the role of gear in power transmission? Discuss the different types of gears used in Power transmission with neat sketch.	1+4
Q.4A	What are the structural components of timber? Draw the neat and clean diagram of different elements.	05
Q.4B	Discuss Dry Manufacturing process of cement.	05
Q.5A	What are the traffic control devices? What are the different types of Road signs?	05
Q.5B	Give the name of important constituents of cement and state the role of each in achieving its properties.	05
Q.6A	Discuss the commonly used belt materials in power transmission? Differentiate between flat belt and rope belt. (Any 6)	2+3
Q.6B	What is importance of clutch in power transmission? Discuss the various types of clutches used in detail.	1+4
OR		
Q.6B	How dynamometer is useful in IC engine? Discuss the various types of dynamometers used in IC engines.	1+4
Q.7A	What are the different design loads which are act on Building? Explain those design loads.	05
Q.7B	What are different branches of Civil Engineering? What is the role of civil engineer in society?	05
OR		
Q.7B	Explain the role of transportation in national development.	05
Q.8A	What are the sub-structures and super structures? Give the different name of building components. Explain foundation with neat and clean diagram.	10
Q.9A	A four cylinder four stroke petrol engine has mean effective pressure of 5.5 bar. The speed of the engine is 1200 rpm if diameter of the piston and stroke length are 110 mm and 120 mm respectively, If engine consumes 180 kg of fuel in hour, then find the following	2×5
	(a) Indicated power and Indicated thermal efficiency if calorific value of the fuel is petrol is 45800 kJ/kg.	
	(b) Brake power and brake thermal efficiency if engine produces a torque of 180 Nm.	

(c) Mechanical efficiency and compression ratio if clearance volume is 1785 cc.

(d) Indicated specific fuel consumption and brake specific fuel consumption.

(e) Engine capacity and specific volume of engine.

Q.9B Differentiate between two stroke engine and four stroke engine. Describe the working principle of four stroke diesel engine with neat sketch. 5+5

OR

Q.9B Discuss the following terms with their mathematical expression. 2×5

(a) Indicated Power and brake power

(b) Indicated thermal efficiency and brake thermal efficiency

(c) Compression ratio and air/fuel ratio

(d) Mechanical efficiency and fuel efficiency

(e) Indicated specific fuel consumption and brake specific fuel consumption