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B.E. 2nd Semester Examination

May-2013

ELEMENTS OF MECHANICAL ENGINEERING

Paper-ME-101-E

Time allowed : 3 hours]

[Maximum marks : 100

Note : Attempt any five questions.

1. (a) Define dryness fraction and explain the measurement of dryness fraction with the help of throttling calorimeter. 10
(b) Explain various boiler mountings and accessories in detail. 10
2. (a) Differentiate between Impulse and reaction turbines and compounding of impulse turbine. 10
(b) Explain function of cooling towers and their classifications. 10
3. (a) Explain the working principle and pressure-volume diagram of Otto cycle engine. 10
(b) Find out the thermal efficiency and also explain the variation of thermal efficiency with specific output in case of constant pressure gas turbine Brayton cycle. 10

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4. (a) Draw a neat diagram of Francis turbine and explain its construction and working principle. 10
- (b) Explain the classification of centrifugal pumps and working of hydraulic lift. 10
5. (a) Explain the Differential pulley block and reversibility of machine. 10
- (b) In a double purchase crab, the pinions have 15 and 200 teeth while the spur wheels have 45 and 40 teeth. The effort handle is 40 cm while the radius of the drum is 15 cm. If the efficiency of the winch is 40%, what load will be lifted by an effort of 250N applied at the end of the handle? 10
6. (a) Explain the functions of brakes, their classification and working of internal expanding shoe brake. 10
- (b) Explain the functions of dynamometers and their classification in detail. 10
7. (a) Explain the total elongation of a uniform bar hanging under its own weight and also explain the relation between various elastic constants. 10

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- (b) The principle stresses at a point in a material are 120 MPa and 60 MPa. Find the magnitude and direction of stress on a plane inclined at 30 degree to the direction of 60 MPa stress. Find also the plane on which the resultant stress is most oblique and its value.

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8. Draw the B.M and S.F diagrams for the beam shown in figure.

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