Seat No.:	E 1 4 NI -
Sear NO:	Enrolment No.
scat 110	Linding 110.

## **GUJARAT TECHNOLOGICAL UNIVERSITY**

Subject Code:3171923 Date:12-01-2023 Subject Name:Internal Combustion Engine Time:10:30 AM TO 01:00 PM Total Marks:70 Instructions:  1. Attempt all questions. 2. Make suitable assumptions wherever necessary. 3. Figures to the right indicate full marks. 4. Simple and non-programmable scientific calculators are allowed.  MARKS Q.1 (a) Compare Petrol and Diesel engine on the basis of: I. Fuel Ignition II. Thermal efficiency III. Fuel supply (b) What are the desirable properties of IC engine fuels? (c) Compare the knocking in SI and CI engines. (d) Why rich mixture required during idling? (e) Explain the working of Sosch fuel pump. (f) What are the drawbacks of simple carburetor? (g) Explain the working of common rail fuel injection system with a line diagram and also discuss about the advantages and disadvantages. (d) Explain the advantages of using hydrogen as a fuel in IC engines. (e) Explain the advantages of using hydrogen as a fuel in IC engines. (b) Explain the term: (c) Describe the various stages of combustion in CI engine with the help of p-\theta diagram.  OR (d) (a) Classify different types of combustion chambers in CI engine. (e) Explain the term: (f) Explain the stages of combustion in SI engine with the help of p-\theta diagram.  OR (d) Give comparison between wet sum and dry sump lubrication system. (e) Explain the stages of combustion in SI engine with the help of p-\theta diagram.  OR (d) Give the classification of engine cooling system. (e) Derive an expression for air-fuel ratio for simple carburetor by using the approximate analysis method.  OR (d) State the function of lubrication system in IC engine. (e) Explain with neat sketch splash lubrication system. (e) Explain with neat sketch splash lubrication system. (f) Compare and differentiate the supercharging and turbocharging. (e) Explain with neat sketch splash lubrication system. (f) Give comparison between the catalytic convertor and thermal rector. (f) A two stroke diesel engine was motored when energy meter reading was 1.5 kW. Then the te	DE CEMECTED VII (NEW) EVAMINATION WINTED 2022			
Subject Name:Internal Combustion Engine Time:10:30 AM TO 01:00 PM Instructions:  1. Attempt all questions. 2. Make suitable assumptions wherever necessary. 3. Figures to the right indicate full marks. 4. Simple and non-programmable scientific calculators are allowed.  MARKS Q.1 (a) Compare Petrol and Diesel engine on the basis of: I. Fuel Ignition II. Thermal efficiency III. Fuel supply (b) What are the desirable properties of IC engine fuels? (c) Compare the knocking in SI and CI engines.  Q.2 (a) Why rich mixture required during idling? (b) What are the drawbacks of simple carburetor? (c) Explain construction and working of Bosch fuel pump.  QR (c) Explain the working of common rail fuel injection system with a line diagram and also discuss about the advantages and disadvantages.  Q.3 (a) What is the importance of ignition lag in SI engine combustion? (b) Explain the advantages of using hydrogen as a fuel in IC engines. (c) Describe the various stages of combustion in CI engine with the help of p-θ diagram.  Q.4 (a) Classify different types of combustion chambers in CI engine.  Q.5 (a) Classify different types of combustion in SI engine with the help of p-θ diagram.  Q.6 (a) Give comparison between wet sum and dry sump lubrication system. (c) Derive an expression for air-fuel ratio for simple carburetor by using the approximate analysis method.  Q.6 (a) State the function of lubrication system in IC engine. (b) Compare and differentiate the supercharging and turbocharging. (c) Explain with neat sketch splash lubrication system. (d) Cive comparison between the catalytic convertor and thermal rector. (e) Explain with neat sketch splash lubrication system. (f) Cive comparison between the catalytic convertor and thermal rector. (g) A two stroke diesel engine was motored when energy meter reading was 1.5 KW. Then the test on the engine was carried out for one hour and	·			
Time:10:30 AM TO 01:00 PM Instructions:  1. Attempt all questions. 2. Make suitable assumptions wherever necessary. 3. Figures to the right indicate full marks. 4. Simple and non-programmable scientific calculators are allowed.  MARKS Q.1 (a) Compare Petrol and Diesel engine on the basis of: 1. Fuel Ignition 11. Thermal efficiency 111. Fuel supply (b) What are the desirable properties of IC engine fuels? (c) Compare the knocking in SI and CI engines.  Q.2 (a) Why rich mixture required during idling? (b) What are the drawbacks of simple carburetor? (c) Explain construction and working of Bosch fuel pump.  QR (c) Explain the working of common rail fuel injection system with a line diagram and also discuss about the advantages and disadvantages.  Q.3 (a) What is the importance of ignition lag in SI engine combustion? (b) Explain the advantages of using hydrogen as a fuel in IC engines. (c) Describe the various stages of combustion in CI engine with the help of p-θ diagram.  QR Q.3 (a) Classify different types of combustion chambers in CI engine. (b) Explain the term: 1. Vapor lock 11. Ice formation (c) Explain the stages of combustion in SI engine with the help of p-θ diagram.  QA (a) Give the classification of engine cooling system. (b) Give comparison between wet sum and dry sump lubrication system. (c) Derive an expression for air-fuel ratio for simple carburetor by using the approximate analysis method.  QA (a) State the function of lubrication system in IC engine. (b) Compare and differentiate the supercharging and turbocharging. (c) Explain with neat sketch splash lubrication system. (d) Give comparison between the catalytic convertor and thermal rector. (d) Give comparison between the catalytic convertor and thermal rector. (d) Give comparison between the catalytic convertor and thermal rector. (e) Explain with neat sketch splash lubrication system. (e) Explain with neat sketch splash lubrication system. (f) Give comparison between the catalytic convertor and thermal rector. (e) Explain with neat sketch sp	•			J1-2U2S
Instructions:  1. Attempt all questions. 2. Make suitable assumptions wherever necessary. 3. Figures to the right indicate full marks. 4. Simple and non-programmable scientific calculators are allowed.  MARKS  Q.1 (a) Compare Petrol and Diesel engine on the basis of:  I. Fuel Ignition II. Thermal efficiency III. Fuel supply (b) What are the desirable properties of IC engine fuels? (c) Compare the knocking in SI and CI engines.  Q.2 (a) Why rich mixture required during idling? (b) What are the drawbacks of simple carburetor? (c) Explain construction and working of Bosch fuel pump.  QR (c) Explain the working of common rail fuel injection system with a line diagram and also discuss about the advantages and disadvantages.  Q.3 (a) What is the importance of ignition lag in SI engine combustion? (b) Explain the advantages of using hydrogen as a fuel in IC engines. (c) Describe the various stages of combustion in CI engine with the help of p-\theta diagram.  QR Q.3 (a) Classify different types of combustion chambers in CI engine. (b) Explain the term:  I. Vapor lock II. Ice formation (c) Explain the stages of combustion in SI engine with the help of p-\theta diagram.  QA (a) Give the classification of engine cooling system. (b) Give comparison between wet sum and dry sump lubrication system. (c) Derive an expression for air-fuel ratio for simple carburetor by using the approximate analysis method.  QA (a) State the function of lubrication system in IC engine. (b) Compare and differentiate the supercharging and turbocharging. (c) Explain with neat sketch splash lubrication system.  QA (c) A two stroke diesel engine was motored when energy meter reading was 1.5 KW. Then the test on the engine was carried out for one hour and	•		<u>e</u>	
