2018

CBCS

1st Semester

AUTOMOBILE MAINTENANCE

PAPER—C1T

(Vocational)

Full Marks : 40

Time : 2 Hours

The figures in the right-hand margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Illustrate the answers wherever necessary.

Group—A

1. Answer any *five* questions : 5×2

(a) Define mechanical efficiency and thermal efficiency of an engine.

(b) Draw the load-extension graph of a solid material.

(c) Define BHP and IHP.

(d) What do you mean by claoric value of a fuel ?

(e) What is the necessity to maintain air-fuel ratio in engine ?

(f) What is compression ratio of an engine ? What is the relation between this ratio and efficiency of the engine ?

(g) Write the chemical reactions which happen in a combustion engine.

(h) What are the causes of knocking in IC engine ?

Group—B

2. Answer any *four* questions : 4×5

(a) (i) What is dual combustion cycle ?

(ii) Define the expression of air standard efficiency of Diesel cycle. 1+4

(b) (i) Write the differences between reversible and irreversible processes.

(ii) A gas is expanded isothermally. Find out the expression for the work done in this process. 2½+2½

(c) Define the following : $2\times2\frac{1}{2}$

(i) Stroke length of an engine

(ii) MEP and SFC

(d) What is temperature stress ? A metal rod having a coefficient of expansion $1.2\times10^{-5}/°C$ has its temperature raised by 10°C. Calcuate the linear strain produced and the linear compressive stress required to prevent expansion of the rod. [Given Young's modulus of the material of the rod is 20×10^{11} CGS unit] 1+4

(e) (i) What do you mean by Octane and cetane number ?

(ii) Mention the advantages and disadvantages of the use of LPG as a motor fuel. 3+2

(f) (i) What are the valves of air-fuel ratio for various conditions of load for a petrol engine ?

(ii) Why additives are mixed in fuels ? 3+2

Group—C

3. Answer any *one* question : 1×10

(a) (i) Find out the expression of the efficiency of a Carnot's engine.

(ii) A Carnot engine has an efficiency 0.3. If heat sink is at 27°C. If the sink receives 200 KJ per second, then find out the power of the engine and also find the temperature of the heat source.

(iii) What are the basic differences between Otto cycle and Diesel cycle ? 4+3+3

(b) (i) How do the injection timing and fuel qualtity affect the engine knock ?

(ii) Discuss different stages of combustion process in a C.I. engine.

(iii) Specification of a 4-stroke 4-cylinder Diesel engine is as follows :

Speed of engine = 300 rpm

Piston stroke = 35 cm

Bore = 25 cm

IMEP = 68.67 N/cm^2

Fuel consumption = 80 kg/nn.

Calculate SFC and IHP. 3+4+3