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# P.E.S. College of Engineering, Mandya - 571 401

***(An Autonomous Institution affiliated to VTU, Belgaum)***

**Second Semester, B.E. - Make-up Examination; July -2016**

**Elements of Mechanical Engineering**

(Common to all Branches)

*Time: 3 hrs* *Max. Marks: 100*

***Note**: i) Answer **FIVE** full questions, selecting **ONE** full question from each unit.*
*ii) Assume suitably missing data if required.*

## UNIT - I

1 a. Explain with neat sketches formation of steam at constant pressure with P-T diagram. 10

b. Explain the following Terms :

i) Latent heat ii) Sensible heat iii) Dryness fraction 10

iv) Superheated steam v) Internal energy.

2 a. Explain with neat sketch closed cycle gas turbine. 10

b. Sketch and explain the working of reaction turbine with the help of Pressure-Velocity graph. 10

## UNIT - II

3 a. With neat sketch explain the working principle of 4-stroke diesel engine with P-V diagram. 12

b. Give the comparison between petrol engine and diesel engine. 8

4 a. Explain with neat sketches working principle of 2-stroke petrol engine. 10

b. The following observations were recorded during a test on 4-stroke engine. Bore = 25 cm, stroke = 40 cm, crank speed = 250 rpm, Net load on brake drum = 700 N, Diameter of brake drum = 2 m. Indicted MEP = 6 bar, Fuel consumption = 0.0013 kg/s. Specific gravity of fuel = 0.78, C.V. of fuel = 43900 kJ/kg. 10

Determine;

i) BP ii) IP iii) $\eta_{mech}$

iv) $\eta_{ITH}$ v) $\eta_{BTH}$.

## UNIT - III

5 a. Explain the working of single acting and double acting reciprocating pumps. 10

b. With neat sketch, explain the parts of centrifugal pump and its application. 10

6 a. Explain with neat sketch vapour absorption refrigeration system. 10

b. With a neat sketch, explain the working of a window type room air conditioner. 10

## UNIT - IV

7 a. Draw a neat sketch of lathe and label the parts. 8

b. Sketch and explain the following :

i) Slab milling ii) slot milling 12

iii) Angular milling iv) straddle milling.

Contd….2

8 a. Explain with neat sketch Radial drilling machine. 10

b. With neat sketches explain the following lathe operations :

i) Facing

ii) Cylindrical turning 10

iii) Swiveling by compound rest.

**UNIT - V**

9 a. Explain with neat sketch Oxy-acetylene gas welding process. 10

b. With neat sketches explain the different types of flames used in gas welding and specify their applications. 10

10 a. Derive an expression for length of belt for cross belt drive. 10

b. A prime mover running at 240 rpm drives a DC generator, by a belt drive. The diameter of the pulley on the output shaft of the prime mover is 160 cm and that of the generator shaft is 60 cm. Determine the speed of the generator shaft in the following cases :

i) Neglecting thickness of belt 10

ii) Considering belt thickness, the thickness of the belt is 6 mm

iii) Considering thickness of belt and a slip of 3%

iv) Velocity of belt considering belt thickness.

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