1. Attempt all questions. 2. Make suitable assumptions wherever necessary. 3. Figures to the right indicate full marks. 4. Simple and non-programmable scientific calculators are allowed.  (a) Compare Petrol and Diesel engine on the basis of:				rks:70
2. Make suitable assumptions wherever necessary. 3. Figures to the right indicate full marks. 4. Simple and non-programmable scientific calculators are allowed.  MARKS  Q.1 (a) Compare Petrol and Diesel engine on the basis of:  I. Fuel Ignition II. Thermal efficiency III. Fuel supply (b) What are the desirable properties of IC engine fuels? (c) Compare the knocking in SI and CI engines. 07  Q.2 (a) Why rich mixture required during idling? (b) What are the drawbacks of simple carburetor? (c) Explain construction and working of Bosch fuel pump. 07  OR (c) Explain the working of common rail fuel injection system with a line diagram and also discuss about the advantages and disadvantages.  Q.3 (a) What is the importance of ignition lag in SI engine combustion? (b) Explain the advantages of using hydrogen as a fuel in IC engines. 04 (c) Describe the various stages of combustion in CI engine with the help of p-θ diagram.  OR  Q.3 (a) Classify different types of combustion chambers in CI engine. 03  (b) Explain the term: 1. Vapor lock 1I. Ice formation (c) Explain the stages of combustion in SI engine with the help of p-θ diagram.  Q.4 (a) Give the classification of engine cooling system. (b) Give comparison between wet sum and dry sump lubrication system. (c) Derive an expression for air-fuel ratio for simple carburetor by using the approximate analysis method.  Q.4 (a) State the function of lubrication system in IC engine. (b) Compare and differentiate the supercharging and turbocharging. (c) Explain with neat sketch splash lubrication system. (d) Compare and differentiate the supercharging and turbocharging. (e) Explain with neat sketch splash lubrication system. (f) Compare and differentiate the supercharging and turbocharging of the comparison between the catallytic convertor and thermal rector. (c) A two stroke diesel engine was motored when energy meter reading was 1.5 KW. Then the test on the engine was carried out for one hour and	Instru			
3. Figures to the right indicate full marks. 4. Simple and non-programmable scientific calculators are allowed.  MARKS Q.1 (a) Compare Petrol and Diesel engine on the basis of:				
4. Simple and non-programmable scientific calculators are allowed.  Q.1 (a) Compare Petrol and Diesel engine on the basis of:  I. Fuel Ignition II. Thermal efficiency III. Fuel supply (b) What are the desirable properties of IC engine fuels? (c) Compare the knocking in SI and CI engines.  Q.2 (a) Why rich mixture required during idling? (b) What are the drawbacks of simple carburetor? (c) Explain construction and working of Bosch fuel pump.  QR (c) Explain the working of common rail fuel injection system with a line diagram and also discuss about the advantages and disadvantages.  Q.3 (a) What is the importance of ignition lag in SI engine combustion? (b) Explain the advantages of using hydrogen as a fuel in IC engines. (c) Describe the various stages of combustion in CI engine with the help of p-θ diagram.  Q.3 (a) Classify different types of combustion chambers in CI engine. (b) Explain the term:  I. Vapor lock II. Ice formation (c) Explain the stages of combustion in SI engine with the help of p-θ diagram.  Q.4 (a) Give the classification of engine cooling system. (b) Give comparison between wet sum and dry sump lubrication system. (c) Derive an expression for air-fuel ratio for simple carburetor by using the approximate analysis method.  Q.4 (a) State the function of lubrication system in IC engine. (b) Compare and differentiate the supercharging and turbocharging. (c) Explain with neat sketch splash lubrication system. (d) Explain with neat sketch splash lubrication system. (e) Explain with neat sketch splash lubrication system. (f) A two stroke diesel engine was motored when energy meter reading was 1.5 KW. Then the test on the engine was carried out for one hour and				
Q.1 (a) Compare Petrol and Diesel engine on the basis of:  1. Fuel Ignition 11. Thermal efficiency 111. Fuel supply (b) What are the desirable properties of IC engine fuels? (c) Compare the knocking in SI and CI engines.  Q.2 (a) Why rich mixture required during idling? (b) What are the drawbacks of simple carburetor? (c) Explain construction and working of Bosch fuel pump.  QR (c) Explain the working of common rail fuel injection system with a line diagram and also discuss about the advantages and disadvantages.  Q.3 (a) What is the importance of ignition lag in SI engine combustion? (b) Explain the advantages of using hydrogen as a fuel in IC engines. (c) Describe the various stages of combustion in CI engine with the help of p-θ diagram.  QR Q.3 (a) Classify different types of combustion chambers in CI engine. (b) Explain the term: 1. Vapor lock 11. Ice formation (c) Explain the stages of combustion in SI engine with the help of p-θ diagram.  Q.4 (a) Give the classification of engine cooling system. (b) Give comparison between wet sum and dry sump lubrication system. (c) Derive an expression for air-fuel ratio for simple carburetor by using the approximate analysis method.  QR Q.4 (a) State the function of lubrication system in IC engine. (b) Compare and differentiate the supercharging and turbocharging. (c) Explain with neat sketch splash lubrication system. (d) Compare and differentiate the supercharging and turbocharging. (e) Explain with neat sketch splash lubrication system. (o) A two stroke diesel engine was motored when energy meter reading was 1.5 KW. Then the test on the engine was carried out for one hour and				
