Total No. of Questions: 6 *Total No. of Printed Pages:3*

Enrollment No.....

Faculty of Engineering
End Sem Examination Dec 2024
RA3CO25 Basic of Thermal Engineering

Programme: B.Tech. Branch/Specialisation: RA

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

			Marks	BL	CO	PO	PSO
Q.1	i.	Which of the following is a type of thermodynamic system? (a) Open system (b) Closed system (c) Thermally isolated system (d) All of these	**1**	1	1	1	1
	ii.	Which of the following occurs without a change in the internal energy? (a) Isochoric process (b) Isenthalpic process (c) Steady-state process (d) Isenthalpic process	**1**	1	1	1	1
	iii.	Which of the following is chosen as the standard thermometric substance? (a) Liquid (b) Solid (c) Gas (d) None of these	**1**	2	1	2	1
	iv.	The entropy of an isolated system can never- (a) Decrease (b) Be zero (c) Increase (d) None of these	**1**	2	1	2	1
	v.	The Otto cycle is the- (a) Air standard cycle of CI engine (b) Air standard cycle of SI engine (c) Vapour power cycle of CI engine (d) Vapour power cycle of SI engine	**1**	1	1	1	1

vi.	In vapour refrigeration cycle, which of the following is used for expansion? (a) Expansion engine (b) Throttling valve or capillary tube (c) Both (a) and (b) (d) None of these	**1**	2	2	2	1
vii.	Which of the following does not relate to spark ignition engine? (a) Spark plug (b) Carburetor (c) Fuel injector (d) Ignition coil	**1**	2	1	2	1
viii.	A two stroke cycle engine gives _____ the number of power strokes as compared to the four stroke cycle engine, at the same engine speed. (a) half (b) same (c) double (d) four times	**1**	2	1	1	1
ix.	Which among these is the main component of a gas turbine plant? (a) Condenser (b) Compressor (c) Boiler (d) Both (b) and (c)	**1**	2	1	1	1
x.	The following method(s) can be used to improve the thermal efficiency of open cycle gas turbine plant- (a) Inter-cooling (b) Reheating (c) Regeneration (d) All of these	**1**	2	2	2	1
Q.2 i.	What is meant by thermodynamic system? How do you classify it?	**2**	2	1	2	1
ii.	What is meant by open and closed system? Give an example.	**3**	1	1	1	1
iii.	Explain with suitable example reversible and irreversible process.	**5**	3	1	2	1
OR iv.	What is meant by point and path function?	**5**	2	1	2	1
Q.3 i.	Explain Zeroth law of thermodynamics?	**3**	1	1	1	1
ii.	Explain second law of thermodynamics. Prove that violation of Kelvin Plank statement leads to violation of Clausius statement.	**7**	3	2	3	2

OR iii.	Derive the efficiency of Carnot cycle and Explain with the help of p-v and t-s diagram.	**7**	3	2	2	1
Q.4	Attempt any two:					
i.	Draw and explain the standard Rankine cycle on P-V and T-S coordinates.	**5**	1	1	1	1
ii.	Draw and compare otto and diesel cycle.	**5**	2	1	2	1
iii.	Describe with neat sketch vapour compression refrigeration cycle.	**5**	1	1	1	1
Q.5	Attempt any two:					
i.	Define carburetion and explain the construction and working of a simple carburetor with neat sketch.	**5**	1	1	1	1
ii.	Discuss about the working of a 4-stroke petrol engine with neat sketch?	**5**	2	1	1	1
iii.	Explain the various stages of combustion in a S.I engine with suitable diagrams.	**5**	2	1	1	1
Q.6 i.	Write the various methods to improve the performance of a gas turbine power plant.	**4**	2	1	2	1
ii.	Explain about the open cycle and closed cycle turbines with neat sketches and also draw the P-V & T-S diagrams.	**6**	2	1	2	1
OR iii.	What are essential components of a simple open cycle gas turbine plant?	**6**	2	1	1	1

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Marking Scheme

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Q.1	i)	d) All of the mentioned	**1**
	ii)	c) Steady-state process	**1**
	iii)	c) Gas	**1**
	iv)	(a) decrease	**1**
	v)	b) air standard cycle of SI engine	**1**
	vi)	b) throttling valve or capillary tube	**1**
	vii)	c) Fuel injector	**1**
	viii)	c) double	**1**
	ix)	b) Compressor	**1**
	x)	d) All of the above	**1**
Q.2	i.	Definition thermodynamic system 1Marks Classification 1 Marks	**2**
	ii.	Definition of Open and closed system 2Marks Example 1Marks	**3**
	iii.	reversible and irreversible process explanation 4marks example 1marks	**5**
OR	iv.	Point Function explanation 2.5marks Path function explanation 2.5marks	**5**
Q.3	i.	Explanation Zeroth Law 3 marks	3
	ii.	Definition 2 Marks Derivation 5	**7**
OR	iii.	Derivation 4 Marks Diagram 3 Marks	**7**
Q.4	i.	Diagram 3 Marks Explanation 2 Marks	**5**
	ii.	Diagram 2 Marks Comparison 3 Marks	**5**
OR	iii.	Diagram 2.5 Marks Explanation 2.5 Marks	**5**
Q.5	i.	Define 1 Marks Diagram 2 Marks Explanation 2 Marks	**5**
	ii.	Diagram 2 Marks Explanation 3 Marks	**5**
OR	iii.	Diagram 2.5 Marks Explanation 2.5 Marks.	**5**
Q.6	i.	One marks for each point	**4**
	ii.	Diagram 3 Marks Explanation 2 Marks Comparison 1 Marks	**6**
	iii.	Diagram 3 Marks (any three component) Explanation 3 Marks (Any three Component)	**6**

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