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DEPARTMENT OF MECHANICAL ENGINEERING.

MODEL QUESTION PAPER.

Entrance Examination for Ph.D Admission(March 2012)

SECTION-A

(10 MULTIPLE CHOICE QUESTIONS TO BE ANSWERED) (10x1=10) Marks

1. Pelton wheel works on
   a. Medium discharge, low head
   b. High discharge, low head
   c. Medium discharge, medium head
   d. Low discharge, high head
2. According to first law of thermodynamics
   a. Mass and energy are mutually convertible
   b. Heat and work are mutually convertible
   c. Heat flows from hot substance to cold substance
   d. Carnot engine is most efficient
3. Pitch diameter of a gear is equal to the product of
   a. Circular pitch and no. of teeth
   b. Face width and no. of teeth
   c. Clearance and no. of teeth
   d. Module and no. of teeth
4. A cutting tool having tool signature 10,9,6,6,8,8,2 have side rake angle
   a. 10° b. 9° c. 8° d. 2°
5. A shaft and hole is designated by 50H7d8.This assembly constitutes
   a. Interference fit
   b. Transition fit
   c. Clearance fit
   d. None of the above

SECTION-B

(6 QUESTIONS FROM ANY ONE SPECIALISATION TO BE ANSWERED.) (6x5=30) Marks

SPECIALISATIONS:

1.PRODUCTION AND INDUSTRIAL ENGINEERING

2.DESIGN ENGINEERING

3.THERMAL AND ENERGY ENGINEERING

PRODUCTION AND INDUSTRIAL ENGINEERING

Model questions

1. A 50mm diameter steel rod was turned at 284rpm and tool failure occurred in 10 minutes. The speed was changed to 232rpm and tool failed in 60 minutes. Assuming straight line relation between cutting speed and tool life, Find value of Taylor's exponent.

2 .What are the methods of manufacturing the crankshaft. choose the best method and justify.

DESIGN ENGINEERING

Model questions

3. A circular rod of 100mm diameter and 500mm length is subjected to tensile force of 1000KN. Determine modulus of rigidity if E=2×10^5N/mm^2 & Poisson ratio =0.3
4. A solid shaft of 100mm diameter transmits 160HP at 200rpm. The modulus of rigidity is 8×10^5Kg/cm^2. Find the maximum angle of twist if the shaft length is 6m.

THERMAL AND ENERGY ENGINEERING

Model questions

5. Air at 20°C blows over a plate of 50×25cm maintained at 250°C. If the convection heat transfer coefficient is 25W/m^2/°C, find the heat transfer rate.
6. 1 Kg of moist air at 70% RH and 21°C is cooled at constant pressure at 1 bar to5°C. The vapour

pressure at 21°C and 5°C are 0.025bar and 0.0087bar. Find the percentage of water vapour that condenses in to water at 5°C.