Q.1 (a) Compare Petrol and Diesel engine on the basis of:  I. Fuel Ignition II. Thermal efficiency III. Fuel supply (b) What are the desirable properties of IC engine fuels? (c) Compare the knocking in SI and CI engines.  Q.2 (a) Why rich mixture required during idling? (b) What are the drawbacks of simple carburetor? (c) Explain construction and working of Bosch fuel pump.  OR (c) Explain the working of common rail fuel injection system with a line diagram and also discuss about the advantages and disadvantages.  Q.3 (a) What is the importance of ignition lag in SI engine combustion? (b) Explain the advantages of using hydrogen as a fuel in IC engines. (c) Describe the various stages of combustion in CI engine with the help of p-θ diagram.  OR  Q.3 (a) Classify different types of combustion chambers in CI engine. (b) Explain the stages of combustion in SI engine with the help of p-θ diagram.  Q.4 (a) Classify different types of combustion in SI engine with the help of p-θ diagram.  Q.4 (a) Give the classification of engine cooling system. (b) Give comparison between wet sum and dry sump lubrication system. (c) Derive an expression for air-fuel ratio for simple carburetor by using the approximate analysis method.  OR  Q.4 (a) State the function of lubrication system in IC engine.  OR  Q.5 (a) Write a short note on SAE rating of lubricants. (b) Give comparison between the catalytic convertor and thermal rector. (c) A two stroke diesel engine was motored when energy meter reading was 1.5 KW. Then the test on the engine was carried out for one hour and		т.	Simple and non-programmable scientific calculators are anowed.	MARKS
I. Fuel Ignition II. Thermal efficiency III. Fuel supply (b) What are the desirable properties of IC engine fuels? (c) Compare the knocking in SI and CI engines.  Q.2 (a) Why rich mixture required during idling? (b) What are the drawbacks of simple carburetor? (c) Explain construction and working of Bosch fuel pump.  QR (c) Explain the working of common rail fuel injection system with a line diagram and also discuss about the advantages and disadvantages.  Q.3 (a) What is the importance of ignition lag in SI engine combustion? (b) Explain the advantages of using hydrogen as a fuel in IC engines. (c) Describe the various stages of combustion in CI engine with the help of p-θ diagram.  QR Q.3 (a) Classify different types of combustion chambers in CI engine. (b) Explain the term:  I. Vapor lock II. Ice formation (c) Explain the stages of combustion in SI engine with the help of p-θ diagram.  Q.4 (a) Give the classification of engine cooling system. (b) Give comparison between wet sum and dry sump lubrication system. (c) Derive an expression for air-fuel ratio for simple carburetor by using the approximate analysis method.  QR Q.4 (a) State the function of lubrication system in IC engine. (b) Compare and differentiate the supercharging and turbocharging. (c) Explain with neat sketch splash lubrications. (d) Write a short note on SAE rating of lubricants. (d) Write a short note on SAE rating of lubricants. (d) A two stroke diesel engine was motored when energy meter reading was 1.5 KW. Then the test on the engine was carried out for one hour and	0.1	(.)		0.2
II. Thermal efficiency III. Fuel supply (b) What are the desirable properties of IC engine fuels? (c) Compare the knocking in SI and CI engines.  Q.2 (a) Why rich mixture required during idling? (b) What are the drawbacks of simple carburetor? (c) Explain construction and working of Bosch fuel pump.  OR (c) Explain the working of common rail fuel injection system with a line diagram and also discuss about the advantages and disadvantages.  Q.3 (a) What is the importance of ignition lag in SI engine combustion? (b) Explain the advantages of using hydrogen as a fuel in IC engines. (c) Describe the various stages of combustion in CI engine with the help of p-θ diagram.  OR  Q.3 (a) Classify different types of combustion chambers in CI engine. (b) Explain the term:  I. Vapor lock II. Ice formation (c) Explain the stages of combustion in SI engine with the help of p-θ diagram.  Q.4 (a) Give the classification of engine cooling system. (b) Give comparison between wet sum and dry sump lubrication system. (c) Derive an expression for air-fuel ratio for simple carburetor by using the approximate analysis method.  OR  Q.4 (a) State the function of lubrication system in IC engine. (b) Compare and differentiate the supercharging and turbocharging. (c) Explain with neat sketch splash lubrication system.  Q.5 (a) Write a short note on SAE rating of lubricants. (b) Give comparison between the catalytic convertor and thermal rector. (c) A two stroke diesel engine was motored when energy meter reading was 1.5 KW. Then the test on the engine was carried out for one hour and	Q.1	(a)	· ·	03
III. Fuel supply (b) What are the desirable properties of IC engine fuels? (c) Compare the knocking in SI and CI engines.  Q.2 (a) Why rich mixture required during idling? (b) What are the drawbacks of simple carburetor? (c) Explain construction and working of Bosch fuel pump.  QR (c) Explain the working of common rail fuel injection system with a line diagram and also discuss about the advantages and disadvantages.  Q.3 (a) What is the importance of ignition lag in SI engine combustion? (b) Explain the advantages of using hydrogen as a fuel in IC engines. (c) Describe the various stages of combustion in CI engine with the help of p-θ diagram.  QR Q.3 (a) Classify different types of combustion chambers in CI engine. (b) Explain the term:  I. Vapor lock II. Ice formation (c) Explain the stages of combustion in SI engine with the help of p-θ diagram.  Q.4 (a) Give the classification of engine cooling system. (b) Give comparison between wet sum and dry sump lubrication system. (c) Derive an expression for air-fuel ratio for simple carburetor by using the approximate analysis method.  QR Q.4 (a) State the function of lubrication system in IC engine. (b) Compare and differentiate the supercharging and turbocharging. (c) Explain with neat sketch splash lubrication system.  Q.5 (a) Write a short note on SAE rating of lubricants. (b) Give comparison between the catalytic convertor and thermal rector. (c) A two stroke diesel engine was motored when energy meter reading was 1.5 KW. Then the test on the engine was carried out for one hour and			$\boldsymbol{\mathcal{E}}$	
(b) What are the desirable properties of IC engine fuels? (c) Compare the knocking in SI and CI engines.  Q.2 (a) Why rich mixture required during idling? (b) What are the drawbacks of simple carburetor? (c) Explain construction and working of Bosch fuel pump.  OR (c) Explain the working of common rail fuel injection system with a line diagram and also discuss about the advantages and disadvantages.  Q.3 (a) What is the importance of ignition lag in SI engine combustion? (c) Explain the advantages of using hydrogen as a fuel in IC engines. (d) Explain the advantages of combustion in CI engine with the help of p-θ diagram.  OR  Q.3 (a) Classify different types of combustion chambers in CI engine. (b) Explain the term:  I. Vapor lock II. Ice formation (c) Explain the stages of combustion in SI engine with the help of p-θ diagram.  Q.4 (a) Give the classification of engine cooling system. (b) Give comparison between wet sum and dry sump lubrication system. (c) Derive an expression for air-fuel ratio for simple carburetor by using the approximate analysis method.  OR  Q.4 (a) State the function of lubrication system in IC engine. (b) Compare and differentiate the supercharging and turbocharging. (c) Explain with neat sketch splash lubrication system.  Q.5 (a) Write a short note on SAE rating of lubricants. (b) Give comparison between the catalytic convertor and thermal rector. (c) A two stroke diesel engine was motored when energy meter reading was 1.5 KW. Then the test on the engine was carried out for one hour and			· ·	
