

B.E. / B.TECH. DEGREE EXAMINATIONS, DEC 2020 (Held during April, 2021)

First Semester

CM18151 – Basic Civil and Mechanical Engineering*Common to BT, CH & EE*

(Regulation 2018)

Time: Three hours

Maximum: 80 Marks

Answer **ALL** questions**PART A - (8 X 2 = 16 marks)**

1. Match the following:

a) Tachometric method	1) Declination
b) Difference between magnetic north and geographic north	2) Hilly terrain
c) stone that marks boundary	3) Earth's curvature
d) Plane and geodetic surveying	4) Mere stone

2. Answer in True/False:

A) Base line is the biggest of the survey line.

B) Chain surveying uses the principle of Triangulation.

C) Record book in which chain measurements are entered.

D) Fore bearing is measured in the direction of survey.

i. A) True B) True C) False D) True

ii. A) True B) True C) False D) False

iii. A) True B) False C) True D) False

iv. A) False B) False C) False D) True

3. Match the following:

- | | |
|--------------------|------------------------|
| a) Scavenging | 1) Four stroke engines |
| b) Otto Cycle | 2) S.I engine |
| c) Diesel Cycle | 3) C.I engine |
| d) Valve mechanism | 4) Two stroke engines |

4. Answer in True/False:

A) A heat engine is a device which transforms the chemical energy of a fuel into thermal energy.

B) Crude oil, coal and natural gases are renewable sources of energy.

C) Boiler is an apparatus to produces thermal energy.

D) Hydraulic turbines use kinetic and potential energy of water and converts into usable mechanical energy

- i. A) True B) True C) False D) True
 - ii. A) True B) True C) False D) False
 - iii. A) True B) False C) True D) True
 - iv. A) False B) False C) False D) True
5. List the different types of bonds in brick masonry.
 6. Define parameters: Bore, Stroke, TDC, BDC.
 7. Differentiate between an impulse turbine and a reaction turbine.
 8. State the values of DBT and RH for human comfort in India.

PART B - (4 X16 = 64 marks)

- 09 (a) (i) Name any four classifications of surveying based on the instruments used. (4)
- (ii) The following consecutive readings were taken with a leveling instrument on a continuously sloping ground. The readings are as follows (8)
- 0.78, 1.535, 1.955, 2.430, 2.985, 3.480, 1.155, 1.960, 2.365, 3.640, 0.935, 1.045, 1.630 and 2.545.
- The reduced level of first point A was 180.75m. The instrument was shifted after 6th and 10th reading. Solve by any one of the methods used in leveling and find the RL of the last point.
- (iii) What is a bridge? What are meant by superstructure and substructure of a bridge? (4)
- (OR)**
- (b) (i) Define bearing capacity of soils and give the methods of improving the bearing capacity. (6)
- (ii) A 200kN compressive load was supplied on cylindrical specimen of 30 mm diameter and 200 mm length. The decrease in length of specimen observed as 0.4 mm. Find out the stress, strain and young's modulus of the material. (5)
- (iii) When do we use deep foundations? With help of suitable sketches, distinguish between pile foundations and fraction pile foundations. (5)
- 10 (a) (i) Draw the layout of Hydroelectric power plant and explain its working principle. (12)
- (ii) State the advantage and disadvantage of Gas turbine power plant. (4)
- (OR)**
- (b) (i) Differentiate between fire tube boiler and water tube boiler. (4)
- (ii) With aid of suitable sketch, explain the working principle of single acting reciprocating pump. (10)

(iii) In a centrifugal pump (except self-priming) priming is required in starting after every shutdown. Justify it? (2)

11 (a) (i) Sketch La Mount high pressure boiler and naming all main parts. (10)

(ii) Compare Yamaha Rx100 and Yamaha FZ with following aspect: Completion of cycle, Flywheel, valve mechanism, cooling requirement, volumetric efficiency, thermal efficiency, power produced and Lubrication requirement. According to company specification Yamaha Rx100 as 2-stroke Engine and Yamaha FZ as 4-stroke engine. (6)

(OR)

(b) With neat sketches, explain the working principle of parallel and series hybrid vehicle configuration. (16)

12 (a) (i) How the Vapour absorption refrigeration is different from Vapour compression refrigeration system? Justify. (12)

(ii) State how the arrangements of Split air conditioner is different from that of a window air conditioner. (4)

(OR)

(b) Define the following terms pertaining to refrigeration system: (16)

- 1) Tonne (of refrigeration)
- 2) Coefficient of performance, (COP)
- 3) Capillary tube
- 4) Cascade refrigeration system
- 5) Condenser
- 6) Expansion valve (thermostatic)
- 7) Cooling load
- 8) Accumulator.