



**Regulation R-18**

**Subject code: B35PC2**

**TKR COLLEGE OF ENGINEERING AND TECHNOLOGY**

(Autonomous, Accredited by NAAC with 'A' Grade)

**B.Tech 3<sup>rd</sup> Year 1<sup>st</sup> Semester Regular/Supply Examinations, 2021**

**Model paper 1**

**Thermal Engineering-1**

**(Mechanical Engineering)**

**Maximum Marks: 70**

**Duration: 3 Hours**

**Note:** This question paper contains two parts A and B.

**2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.**

**3. Part B consists of 5 Units. Answer any one full question from each unit.**

**4. Each question carries 10 marks and may have a, b, c, d as sub questions.**

**Part-A**

**All the following questions carry equal marks**

**(10x2M=20 Marks)**

- |    |  |
|----|--|
| 1  | Stoichiometric air-fuel ratio means?           |
| 2  | List the advantages of valve timing diagram?   |
| 3  | What is called flame front and flame velocity? |
| 4  | What is ignition delay period?                 |
| 5  | Define Brake Power                             |
| 6  | Define Friction Power                          |
| 7  | Define Air Compressor                          |
| 8  | Define Clearance ratio of a compressor         |
| 9  | Define Degree of reaction                      |
| 10 | What is Workdone Factor?                       |

**Part-B**

**Answer All the following questions.**

**(10MX 5=50Marks)**

- |    |   |
|----|---|
| 11 | Explain cooling system for IC engines?  |
|    | OR  |
| 12 | State and explain different combustion stages in SI engine?   |
| 13 | What are the types of fuel injection systems? Explain anyone with a neat sketch?  |
|    | OR  |
| 14 | Explain Battery ignition system with a neat diagram?  |
| 15 | A two stroke diesel engine was motored when meter reading was 1.5 kW. Then the test on the engine was carried with following results Brake torque = 120N-m; RPM =600; fuel used = 2.5kg; CV of fuel = 41kJ/kg; Cooling water used = 820kg; rise in cooling water temperature is 10 <sup>0</sup> C; Exhaust gas temp. =350 <sup>0</sup> C; Room temp.= 25 <sup>0</sup> C; A:F=32:1; Calculate: BP, I.P Mechanical Efficiency and indicated thermal efficiencies and draw heat balance sheet on Percentage Basis. |
|    | OR  |
| 16 | A) What is the significance of Morse test. Explain in detail<br>B) Explain Willan's line method   |
| 17 | a) Explain the working of Axial Flow compressor with neat Sketch  |

	b) Explain Velocity diagram of axial flow compressor
	OR
18	Determine the efficiency of vane type compressor which has an air delivery of $0.05\text{m}^3/\text{rev}$ when it compresses air from 1 bar to 1.5 bar where there is 40% pressure rise due to internal compression before back flow occurs
19	a) What is Air Refrigeration? Discuss Reversed Carnot Cycle in detail b) Give important applications of refrigeration
	OR
20	Differentiate between Simple Vapour compression and vapour absorption systems



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**Model paper 2**

**Thermal Engineering-1**

**(Mechanical Engineering)**

**Maximum Marks: 70**

**Duration: 3 Hours**

- Note:** This question paper contains two parts A and B.  
2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.  
3. Part B consists of 5 Units. Answer any one full question from each unit.  
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

**Part-A**

**All the following questions carry equal marks**

**(10x2M=20 Marks)**

1	What is meant by compression ratio?
2	Differentiate between normal combustion and abnormal combustion phenomena in case of SI Engine
3	Explain the difference between Pre-ignition, auto-ignition and detonation?
4	What are the various losses of IC Engine?
5	Define Indicated Power
6	Define Friction Power
7	Define Air Compressor
8	Define a single stage compressor
9	Give an example of Dynamic type rotary compressor
10	Define a Rotary compressor

**Part-B**

**Answer All the following questions.**

**(10MX 5=50Marks)**

11	Discuss the various important qualities of a good ignition system
	OR
12	Discuss the desirable characteristics of a good combustion chamber for an SI engine
13	Discuss the various methods for improving the anti-knock quality of an SI engine
	OR
14	What are the types of fuel injection systems? Explain any one with a neat sketch?
15	Explain heat balance sheet in detail
	OR
16	Derive the expression for the work done by a single stage compressor
17	a) Explain the working of Axial Flow compressor with neat Sketch b) Explain Velocity diagram of axial flow compressor
	OR
18	Differentiate between Reciprocating and Rotary Compressors
19	a) What is Air Refrigeration? Discuss Reversed Carnot Cycle in detail b) Give important applications of refrigeration