(c) Compare the knocking in SI and CI engines.  Q.2 (a) Why rich mixture required during idling? (b) What are the drawbacks of simple carburetor? (c) Explain construction and working of Bosch fuel pump.  OR (c) Explain the working of common rail fuel injection system with a line diagram and also discuss about the advantages and disadvantages.  Q.3 (a) What is the importance of ignition lag in SI engine combustion? (b) Explain the advantages of using hydrogen as a fuel in IC engines. (c) Describe the various stages of combustion in CI engine with the help of p-θ diagram.  OR  Q.3 (a) Classify different types of combustion chambers in CI engine. (b) Explain the term:  I. Vapor lock II. Ice formation (c) Explain the stages of combustion in SI engine with the help of p-θ diagram.  Q.4 (a) Give the classification of engine cooling system. (b) Give comparison between wet sum and dry sump lubrication system. (c) Derive an expression for air-fuel ratio for simple carburetor by using the approximate analysis method.  OR  Q.4 (a) State the function of lubrication system in IC engine. (b) Compare and differentiate the supercharging and turbocharging. (c) Explain with neat sketch splash lubrication system.  Q.5 (a) Write a short note on SAE rating of lubricants. (b) Give comparison between the catalytic convertor and thermal rector. (c) A two stroke diesel engine was motored when energy meter reading was 1.5 KW. Then the test on the engine was carried out for one hour and		<b>(b)</b>	** *	04
<ul> <li>Q.2 (a) Why rich mixture required during idling? (b) What are the drawbacks of simple carburetor? (c) Explain construction and working of Bosch fuel pump. OR (c) Explain the working of common rail fuel injection system with a line diagram and also discuss about the advantages and disadvantages.</li> <li>Q.3 (a) What is the importance of ignition lag in SI engine combustion? (b) Explain the advantages of using hydrogen as a fuel in IC engines. (c) Describe the various stages of combustion in CI engine with the help of p-θ diagram.  OR  Q.3 (a) Classify different types of combustion chambers in CI engine. (d) Explain the term:  I. Vapor lock II. Ice formation (e) Explain the stages of combustion in SI engine with the help of p-θ diagram.  Q.4 (a) Give the classification of engine cooling system. (b) Give comparison between wet sum and dry sump lubrication system. (c) Derive an expression for air-fuel ratio for simple carburetor by using the approximate analysis method.  OR  Q.4 (a) State the function of lubrication system in IC engine. (b) Compare and differentiate the supercharging and turbocharging. (c) Explain with neat sketch splash lubrication system.  Q.5 (a) Write a short note on SAE rating of lubricants. (c) A two stroke diesel engine was motored when energy meter reading was 1.5 KW. Then the test on the engine was carried out for one hour and</li> </ul>				
<ul> <li>(b) What are the drawbacks of simple carburetor?</li> <li>(c) Explain construction and working of Bosch fuel pump. OR</li> <li>(c) Explain the working of common rail fuel injection system with a line diagram and also discuss about the advantages and disadvantages.</li> <li>Q.3 (a) What is the importance of ignition lag in SI engine combustion? (b) Explain the advantages of using hydrogen as a fuel in IC engines. (c) Describe the various stages of combustion in CI engine with the help of p-θ diagram.  OR</li> <li>Q.3 (a) Classify different types of combustion chambers in CI engine. (d) Explain the term:  I. Vapor lock II. Ice formation (e) Explain the stages of combustion in SI engine with the help of p-θ diagram.</li> <li>Q.4 (a) Give the classification of engine cooling system. (b) Give comparison between wet sum and dry sump lubrication system. (c) Derive an expression for air-fuel ratio for simple carburetor by using the approximate analysis method.  OR</li> <li>Q.4 (a) State the function of lubrication system in IC engine. (b) Compare and differentiate the supercharging and turbocharging. (c) Explain with neat sketch splash lubrications. (d) Give comparison between the catalytic convertor and thermal rector. (e) A two stroke diesel engine was motored when energy meter reading was 1.5 KW. Then the test on the engine was carried out for one hour and</li> </ul>		(C)	Compare the knocking in SI and CI engines.	U7
<ul> <li>(b) What are the drawbacks of simple carburetor?</li> <li>(c) Explain construction and working of Bosch fuel pump. OR</li> <li>(c) Explain the working of common rail fuel injection system with a line diagram and also discuss about the advantages and disadvantages.</li> <li>Q.3 (a) What is the importance of ignition lag in SI engine combustion? (b) Explain the advantages of using hydrogen as a fuel in IC engines. (c) Describe the various stages of combustion in CI engine with the help of p-θ diagram.  OR</li> <li>Q.3 (a) Classify different types of combustion chambers in CI engine. (d) Explain the term:  I. Vapor lock II. Ice formation (e) Explain the stages of combustion in SI engine with the help of p-θ diagram.</li> <li>Q.4 (a) Give the classification of engine cooling system. (b) Give comparison between wet sum and dry sump lubrication system. (c) Derive an expression for air-fuel ratio for simple carburetor by using the approximate analysis method.  OR</li> <li>Q.4 (a) State the function of lubrication system in IC engine. (b) Compare and differentiate the supercharging and turbocharging. (c) Explain with neat sketch splash lubrications. (d) Give comparison between the catalytic convertor and thermal rector. (e) A two stroke diesel engine was motored when energy meter reading was 1.5 KW. Then the test on the engine was carried out for one hour and</li> </ul>	$\Omega_{2}$	(a)	Why rich mixture required during idling?	03
(c) Explain construction and working of Bosch fuel pump.  OR  (c) Explain the working of common rail fuel injection system with a line diagram and also discuss about the advantages and disadvantages.  Q.3 (a) What is the importance of ignition lag in SI engine combustion?  (b) Explain the advantages of using hydrogen as a fuel in IC engines.  (c) Describe the various stages of combustion in CI engine with the help of p-θ diagram.  OR  Q.3 (a) Classify different types of combustion chambers in CI engine.  (b) Explain the term:  I. Vapor lock II. Ice formation  (c) Explain the stages of combustion in SI engine with the help of p-θ diagram.  Q.4 (a) Give the classification of engine cooling system.  (b) Give comparison between wet sum and dry sump lubrication system.  (c) Derive an expression for air-fuel ratio for simple carburetor by using the approximate analysis method.  OR  Q.4 (a) State the function of lubrication system in IC engine.  OR  Q.5 (a) Write a short note on SAE rating of lubricants.  (b) Give comparison between the catalytic convertor and thermal rector.  Q.5 (a) Write a short note on SAE rating of lubricants.  (b) Give comparison between the catalytic convertor and thermal rector.  Q.5 (a) Write a short note on SAE rating of lubricants.  (c) A two stroke diesel engine was motored when energy meter reading was 1.5 KW. Then the test on the engine was carried out for one hour and	Q.2			
