

B.TECH. DEGREE EXAMINATION, APRIL-2013
Eighth Semester, Branch: Automobile Engineering
SYSTEM MODELING AND SIMULATION (AU010805G01)
(SAMPLE QUESTION PAPER)

Time: Three hours

Maximum: 100 marks

Part A (Answer all. Each question carries 3 marks)

1. What is abnormal combustion knock? Write different types of such knock.
2. Explain how the cetane number affects delay period.
3. Define the terms H_{rp} and U_{rp} .
4. Write the two basic types and their subtypes of models for the processes that govern engine performance and emission?
5. What is compression ratio? How compression ratio altered in VCR engine?

Part B (Answer all. Each question carries 5 marks)

6. With P- θ diagram explain the stages of combustion in SI engine.
7. What you meant by knock rating of CI fuels? Explain any rating method.
8. Find equation to determine the temperature drop due to fuel vapourisation in SI engine.
9. With P-V diagram explain the deviation between actual and ideal otto cycle.
10. Explain the working of a HCCI engine with neat figures.

Part C (Each question carries 12 marks)

11. What you meant by flame propagation? Explain the engine factors affecting flame propagation.

OR

12. Explain the theories of detonation,. Also explain surface ignition and its types.

13. With P- θ diagram write the stages of combustion in CI engine and also explain factors affecting delay period.

OR

14. What is diesel knock? With P- θ diagram explain difference between SI engine and CI engine knock

15. Explain the measurement of U_{rp} and H_{rp} . Find the equations for U_{rp} of octane and H_{rp} of decane as examples.

OR

16. What you meant by combustion modeling? Discuss Zero-dimensional combustion model.

17. Write down the simulation with adiabatic combustion for full throttle operation in SI engine.

OR

18. The compression ratio for an ideal Diesel cycle is 16. The pressure is 1atm and temperature 300K at the beginning of compression stroke. The cut-off ratio is 4. Determine,

- a) p, V, T values at the end of each process
- b) thermal efficiency
- c) mean effective pressure

Take bore=80mm and stroke=110mm. The ratio of specific heats for air is 1.4, C_p is 1.004kJ/kgK and C_v is 0.717kJ/kgK.

19. Simulate any dual-fuel engine concept with supporting graphs and figures.

OR

20. Write the simulation for a VCR engine with figures and graphs.