PAPER ID-310758

Subject Code: KAU051

Roll No: | | | | | | | | | | | | | |

B TECH
(SEM-V) THEORY EXAMINATION 2020-21
AUTOMOBILE ENGINES & COMBUSTION

Time: 3 Hours ***Total Marks: 100***

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. 2X10=20

Q no.	Question	Marks	CO
a.	Classify the internal combustion engine.	2	CO1
b.	Describe crank case ventilation.	2	CO3
c.	What is the role of ballast resistor in ignition system?	2	CO3
d.	What do you mean by SOHC mechanism?	2	CO1
e.	Explain squish, swirl and tumble air movement.	2	CO3
f.	Write difference between Variable Geometry and Waste Gate turbocharger.	2	CO3
g.	What do you mean by IHP, BHP and FHP? Write expression of each.	2	CO1
h.	Why additives are used in fuel?	2	CO5
i.	What is the role of thermostat in cooling system?	2	CO3
j.	Define ignition limits.	2	CO5

SECTION B

2. Attempt any *three* of the following: 3X10=30

Q no.	Question	Marks	CO
a.	What do you understand by turbocharging? Also explain the effect of turbocharging on IC engine.	10	CO3
b.	What is the effect of knocking in SI engine? Also discuss various factors influencing the knocking in SI and CI engine.	10	CO2
c.	Explain with suitable sketches different types of lubrication system used in IC engine.	10	CO3
d.	Explain in detail the factors affecting burning velocity of fuel.	10	CO2
e.	Explain in detail actual valve timing diagram for CI engine.	10	CO1

SECTION C

3. Attempt any *one* part of the following:

Q no.	Question	Marks	CO
a.	Write short notes on: (i) Theoretical Flame Temperature (ii) Adiabatic Flame Temperature (iii) Actual Flame Temperature	10	CO2
b.	Write short note on- (i) Exhaust gas recirculation (ii) Diesel oxidation catalyst (iii) Particulate traps (iv) Selective catalyst reduction	10	CO4

4. Attempt any *one* part of the following:

Q no.	Question	Marks	CO
a.	Explain the factors affecting flame propagation in SI engine.	10	CO2
b.	A single cylinder four stroke engine working on dual combustion cycle has a compression ratio of 15:1. The engine draws in air at 1 bar, 27ºC and the maximum pressure in the cylinder is limited to 55 bar. If the heat transfer at constant volume is twice that at constant pressure, determine- (i) Constant volume pressure ratio (ii) Cut off ratio (iii) Thermal efficiency of the cycle. Assume Cp= 1.005 KJ/Kg.k, Cv= 0.718 KJ/Kg.k and $\gamma = 1.4$.	10	CO6

5. Attempt any *one* part of the following:

Q no.	Question	Marks	CO
a.	Compare Otto, Diesel and Dual Cycle on the following basis- (i) Same Compression ratio and heat addition (ii) Same Compression ratio and heat rejection (iii) Same Peak pressure, peak temperature, and heat rejection (iv) Same maximum pressure and heat addition	10	CO5
b.	How NOx formation takes place and what are the steps to prevent it?	10	CO4

6. Attempt any *one* part of the following:

Q no.	Question	Marks	CO
a.	Explain with suitable diagram the combustion stages of SI and CI engine.	10	CO2
b.	For the Otto standard cycle with fixed intake and maximum temperature, Show that the compression ratio for maximum work output is given by the expression. $r^{\gamma-1} = (T_{max}/T_{intake})^{1/2}$	10	CO5

7. Attempt any *one* part of the following:

Q no.	Question	Marks	CO
a.	Draw the Dual cycle on P-V and T-S diagram. Derive an expression for its efficiency.	10	CO5
b.	A Diesel engine operating on the air-standard diesel cycle of six cylinders of 100 mm bore & 120 mm stroke. The engine speed is 1800 rpm. At the beginning of compression the pressure & temperature of the air are 1.03 bar & 35°C. If the clearance volume is 1/8 of the stroke volume & the air is heated to 1500°C, calculate- (i) The pressure & temperature at the salient points of the cycle (ii) The compression ratio (iii) The efficiency of the cycle (iv) The power output. Take, Cp = 1.004 kJ/Kg-k & Cv = 0.717 KJ/Kg-k	10	CO6