Ce Explain the working of common rail fuel injection system with a line diagram and also discuss about the advantages and disadvantages.  Q.3 (a) What is the importance of ignition lag in SI engine combustion? (b) Explain the advantages of using hydrogen as a fuel in IC engines. (c) Describe the various stages of combustion in CI engine with the help of p-θ diagram.  OR  Q.3 (a) Classify different types of combustion chambers in CI engine. (b) Explain the term:  I. Vapor lock  II. Ice formation (c) Explain the stages of combustion in SI engine with the help of p-θ diagram.  Q.4 (a) Give the classification of engine cooling system. (b) Give comparison between wet sum and dry sump lubrication system. (c) Derive an expression for air-fuel ratio for simple carburetor by using the approximate analysis method.  OR  Q.4 (a) State the function of lubrication system in IC engine. (b) Compare and differentiate the supercharging and turbocharging. (c) Explain with neat sketch splash lubrication system.  Q.5 (a) Write a short note on SAE rating of lubricants. (b) Give comparison between the catalytic convertor and thermal rector. (c) A two stroke diesel engine was motored when energy meter reading was 1.5 KW. Then the test on the engine was carried out for one hour and			<u>*</u>	
(c) Explain the working of common rail fuel injection system with a line diagram and also discuss about the advantages and disadvantages.  Q.3 (a) What is the importance of ignition lag in SI engine combustion? (b) Explain the advantages of using hydrogen as a fuel in IC engines. (c) Describe the various stages of combustion in CI engine with the help of p-θ diagram.  OR  Q.3 (a) Classify different types of combustion chambers in CI engine. (b) Explain the term:  I. Vapor lock II. Ice formation (c) Explain the stages of combustion in SI engine with the help of p-θ diagram.  Q.4 (a) Give the classification of engine cooling system. (b) Give comparison between wet sum and dry sump lubrication system. (c) Derive an expression for air-fuel ratio for simple carburetor by using the approximate analysis method.  OR  Q.4 (a) State the function of lubrication system in IC engine. (b) Compare and differentiate the supercharging and turbocharging. (c) Explain with neat sketch splash lubrication system.  Q.5 (a) Write a short note on SAE rating of lubricants. (b) Give comparison between the catalytic convertor and thermal rector. (c) A two stroke diesel engine was motored when energy meter reading was 1.5 KW. Then the test on the engine was carried out for one hour and		(C)		U7
diagram and also discuss about the advantages and disadvantages.  Q.3 (a) What is the importance of ignition lag in SI engine combustion? 03 (b) Explain the advantages of using hydrogen as a fuel in IC engines. 04 (c) Describe the various stages of combustion in CI engine with the help of p-θ diagram.  OR  Q.3 (a) Classify different types of combustion chambers in CI engine. 03 (b) Explain the term: 04  I. Vapor lock II. Ice formation (c) Explain the stages of combustion in SI engine with the help of p-θ diagram.  Q.4 (a) Give the classification of engine cooling system. 03 (b) Give comparison between wet sum and dry sump lubrication system. 04 (c) Derive an expression for air-fuel ratio for simple carburetor by using the approximate analysis method.  OR  Q.4 (a) State the function of lubrication system in IC engine. 03 (b) Compare and differentiate the supercharging and turbocharging. 04 (c) Explain with neat sketch splash lubrications. 07  Q.5 (a) Write a short note on SAE rating of lubricants. 07 (b) Give comparison between the catalytic convertor and thermal rector. 04 (c) A two stroke diesel engine was motored when energy meter reading was 1.5 KW. Then the test on the engine was carried out for one hour and		(c)		07
<ul> <li>Q.3 (a) What is the importance of ignition lag in SI engine combustion? (b) Explain the advantages of using hydrogen as a fuel in IC engines. (c) Describe the various stages of combustion in CI engine with the help of p-θ diagram.  OR  Q.3 (a) Classify different types of combustion chambers in CI engine. (b) Explain the term:  I. Vapor lock  II. Ice formation (c) Explain the stages of combustion in SI engine with the help of p-θ diagram.  Q.4 (a) Give the classification of engine cooling system. (b) Give comparison between wet sum and dry sump lubrication system. (c) Derive an expression for air-fuel ratio for simple carburetor by using the approximate analysis method.  OR  Q.4 (a) State the function of lubrication system in IC engine. (b) Compare and differentiate the supercharging and turbocharging. (c) Explain with neat sketch splash lubrications system.  Q.5 (a) Write a short note on SAE rating of lubricants. (b) Give comparison between the catalytic convertor and thermal rector. (c) A two stroke diesel engine was motored when energy meter reading was 1.5 KW. Then the test on the engine was carried out for one hour and</li> </ul>		(C)	<u> </u>	07
<ul> <li>(b) Explain the advantages of using hydrogen as a fuel in IC engines.</li> <li>(c) Describe the various stages of combustion in CI engine with the help of p-θ diagram.</li> <li>OR</li> <li>Q.3 (a) Classify different types of combustion chambers in CI engine.</li> <li>(b) Explain the term:  I. Vapor lock  II. Ice formation</li> <li>(c) Explain the stages of combustion in SI engine with the help of p-θ diagram.</li> <li>Q.4 (a) Give the classification of engine cooling system.</li> <li>(b) Give comparison between wet sum and dry sump lubrication system.</li> <li>(c) Derive an expression for air-fuel ratio for simple carburetor by using the approximate analysis method.</li> <li>Q.4 (a) State the function of lubrication system in IC engine.</li> <li>(b) Compare and differentiate the supercharging and turbocharging.</li> <li>(c) Explain with neat sketch splash lubrication system.</li> <li>Q.5 (a) Write a short note on SAE rating of lubricants.</li> <li>(b) Give comparison between the catalytic convertor and thermal rector.</li> <li>(c) A two stroke diesel engine was motored when energy meter reading was 1.5 KW. Then the test on the engine was carried out for one hour and</li> </ul>			diagram and also diseass about the advantages and disadvantages.	
