

7E1847

Roll No. \_\_\_\_\_

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7E1847

B. Tech. VII - Sem. (Main / Back) Exam. - 2024

Mechanical Engineering

7ME5-11 I. C. Engines

Time: 3 Hours

Maximum Marks: 70

Instructions to Candidates:

*Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five questions from Part C.*

*Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.*

*Use of following supporting material is permitted during examination. (Mentioned in form No. 205)*

1. NIL

2. NIL

**PART – A**

[10×2=20]

**(Answer should be given up to 25 words only)**

**All questions are compulsory**

- Q.1 What is the Mechanical Efficiency of an IC engine?
- Q.2 Draw PV diagrams of Otto Cycle and Diesel Cycle.
- Q.3 Why the size of SI engine cylinder is limited by approx. 100mm?
- Q.4 Write the four differences between CI and SI engine.
- Q.5 What is the importance of swirl and turbulence in combustion?
- Q.6 Write the name of alternative fuels for SI and CI engines.
- Q.7 Draw Battery Ignition System for SI engine.
- Q.8 Write various properties of lubrication oil for IC engines.
- Q.9 What is the need of cooling in IC engine?
- Q.10 Draw any two designs of combustion chamber for SI engine.

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## **PART – B**

[5×4=20]

### **(Analytical/Problem solving questions)**

#### **Attempt any five questions**

- Q.1 Explain air standard and actual cycles for SI engine operation.
- Q.2 How indicating power of IC engine determined? Write the name of different methods and explain Willan's Line Method for finding indicating power of a CI engine.
- Q.3 What is the Delay Period in CI engine combustion? What are the factors that affect delay period? Explain.
- Q.4 Draw four stage combustion diagram of CI engine and explain all four stages in short.
- Q.5 Draw and explain mechanical fuel pump for SI engine vehicles.
- Q.6 Draw and explain Electronic Ignition System for a SI engine.
- Q.7 Define Scavenging Process. What is the importance of scavenging in 2-stroke engine?

## **PART – C**

[3×10=30]

### **(Descriptive/Analytical/Problem Solving/Design Questions)**

#### **Attempt any three questions**

- Q.1 Explain Detonation in SI engine. What is the effect of detonation on combustion process?  
Explain (i) Auto Ignition Theory (ii) Detonation Theory
  - Q.2 Draw p-θ diagram of SI engine combustion. What are the various factors that affect the second stage of combustion "Flame Propagation" in SI engine? Explain in detail.
  - Q.3 The engine of the Fiat car has four cylinders of 68mm bore 75mm stroke. The compression ratio is 8. Determine the cubic capacity of the engine and the clearance volume of each cylinder.
  - Q.4 What are various methods of supercharging of IC engine? Compare merits and demerits of supercharging in CI and SI engines.
  - Q.5 Draw and explain the construction and working of free piston engine.
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7E1811

Roll No. \_\_\_\_\_

Total No. of Pages: 2

**7E1811****B. Tech. VII - Sem. (Main / Back) Exam., - 2024****Open Elective – I****7AG6-60.2 Environmental Engineering and Disaster Management****Time: 3 Hours****Maximum Marks: 70***Instructions to Candidates:**Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five questions from Part C.**Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.**Use of following supporting material is permitted during examination. (Mentioned in form No. 205)*1. NIL2. NIL**PART – A****[10×2=20]****(Answer should be given up to 25 words only)****All questions are compulsory**

- Q.1 What is the importance of safe water supply?
- Q.2 What are the standard of drinking water?
- Q.3 What is solid waste?
- Q.4 What are the different types of pollutions?
- Q.5 What is disaster management?
- Q.6 What do you mean by wastewater?
- Q.7 Define chemical oxygen demand.

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- Q.8 Define total organic carbon.  
Q.9 What are the physical & chemical parameter of the water quality?  
Q.10 What are the different types of pollutant in wastewater?

**PART – B**

**[5×4=20]**

**(Analytical/Problem solving questions)**

**Attempt any five questions**

- Q.1 What is hardness? Define Dissolve oxygen and Biological oxygen demand.  
Q.2 Why soiling and corrosion are hidden cost of air pollution? Explain.  
Q.3 How do individual contaminants affects human health? Explain it.  
Q.4 Differentiate between natural and man-made pollution with examples.  
Q.5 Discuss the role of green house in disaster management.  
Q.6 Explain term Air Pollution. Discuss the types of air pollutants which causes air pollutions.  
Q.7 Write the different step involve in domestic wastewater treatment plant.

**PART – C**

**[3×10=30]**

**(Descriptive/Analytical/Problem Solving/Design Questions)**

**Attempt any three questions**

- Q.1 What is landslide? What are the causes of landslide? Explain.  
Q.2 Explain term deforestation. Discuss the factors promoting deforestation.  
Q.3 Discuss the treatment methods of effluent domestic water, wastewater and industrial wastewater.  
Q.4 What are the different BIS standard for pollutants in air? Explain it.  
Q.5 Discuss manmade disaster due to lack of public awareness. Explain relationship between national security and disaster.
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7E1747

Roll No. \_\_\_\_\_

Total No. of Pages: 2**7E1747****B. Tech. VII - Sem. (Re Back) Exam., - 2024****Mechanical Engineering****7ME5-11 I. C. Engines****Time: 3 Hours****Maximum Marks: 120**  
**Min. Passing Marks: 42***Instructions to Candidates:**Attempt all ten questions from Part A, five questions out of seven questions from Part B and four questions out of five questions from Part C.**Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.**Use of following supporting material is permitted during examination. (Mentioned in form No. 205)*1. NIL2. NIL**PART – A****[10×2=20]****(Answer should be given up to 25 words only)****All questions are compulsory**

- Q.1 What are the stages of combustion in a SI engines?
- Q.2 Why smoke is formed in a CI engine?
- Q.3 What is 4-stroke engine?
- Q.4 What is an IC engine?
- Q.5 What is the difference between 2-stroke and 4-stroke IC engine?
- Q.6 Mention any two advantages of induction swirl.
- Q.7 What is Ignition Lag?

- Q.8 What is a heterogeneous air-fuel mixture?
- Q.9 What is an indirect-injection type combustion chamber?
- Q.10 What is Mechanical efficiency?

### **PART – B**

[5×8=40]

#### **(Analytical/Problem solving questions)**

##### **Attempt any five questions**

- Q.1 Explain about the various types of combustion chambers of S.I. Engine with neat sketch.
- Q.2 Discuss about the phenomena of Knock in S.I. & C.I. Engines.
- Q.3 Explain CRDI.
- Q.4 Explain various classification of an I.C. Engines.
- Q.5 Discuss the effects of engine variables on combustion parameters.
- Q.6 Discuss about the working of a 4 stroke petrol engine with neat sketch.
- Q.7 Explain the construction and working of a Solex Carburetor with neat sketch.

### **PART – C**

[4×15=60]

#### **(Descriptive/Analytical/Problem Solving/Design Questions)**

##### **Attempt any four questions**

- Q.1 Explain the working of a 2 stroke petrol engine with neat sketch.
- Q.2 Explain the working of a 4 stroke diesel engine with neat sketch.
- Q.3 Define Carburetion and explain the construction and working of a simple carburetor with neat sketch.
- Q.4 What is the use of Lubrication system in automobiles? Explain various types of lubrication systems with neat sketch.
- Q.5 Explain the working of Battery coil ignition systems with neat sketch.