Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE SEMESTER– 1st / 2nd • EXAMINATION – SUMMER 2016

Subject Code: 110006 **Date: 01/06/2016**

Subject Name: Elements of Mechanical Engineering

Time:02:30 PM to 05:00 PM **Total Marks: 70**

Instructions:

1. **Attempt any five questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	What is prime mover ? How are they classified ?	**04**
	(b)	What are different types of coal ? state their properties	**04**
	(c)	With usual notations prove that Cp – Cv = R	**06**
Q.2	**(a)**	What do you mean by boiler mountings & accessories. List at list five boiler mountings & explain any one with neat sketch.	**04**
	(b)	Define following terms with respect to steam (i) Dryness fraction (ii) Degree of super heat (iii) Specific volume	**03**
	(c)	A gas whose pressure, volume and temp are 3 bar, 0.1 m^3 and 190^0 c respectively has the state changed at constant pressure until the temperature becomes 15^0 c. Calculate (i) Heat transferred. (ii) Work done during the process. Take R = 0.29 KJ/kg k & Cp = 1.005 KJ/kg k	**07**
Q.3	**(a)**	Write the difference between two stroke and four stroke cycle I.C engines	**06**
	(b)	Following observations were recorded during a test on a single cylinder oil engine . Bore = 300 mm, Stroke = 450 mm, Speed = 300 rpm , i.m.e.p = 6 bar , Net break load = 1.5 kN, Brake drum diameter = 1.8 m Calculate (i) Indicated power (ii) Break power (iii) Mechanical efficiency	**08**
Q.4	**(a)**	Explain the essential elements of a heat engine.	**03**
	(b)	Derive an expression for air standard efficiency of an otto cycle.	**04**
	(c)	In air standard otto cycle the maximum and minimum temperatures are 1673k and 288k. The heat supplied per kg of air is 800 KJ. Calculate (i) The compression ratio (ii) Efficiency. Take Cv = 0.718 KJ/kgK & γ = 1.4	**07**
Q.5	**(a)**	Compare centrifugal pump and reciprocating pump.	**04**
	(b)	Explain construction and working of centrifugal pump with sketch.	**06**
	(c)	Differentiate between clutch & brake	**04**
Q.6	**(a)**	What are the uses of compressed air ?	**03**
	(b)	Write the statement of (i) Zeroth law (ii) First law & (iii) Second law of thermodynamics	**03**
	(c)	What is the purpose of governor ? Explain proter governor with neat sketch	**08**
Q.7	**(a)**	Differentiate between fire tube and water tube boiler	**04**
	(b)	Compare Flat & V belt drive	**05**
	(c)	State advantage of gaseous fuels over solid and liquid fuels.	**05**

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