<ul> <li>(b) Explain the advantages of using hydrogen as a fuel in IC engines.</li> <li>(c) Describe the various stages of combustion in CI engine with the help of p-θ diagram.</li> <li>OR</li> <li>Q.3 (a) Classify different types of combustion chambers in CI engine.</li> <li>(b) Explain the term:  I. Vapor lock  II. Ice formation</li> <li>(c) Explain the stages of combustion in SI engine with the help of p-θ diagram.</li> <li>Q.4 (a) Give the classification of engine cooling system.</li> <li>(b) Give comparison between wet sum and dry sump lubrication system.</li> <li>(c) Derive an expression for air-fuel ratio for simple carburetor by using the approximate analysis method.</li> <li>Q.4 (a) State the function of lubrication system in IC engine.</li> <li>(b) Compare and differentiate the supercharging and turbocharging.</li> <li>(c) Explain with neat sketch splash lubrication system.</li> <li>Q.5 (a) Write a short note on SAE rating of lubricants.</li> <li>(b) Give comparison between the catalytic convertor and thermal rector.</li> <li>(c) A two stroke diesel engine was motored when energy meter reading was 1.5 KW. Then the test on the engine was carried out for one hour and</li> </ul>	0.3	(a)	What is the importance of ignition lag in SI engine combustion?	03
(c) Describe the various stages of combustion in CI engine with the help of p-θ diagram.  OR  Q.3 (a) Classify different types of combustion chambers in CI engine.  I. Vapor lock II. Ice formation (c) Explain the stages of combustion in SI engine with the help of p-θ diagram.  Q.4 (a) Give the classification of engine cooling system. (b) Give comparison between wet sum and dry sump lubrication system. (c) Derive an expression for air-fuel ratio for simple carburetor by using the approximate analysis method.  OR  Q.4 (a) State the function of lubrication system in IC engine. (b) Compare and differentiate the supercharging and turbocharging. (c) Explain with neat sketch splash lubrication system.  Q.5 (a) Write a short note on SAE rating of lubricants. (b) Give comparison between the catalytic convertor and thermal rector. (c) A two stroke diesel engine was motored when energy meter reading was 1.5 KW. Then the test on the engine was carried out for one hour and	<b>V.</b> C			
P-θ diagram.  OR  Q.3 (a) Classify different types of combustion chambers in CI engine.  (b) Explain the term:  I. Vapor lock  II. Ice formation  (c) Explain the stages of combustion in SI engine with the help of p-θ diagram.  Q.4 (a) Give the classification of engine cooling system.  (b) Give comparison between wet sum and dry sump lubrication system.  (c) Derive an expression for air-fuel ratio for simple carburetor by using the approximate analysis method.  OR  Q.4 (a) State the function of lubrication system in IC engine.  (b) Compare and differentiate the supercharging and turbocharging.  (c) Explain with neat sketch splash lubrication system.  Q.5 (a) Write a short note on SAE rating of lubricants.  (b) Give comparison between the catalytic convertor and thermal rector.  (c) A two stroke diesel engine was motored when energy meter reading was 1.5 KW. Then the test on the engine was carried out for one hour and				
OR  Q.3 (a) Classify different types of combustion chambers in CI engine. (b) Explain the term:  I. Vapor lock II. Ice formation (c) Explain the stages of combustion in SI engine with the help of p-θ diagram.  Q.4 (a) Give the classification of engine cooling system. (b) Give comparison between wet sum and dry sump lubrication system. (c) Derive an expression for air-fuel ratio for simple carburetor by using the approximate analysis method.  OR  Q.4 (a) State the function of lubrication system in IC engine. (b) Compare and differentiate the supercharging and turbocharging. (c) Explain with neat sketch splash lubrication system.  Q.5 (a) Write a short note on SAE rating of lubricants. (b) Give comparison between the catalytic convertor and thermal rector. (c) A two stroke diesel engine was motored when energy meter reading was 1.5 KW. Then the test on the engine was carried out for one hour and		(0)		0.
<ul> <li>(b) Explain the term:  I. Vapor lock  II. Ice formation</li> <li>(c) Explain the stages of combustion in SI engine with the help of p- θ diagram.</li> <li>Q.4 (a) Give the classification of engine cooling system.</li> <li>(b) Give comparison between wet sum and dry sump lubrication system.</li> <li>(c) Derive an expression for air-fuel ratio for simple carburetor by using the approximate analysis method.</li> <li>Q.4 (a) State the function of lubrication system in IC engine.</li> <li>Q.5 (a) State the function of system in IC engine.</li> <li>Q.6 (b) Compare and differentiate the supercharging and turbocharging.</li> <li>Q.6 (c) Explain with neat sketch splash lubrication system.</li> <li>Q.5 (a) Write a short note on SAE rating of lubricants.</li> <li>(b) Give comparison between the catalytic convertor and thermal rector.</li> <li>(c) A two stroke diesel engine was motored when energy meter reading was 1.5 KW. Then the test on the engine was carried out for one hour and</li> </ul>			1 0	
<ul> <li>(b) Explain the term:  I. Vapor lock  II. Ice formation</li> <li>(c) Explain the stages of combustion in SI engine with the help of p- θ diagram.</li> <li>Q.4 (a) Give the classification of engine cooling system.</li> <li>(b) Give comparison between wet sum and dry sump lubrication system.</li> <li>(c) Derive an expression for air-fuel ratio for simple carburetor by using the approximate analysis method.</li> <li>Q.4 (a) State the function of lubrication system in IC engine.</li> <li>Q.5 (a) State the function of system in IC engine.</li> <li>Q.6 (b) Compare and differentiate the supercharging and turbocharging.</li> <li>Q.6 (c) Explain with neat sketch splash lubrication system.</li> <li>Q.5 (a) Write a short note on SAE rating of lubricants.</li> <li>(b) Give comparison between the catalytic convertor and thermal rector.</li> <li>(c) A two stroke diesel engine was motored when energy meter reading was 1.5 KW. Then the test on the engine was carried out for one hour and</li> </ul>	0.3	(a)	Classify different types of combustion chambers in CI engine.	03
<ul> <li>I. Vapor lock</li></ul>				04
II. Ice formation (c) Explain the stages of combustion in SI engine with the help of p- θ diagram.  Q.4 (a) Give the classification of engine cooling system. (b) Give comparison between wet sum and dry sump lubrication system. (c) Derive an expression for air-fuel ratio for simple carburetor by using the approximate analysis method.  OR  Q.4 (a) State the function of lubrication system in IC engine. (b) Compare and differentiate the supercharging and turbocharging. (c) Explain with neat sketch splash lubrication system.  Q.5 (a) Write a short note on SAE rating of lubricants. (b) Give comparison between the catalytic convertor and thermal rector. (c) A two stroke diesel engine was motored when energy meter reading was 1.5 KW. Then the test on the engine was carried out for one hour and		` '		
