

JK Lakshmipat University Jaipur
INSTITUTE OF ENGINEERING AND TECHNOLOGY

End-Term Examination, April-May 2018

B. Tech. in CSE, CSE-RH, ECE, ECE-RH, EE, Semester II

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 questions (10 questions @ 1 mark)

10

- i. In a four stroke engine, the number of revolutions of the crankshaft for completion of working cycle is
(A) one (B) two (C) three (D) four
- ii. The **m. e. p.** of a diesel engine with fixed compression ratio can be improved by
(A) increasing cut-off ratio (B) increasing back pressure
(C) increasing operating pressure (D) reducing charge density
- iii. Length of cross belt connecting two pulleys of radii r_1 and r_2 and at a center distance D apart, is
(A) $\pi (r_1 + r_2) + (r_1 - r_2)^2/D + 2D$ (B) $\pi (r_1 + r_2) + (r_1 + r_2)^2/D + 2D$
(C) $\pi (r_1 - r_2) + (r_1 - r_2)^2/D + 2D$ (D) $\pi (r_1 - r_2) + (r_1 + r_2)^2/D + 2D$
- iv. The circle passing through the top of the teeth of gear is known as
(A) inner circle (B) base circle (C) addendum circle (D) dedendum circle
- v. A system comprising of single phase is known as
(A) open system (B) closed system (C) homogeneous system (D) heterogeneous system
- vi. In an isolated system, what transfers?
(a) mass (b) energy (c) both mass and energy (d) neither mass nor energy

ix The main ingredient of Portland cement are:

- (a) Lime and Silica
- (b) Lime and Alumina
- (c) Silica and Alumina
- (d) Lime and Iron

x Gypsum consist of:

- (a) H_2S and CO_2
- (b) $CaSO_4$ and H_2O
- (c) Lime and H_2O
- (d) CO_2 and Calcium

Q.1B Short answer type questions (4 questions @ 2.5 marks)

10

a. What is Prime mover? How prime movers are Classified?

b. Compare Otto cycle with Diesel cycle

c. Write two differences between Quarrying and Mining.

d. Write Short notes on:

- (a) Dead Load of building
- (b) Live Load on building

Q.2A Define and explain Absolute pressure, Gauge pressure and Atmospheric pressure.

05

Q.2B Classify and explain thermodynamic system and give example of each.

05

Q.3A Explain with neat sketch Bourdon tube type pressure gauge

05

Q.3B Explain the structure and working of four stroke petrol engine with a neat sketch

05

OR

Q.3B An engine operation on an air standard Otto cycle has a compression ratio equal to 7. The conditions at the start of compression are 0.1 MPa and 300 K. the pressure at the end of heat addition is 4 MPa. Determine (i) thermal efficiency (ii) net work done per kg of air where $C_v = 0.718$ kJ/kg, $\gamma_{air} = 1.4$ and (iii) mean effective pressure

05

Q.4A What are the relative merits and demerits of belt, rope and chain drive?

05

Q.4B A leather belt of density 1000 kg/m³, thickness 10 mm is used to transmit a power of 8 kW from a pulley 1.5 m in diameter running at 300 rpm. Determine the width of the belt taking centrifugal tension into account. If angle of lap is 165° and coefficient of friction between belt and pulley is 0.25. Assuming allowable stress for leather belt is 1.5 MPa.

05

OR

Q.4B Define following terms with respect to gear and depict the same through a sketch: (i) module (ii) pressure angle (iii) pitch point (iv) addendum (v) pitch circle

05

Q.5A What is the use of braking system in a vehicle? Classify the various types of brakes

05

Q.5B What are the various types of chain drive? Explain with neat sketches

05

Q.6A Classify the gears and explain any two of them with neat sketches

05

Q.6B What are the geological classification of rock? Explain with example.

05

Q.7A Classify buildings according to National Building Code of India (SP 7).

05

Q.7B Explain different process of Preparation of brick.

05

Q.8A What are the different branches of Civil Engineering? Explain them.

05

Q.8B Write different modes of transportation.

05

Q.9 What is Rigid Pavements? Explain Flexible Pavements with neat and clean diagram.

10