



**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY- PUTTUR**  
**(AUTONOMOUS)**

**QUESTION BANK (DESCRIPTIVE)**

**Subject with Code : Modelling of I.C Engines(18ME3119)**

**Course & Branch: M.Tech – (TE)**

**Year & Sem: I- & II-Sem**

**Regulations: R18**

**UNIT –I**

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|----|---|-----|
| 1  | What are the various factors affecting the combustion of diesel engines?                  | 12M |
| 2  | What are the various factors affecting the combustion of petrol engines?                  | 12M |
| 3  | a) Explain the combustion phenomena of petrol engines and mention p- $\theta$ diagram.    | 06M |
|    | b) What are the various governing equations?  | 06M |
| 4  | a) How do you classify the diesel engine based on ports geometry?                         | 06M |
|    | b) Explain the combustion phenomena of diesel engines and mention the P- $\theta$ diagram | 06M |
| 5  | a) Write in detail about engine and its classifications                                   | 06M |
|    | b) How do you classify reciprocating engines by applications?                             | 06M |
| 6  | Differentiate CI and SI engines.  | 12M |
| 7  | What approaches are to be consider for modelling?   | 06M |
|    | What is model building and integration methods?   | 06M |
| 8  | a) What parameters are used in an engine performance?                                     | 06M |
|    | b) What are the specific advantages of exhaust gas recirculation and explain?             | 06M |
| 9  | Classify the petrol engine with engine geometry?  | 12M |
| 10 | Explain with sketches the valve lift curves.  | 12M |

**UNIT –II**

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|----|---|-----|
| 1  | Differentiate single vs two zone model and its applications of heat release analysis? | 12M |
| 2  | Distinguish pre mixed and diffusive combustion models.                                | 12M |
| 3  | Explain WIEBE functions of combustion heat release.                                   | 12M |
| 4  | Explain wall heat transfer correlations   | 12M |
| 5  | a) Narrate the ignition delay.  | 6M  |
|    | b) More ignition delay, will it improve the performance of an engine- justify.        | 6M  |
| 6  | Write a brief note on internal energy estimation .                                    | 12M |
| 7  | What are the different factors that affect combustion with pre mixed charge           | 12M |
| 8  | Name various factors that influence heat release in combustion process                | 12M |
| 9  | How wall heat transfer that affects engine performance?                               | 12M |
| 10 | What factors affect the ignition delay of an IC engine?                               | 12M |

**UNIT –III**

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|---|---|-----|
| 1 | a) How the turbulence affects the engine performance?   | 6M  |
|   | b) How fuel atomization affects the engine performance?                                       | 6M  |
| 2 | a) How do you create turbulence in engine?  | 6M  |
|   | b) Which type of spray structure will improve engine performance and explain.                 | 6M  |
| 3 | How the fuel droplet will affect the knocking in petrol engines?                              | 12M |
| 4 | Smaller fuel droplet will improve the engine performance- justify .                           | 12M |
| 5 | What are the various types of fuel injectors and explain any one in detail with a neat sketch | 12M |
| 6 | Name various fuel injection systems and explain any one in detail with neat sketch            | 12M |
| 7 | What are the types and uses of spray structures?  | 12M |

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|----|---|-----|
| 8  | Explain fuel atomization with sketches                            | 12M |
| 9  | What are the effects of droplet turbulence interactions -explain. | 12M |
| 10 | Write the effects of droplet in impingement on walls              | 12M |

#### UNIT -IV

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|----|--|------|
| 1  | What is turbo charging and how it affects engine performance?                        | 12M  |
| 2  | Explain the working principle of turbo charger with a neat sketch.                   | 12 M |
| 3  | Classify the turbo chargers and explain any one with neat sketch.                    | 12M  |
| 4  | Distinguish and differentiate between constant pressure and pulse turbo charging.    | 12M  |
| 5  | For the charging system, what are the implications from compressor and turbine maps. | 12M  |
| 6  | Name various components of turbo charging system with its functions and sketches.    | 12M  |
| 7  | Identify the importance of compressor in the engine performance.                     | 12M  |
| 8  | Explain the importance of charge air cooler.   | 12M  |
| 9  | Explain the components of turbo charging system with its functions in detail.        | 12M  |
| 10 | Elaborate the components and its functions of pulse turbo charging.                  | 12M  |

#### UNIT -V

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|---|---|-----|
| 1 | Draw otto-cycle, p-v diagram and derive a mathematical model for its performance.                             | 12M |
| 2 | With sketches show the simulation of otto cycle at full throttle, part throttle and super charged conditions. | 12M |
| 3 | Explain progressive combustion and its advantages.  | 12M |
| 4 | How auto ignition modelling helps?  | 12M |
| 5 | What is single zone modelling and applications?   | 12M |

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|----|---|-----|
| 6  | What is mass burning rate estimation and explain?   | 12M |
| 7  | Elaborate SI engine with stratified charge and applications.                                | 12M |
| 8  | What are the effects of friction in pumping, piston assembly, bearings and valve train etc. | 12M |
| 9  | Differentiate with brief note on friction estimation for warm and warmup engines.           | 12M |
| 10 | a) How auto ignition modelling helps in cold counties?                                      | 6M  |
|    | b) Write a brief note on stratified charge on S.I engine.                                   | 6M  |

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