<ul> <li>θ diagram.</li> <li>Q.4 (a) Give the classification of engine cooling system.</li> <li>(b) Give comparison between wet sum and dry sump lubrication system.</li> <li>(c) Derive an expression for air-fuel ratio for simple carburetor by using the approximate analysis method.</li> <li>OR</li> <li>Q.4 (a) State the function of lubrication system in IC engine.</li> <li>(b) Compare and differentiate the supercharging and turbocharging.</li> <li>(c) Explain with neat sketch splash lubrication system.</li> <li>Q.5 (a) Write a short note on SAE rating of lubricants.</li> <li>(b) Give comparison between the catalytic convertor and thermal rector.</li> <li>(c) A two stroke diesel engine was motored when energy meter reading was 1.5 KW. Then the test on the engine was carried out for one hour and</li> </ul>				
Q.4 (a) Give the classification of engine cooling system. (b) Give comparison between wet sum and dry sump lubrication system. (c) Derive an expression for air-fuel ratio for simple carburetor by using the approximate analysis method.  OR  Q.4 (a) State the function of lubrication system in IC engine. (b) Compare and differentiate the supercharging and turbocharging. (c) Explain with neat sketch splash lubrication system.  Q.5 (a) Write a short note on SAE rating of lubricants. (b) Give comparison between the catalytic convertor and thermal rector. (c) A two stroke diesel engine was motored when energy meter reading was 1.5 KW. Then the test on the engine was carried out for one hour and		<b>(c)</b>	Explain the stages of combustion in SI engine with the help of p-	07
(b) Give comparison between wet sum and dry sump lubrication system. (c) Derive an expression for air-fuel ratio for simple carburetor by using the approximate analysis method.  OR  Q.4 (a) State the function of lubrication system in IC engine. (b) Compare and differentiate the supercharging and turbocharging. (c) Explain with neat sketch splash lubrication system.  Q.5 (a) Write a short note on SAE rating of lubricants. (b) Give comparison between the catalytic convertor and thermal rector. (c) A two stroke diesel engine was motored when energy meter reading was 1.5 KW. Then the test on the engine was carried out for one hour and			heta diagram.	
(b) Give comparison between wet sum and dry sump lubrication system. (c) Derive an expression for air-fuel ratio for simple carburetor by using the approximate analysis method.  OR  Q.4 (a) State the function of lubrication system in IC engine. (b) Compare and differentiate the supercharging and turbocharging. (c) Explain with neat sketch splash lubrication system.  Q.5 (a) Write a short note on SAE rating of lubricants. (b) Give comparison between the catalytic convertor and thermal rector. (c) A two stroke diesel engine was motored when energy meter reading was 1.5 KW. Then the test on the engine was carried out for one hour and				
(c) Derive an expression for air-fuel ratio for simple carburetor by using the approximate analysis method.  OR  Q.4 (a) State the function of lubrication system in IC engine. (b) Compare and differentiate the supercharging and turbocharging. (c) Explain with neat sketch splash lubrication system.  Q.5 (a) Write a short note on SAE rating of lubricants. (b) Give comparison between the catalytic convertor and thermal rector. (c) A two stroke diesel engine was motored when energy meter reading was 1.5 KW. Then the test on the engine was carried out for one hour and	<b>Q.4</b>	(a)	Give the classification of engine cooling system.	
approximate analysis method.  OR  Q.4 (a) State the function of lubrication system in IC engine. (b) Compare and differentiate the supercharging and turbocharging. (c) Explain with neat sketch splash lubrication system.  Q.5 (a) Write a short note on SAE rating of lubricants. (b) Give comparison between the catalytic convertor and thermal rector. (c) A two stroke diesel engine was motored when energy meter reading was 1.5 KW. Then the test on the engine was carried out for one hour and		<b>(b)</b>		
Q.4 (a) State the function of lubrication system in IC engine. (b) Compare and differentiate the supercharging and turbocharging. (c) Explain with neat sketch splash lubrication system.  Q.5 (a) Write a short note on SAE rating of lubricants. (b) Give comparison between the catalytic convertor and thermal rector. (c) A two stroke diesel engine was motored when energy meter reading was 1.5 KW. Then the test on the engine was carried out for one hour and		<b>(c)</b>		07
<ul> <li>Q.4 (a) State the function of lubrication system in IC engine.</li> <li>(b) Compare and differentiate the supercharging and turbocharging.</li> <li>(c) Explain with neat sketch splash lubrication system.</li> <li>Q.5 (a) Write a short note on SAE rating of lubricants.</li> <li>(b) Give comparison between the catalytic convertor and thermal rector.</li> <li>(c) A two stroke diesel engine was motored when energy meter reading was 1.5 KW. Then the test on the engine was carried out for one hour and</li> </ul>			÷÷ · · · · · · · · · · · · · · · · · ·	
<ul> <li>(b) Compare and differentiate the supercharging and turbocharging.</li> <li>(c) Explain with neat sketch splash lubrication system.</li> <li>(d) Write a short note on SAE rating of lubricants.</li> <li>(e) Give comparison between the catalytic convertor and thermal rector.</li> <li>(f) A two stroke diesel engine was motored when energy meter reading was 1.5 KW. Then the test on the engine was carried out for one hour and</li> </ul>				
<ul> <li>(c) Explain with neat sketch splash lubrication system.</li> <li>Q.5 (a) Write a short note on SAE rating of lubricants.</li> <li>(b) Give comparison between the catalytic convertor and thermal rector.</li> <li>(c) A two stroke diesel engine was motored when energy meter reading was 1.5 KW. Then the test on the engine was carried out for one hour and</li> </ul>	<b>Q.4</b>			
Q.5 (a) Write a short note on SAE rating of lubricants.  (b) Give comparison between the catalytic convertor and thermal rector.  (c) A two stroke diesel engine was motored when energy meter reading was 1.5 KW. Then the test on the engine was carried out for one hour and				
<ul> <li>(b) Give comparison between the catalytic convertor and thermal rector.</li> <li>(c) A two stroke diesel engine was motored when energy meter reading was 1.5 KW. Then the test on the engine was carried out for one hour and</li> </ul>		(c)	Explain with neat sketch splash lubrication system.	07
<ul> <li>(b) Give comparison between the catalytic convertor and thermal rector.</li> <li>(c) A two stroke diesel engine was motored when energy meter reading was 1.5 KW. Then the test on the engine was carried out for one hour and</li> </ul>	0.5	(0)	Write a short note on SAE rating of lubricants	0.2
(c) A two stroke diesel engine was motored when energy meter reading was 1.5 KW. Then the test on the engine was carried out for one hour and	Q.5		<u>~</u>	
1.5 KW. Then the test on the engine was carried out for one hour and		, ,	<del>_</del>	
<del>-</del>		(0)	•	U/
following observations were recorded:			following observations were recorded:	

