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Roll No. :

337653(37)

B. E. (Sixth Semester) Examination 2020

APR-MAY 2022

(New Scheme)

(Mechanical Engg. Branch)

INTERNAL COMBUSTION ENGINES

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

***Note : Part (a) is compulsory. Solve any two parts from
(b), (c) & (d) of each questions.***

Unit - I

1. (a) Classify I.C. Engine. 2
- (b) What are the factors which are responsible for

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- deviating actual value timing diagram from ideal one. Draw value timing diagram of four stroke high speed and low speed S.I. Engine. 7
- (c) How do the specific heats vary with temperature? What is physical explanation for this variation? Explain with the help of a P-V diagram, the loss due to variation of specific heat. 7
- (d) A petrol engine of compression ratio 6 uses a fuel of calorific value 44000 kJ/kg. The air fuel ratio is 15 : 1. The temperature and pressure of the charge at the end of the suction stroke are 60°C and 1 bar respectively. Determine the maximum pressure in the cylinder if the index of compression is 1.32 and the specific heat at constant volume is expressed by the relation, $C_v = 0.71 + 20 \times 10^{-5} T$ kJ/kgK where T is the temperature in K. Compare this value with that of constant specific heat $C_v = 0.71$ kJ/kgK. 7

Unit - II

2. (a) Define octane and cetane number? 2

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- (b) Describe stages of combustion in a CI engine with the help of pressure crank angle diagram and discuss the variable affecting delay period. 7
- (c) What do you mean by abnormal combustion? Explain the phenomenon of detonation in S.I. Engine? What are the factors which affect the tendency to detonate. Describe? 7
- (d) Discuss the effect of volatility on the following : 7
- (i) Carburetor icing
 - (ii) Crank-case dilution
 - (iii) Evaporation loss

Unit - III

3. (a) Write drawback of simple carburettor. 2
- (b) What is the necessity of gasoline injection? Describe briefly the MPFI system with neat sketch. 7
- (c) Define the term idling. Explain why a rich mixture is required for idling. Describe with suitable sketch idling system of modern carburettor. 7

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- (d) Derive an expression for air-fuel ratio from simple carburettor neglecting compressibility of air. 7

Unit - IV

4. (a) Explain various methods of IC engine governing. 2
- (b) What do you understand by ignition? Describe battery ignition system with the help of sketch. 7
- (c) Discuss the function of lubrication system in an engine. Explain wet lubrication system in detail. 7
- (d) Why cooling of an IC engine is necessary? Describe with a sketch the forced circulation water cooling system. What are its merits and demerits. 7

Unit - V

5. (a) Explain the term : 2
- (i) Volumetric efficiency
- (ii) Relative efficiency
- (b) Describe Morse test. Write assumption made and limitation of Morse test. 7
- (c) What are the methods for measuring friction power of I.C. Engine? Describe the Willian's line method. To which type of engine it is applicable? 7

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- (d) Sketch a typical variable speed test performance curve at full throttle of SI engine and discuss the nature of curve. 7

- (i) Indicated power vs speed
- (ii) bsfc vs speed
- (iii) Torque vs speed