PAPER ID-310225

Subject Code: KME054

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

BTECH
(SEM V) THEORY EXAMINATION 2023-24
I C ENGINE, FUELS & LUBRICATION

TIME: 3 HRS **M.MARKS: 100**

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

SECTION A

1. Attempt *all* questions in brief.

Q no.	Question	Marks	CO
a.	How will you differentiate between two stroke engine and four stroke engines?	2	1
b.	What is the relation between mean effective pressure and mean pressure of an IC engine?	2	1
c.	Explain – (i). Pre-ignition (ii). Auto-ignition (iii). Detonation.	2	2
d.	Why is spark advance required? Discuss the factors that affect ignition timing.	2	2
e.	What is the principle in carburetion?	2	3
f.	What are the basic requirements of fuel injection in CI engines?	2	3
g.	What are the advantages and disadvantages of PNG?	2	4
h.	What causes the S.I. engine's emissions of hydrocarbons?	2	4
i.	Does the cooling of the engine components come from the lubrication system? How come?	2	5
j.	Why can't petrol (gasoline) be used in a compression ignition (CI) engine or diesel be fed to a spark ignition (SI) engine?	2	5

SECTION B

2. Attempt any *three* of the following:

Q no.	Question	Marks	CO
a.	What a theoretical valve timing diagram is different from actual valve timing diagram (with diagram). Explain effect of each valve openings and closing with their range of angle values.	10	1
b.	Explain that the requirement of air motion and swirl in CI engine combustion chamber is much more stringent that in an SI Engine.	10	2
c.	What do you mean by MPFI System? Give the difference between L-MPFI & D- MPFI System.	10	3
d.	Which are the alternative fuels for I.C. Engine? Write a short note on some of them.	10	4
e.	What do you understand by ignition timing discuss various factors which affect the ignition timing?	10	5

SECTION C

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

Q no.	Question	Marks	CO
a.	What is the basic difference between Otto cycle & Diesel cycle? Deduce the expression of work done, thermal efficiency and mean effective pressure for Diesel cycle.	10	1

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b.	An oil engine works on Dual cycle having compression ratio of 10. The pressure and temperature at the beginning of compression stroke are 1 bar and 27 ^{0}C respectively. If the maximum pressure reached is 30 bar and the maximum temperature of the cycle is 1200 ^{0}C, calculate: (i) the temperature at the end of constant volume heat addition (ii) cut-off ratio (iii) work output (iv) efficiency of the cycle Take C_v = 0.718 kJ/ kg K and C_p = 1.005 kJ/ kg K for air.	10	1

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

Q no.	Question	Marks	CO
a.	What does "delay period" mean? What variable influences the delay period?	10	2
b.	How does a flame front propagate? Discuss the factors affecting the flame speed?	10	2

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

Q no.	Question	Marks	CO
a.	Discuss briefly the scavenging in 2-stroke engine.	10	3
b.	With the help of neat sketch explain the working principle of simple carburetor.	10	3

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

Q no.	Question	Marks	CO
a.	What are the major sources of air pollutants? What all pollutants are emitted by I. C. engines?	10	4
b.	Explain catalytic convertor as after treatment device to control CO, HC & NOX.	10	4

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

Q no.	Question	Marks	CO
a.	How the valve timing is controlled in the stratified charge injection engine. Explain with neat sketch.	10	5
b.	Explain the construction and working of battery ignition system with a neat sketch.	10	5