Brake torque = 120Nm

RPM = 600 Fuel used = 2.5 Kg/hr C.V. of fuel = 40.3 MJ/Kg Cooling water used = 818 Kg/hr Rise in cooling water temperature =  $10^{0}$  C  $Cp_{w} = 4.2$  KJ/Kg-K Exhaust gas temperature =  $345^{0}$  C Room temperature =  $25^{0}$  C A:F ratio = 32:1  $Cp_{g} = 1.045$  KJ/Kg-K

Draw heat balance sheet indicating units in KJ/min and also on percentage basis.

## OR

Q.5 (a) Explain the procedure of engine trouble shooting.

03 04

**(b)** Write a brief note on Wankel engine.

07

(c) In a test of four cylinder four stroke petrol engine of 75 mm bore & 100mm stroke. The following results were obtained at full throttle at a constant speed and with a fixed setting of the fuel supply of 0.082 kg/min.

Brake power with all cylinder working = 15.24 KW

Brake power with cylinder 1 cut off = 10.45 KW

Brake power with cylinder 2 cut off = 10.38 KW

Brake power with cylinder 3 cut off = 10.23 KW

Brake power with cylinder 4 cut off = 10.45 KW

Estimate the indicated power of the engine under this conditions. If calorific value of fuel is 44 MJ/Kg, find the thermal efficiency of the engine and compare it with air standard efficiency. The clearance volume is taken as 115 cc.

\*\*\*\*\*