	OR
20	Discuss Simple Vapour Compression Cycle with neat sketch

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**B.Tech 3<sup>rd</sup> Year 1<sup>st</sup> Semester Regular/Supply Examinations, 2021****Model paper 3****Thermal Engineering-1****(Mechanical Engineering)****Maximum Marks: 70****Duration: 3 Hours****Note:** This question paper contains two parts A and B.**2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.****3. Part B consists of 5 Units. Answer any one full question from each unit.****4. Each question carries 10 marks and may have a, b, c, d as sub questions.****Part-A****All the following questions carry equal marks****(10x2M=20 Marks)**

- |    |  |
|----|--|
| 1  | What are the different strokes in two stroke engines         |
| 2  | List out the differences between the SI engine and CI engine |
| 3  | Explain meant by Cetane number                               |
| 4  | Describe the three desirable properties of CI engine fuels   |
| 5  | Define Brake Power   |
| 6  | Define Indicated Power                                       |
| 7  | What is the condition for maximum efficiency?                |
| 8  | Define Isothermal efficiency of a compressor                 |
| 9  | What is Workdone Factor?                                     |
| 10 | Define Pressure coefficient                                  |

**Part-B****Answer All the following questions.****(10MX 5=50Marks)**

- |    |  |
|----|--|
| 11 | Draw a neat sketch and explain the working of splash lubricating system.                                 |
|    | OR   |
| 12 | Analyze the stages of combustion in SI engines elaborating the flame front propagation                   |
| 13 | What are anti knock agents? Indicate the substances used and their effects on reducing of knocking       |
|    | OR   |
| 14 | Discuss the desirable characteristics of a good combustion chamber for an CI engine                      |
| 15 | a) What is Brake Power? How do you measure BP with Rope Brake Dynamometer ?<br>b) What is Motoring test? |
|    | OR   |
| 16 | A) What is the significance of Morse test. Explain in detail<br>B) Explain Willan's line method          |
| 17 | Compare Centrifugal and Axial flow Compressors   |
|    | OR   |
| 18 | a) List Various types of Compressors<br>b) Explain with neat sketch, working of Roots Blower             |
| 19 | Explain Air Conditioning Cycle with neat Sketch  |
|    | OR   |
| 20 | Explain the working of Central System in Air Conditioning with neat sketch                               |



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**Model paper 4**

**Thermal Engineering-1  
(Mechanical Engineering)**

**Maximum Marks: 70**

**Duration: 3 Hours**

**Note:** This question paper contains two parts A and B.  
2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.  
3. Part B consists of 5 Units. Answer any one full question from each unit.  
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

**Part-A**

**All the following questions carry equal marks (10x2M=20 Marks)**

1	List out the differences between the SI engine and CI engine
2	Discuss about indirect injection combustion chambers
3	List out various factors influencing delay period
4	What is meant by compression ratio?
5	Define Indicated Power
6	Define Friction Power
7	What is the condition for maximum efficiency?
8	Define Isothermal efficiency of a compressor
9	What is Workdone Factor?
10	Define Pressure coefficient

**Part-B**

**Answer All the following questions. (10MX 5=50Marks)**

11	Describe the working of pressure feed lubrication system with a neat sketch
	OR
12	With the help of graph, explain the factors which influence the flame speed in an S.I. engine
13	What is Physical delay? Discuss the factors that affect the delay period in a C.I. engine.
	OR
14	Explain with neat sketch of CI engine combustion chambers.
15	A two stroke diesel engine was motored when meter reading was 1.5 kW. Then the test on the engine was carried with following results Brake torque = 120N-m; RPM = 600; fuel used = 2.5kg; CV of fuel = 41kJ/kg; Cooling water used = 820kg; rise in cooling water temperature is 10°C; Exhaust gas temp. = 350°C; Room temp. = 25°C; A:F=32:1; Calculate: BP, I.P Mechanical Efficiency and indicated thermal efficiencies and draw heat balance sheet on Percentage Basis.
	OR
16	A) What is the significance of Morse test. Explain in detail B) Explain Willan's line method
17	a) Explain the working of Axial Flow compressor with neat Sketch

	b) Explain Velocity diagram of axial flow compressor
	OR
18	Differentiate between Reciprocating and Rotary Compressors
19	Explain Air Conditioning Cycle with neat Sketch
	OR
20	Explain the working of Central System in Air Conditioning with neat sketch