

## Eighth Semester B.E. Degree Examination, December 2011

### Industrial Management

Time: 3 hrs.

Max. Marks:100

*Note: Answer any FIVE full questions, selecting at least TWO questions from each part.*

#### PART – A

- 1 a. Briefly explain, giving the important milestones, the historical development of the present day's management thought. (10 Marks)
- b. Explain the essence and contribution of the scientific management movement. (10 Marks)
- 2 a. Discuss the features, merits and demerits of a sole proprietary concern. (10 Marks)
- b. Briefly explain the various stages in starting a joint stock company. (10 Marks)
- 3 a. Define quality. Briefly explain the statistical tools used for quality control and improvement. (10 Marks)
- b. Distinguish between type I and type II errors. Bring out the differences between charts for variables and charts for attribution. (10 Marks)
- 4 a. List the objectives of work study and explain the procedure for method study. (10 Marks)
- b. Describe the principles of motion economy. (10 Marks)

#### PART – B

- 5 a. Briefly explain Hawthorne studies and discuss their implications. (10 Marks)
- b. Explain the various skills of a manager at various levels. (10 Marks)
- 6 a. Discuss the contributions of Skinner to behavioral science. (10 Marks)
- b. Explain Herzberg's two factor theory of motivation. (10 Marks)
- 7 a. Briefly explain process management and discuss the major process management decisions. (10 Marks)
- b. Explain how 'research and development' and 'technology fusion' is brought about. (10 Marks)
- 8 Write notes on :
  - a. Primary areas of technology management
  - b. Understanding past and predicting future behaviours
  - c. Malsow's hierarchy of needs
  - d. Safety precautions and safe practices. (20 Marks)

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**Eighth Semester B.E. Degree Examination, December 2011**  
**Hydraulics and Pneumatics**

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions, selecting atleast TWO questions from each part.**

**PART – A**

- 1
  - a. State Pascal's Law. Explain with a neat sketch, the basic hydraulic power system. (08 Marks)
  - b. Using a neat diagram, explain the construction and functioning of a pressure compensated, variable displacement hydraulic vane pump. (08 Marks)
  - c. Three devices A, B and C are connected in series to a pump. The device A operates at 0.4MPa. The device B operates at 0.8MPa and the device C operates at 1MPa. Sketch the arrangement and determine the pressure at which the pump should deliver the fluid. (04 Marks)
  
- 2
  - a. With a neat sketch, explain radial piston motor construction and working principle. (08 Marks)
  - b. A hydraulic motor has a displacement of  $150\text{cm}^3$ , operates with a pressure of 75bar and a speed of 1800rpm. If the actual flow rate consumed by the motor is  $0.005\text{m}^3/\text{s}$  and the actual torque delivered by the motor is 165N-m, find i) Volumetric efficiency ii) Mechanical efficiency iii) Overall efficiency iv) The actual KW delivered by the motor. (08 Marks)
  - c. Why single acting single rod cylinder is called as differential cylinder? How does it differ from the non – differential cylinder? (04 Marks)
  
- 3
  - a. With a neat sketch, explain the operation of a counter balance valve. (08 Marks)
  - b. Draw the ISO hydraulic symbols for the following i) Compound pressure relief valve ii) Pilot centred, solenoid operated 3/3 DCV iii) Pressure sequencing valve iv) Pressure - Temp compensated flow control valve with reverse free flow. (08 Marks)
  - c. With a neat diagram, explain the operation of a spring centred, pilot operated fourway – three position directional control valve. (04 Marks)
  
- 4
  - a. Explain briefly, with a neat sketch, the cylinder synchronizing circuit, operated together with a pair of cylinders in series in a synchronized manner to lift (push) the load. (08 Marks)
  - b. With hydraulic circuit, explain the operation of a double pump hydraulic system. (08 Marks)
  - c. What are hydraulic accumulators? Classify the different accumulators used in hydraulic systems. (04 Marks)

**PART – B**

- 5
  - a. State and explain widely used types of seals in hydraulic systems. (08 Marks)
  - b. Write short notes on : i) Reservoir system ii) Filters. (08 Marks)
  - c. During the testing of a oil filter, it is found that 40,000 particles, greater than  $30\mu\text{m}$  enter the filter and 2000 of these particles go through it. Compute the Beta ratio and Beta efficiency of this filter. (04 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
 2. Any revealing of identification, appeal to evaluator and /or equations written eg.  $42+8 = 50$ , will be treated as malpractice.

- 6 a. Determine the importance of the end – cushioning effect, in an pneumatic linear actuator with sketch. (08 Marks)
- b. Write short notes on the following :  
i) Cylinder mounting arrangement      ii) Rodless cylinder (08 Marks)
- c. State the advantages of an pneumatic system. (04 Marks)
- 7 a. Draw a pneumatic circuit that provides an adjustable deceleration air cushion at both ends of the stroke for a single ended piston. Briefly explain the working principle. (08 Marks)
- b. Using two – way – two position directional control valves, show how the following logic functions can be achieved in pneumatics : i) AND ii) NOR      iii) OR      iv) NAND (12 Marks)
- 8 a. Draw and explain the electrical control circuitry for a regenerative circuit. (10 Marks)
- b. Write short notes on :  
i) Air filters      ii) Air driers      iii) Air lubrication units. (10 Marks)

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## Eighth Semester B.E. Degree Examination, December 2011

### Tribology

Time: 3 hrs.

Max. Marks:100

- Note: 1. Answer any FIVE full questions, selecting at least TWO questions from each part.  
2. Use of design data handbook is permitted.**

#### PART – A

- 1
  - a. Derive the expression for the flow of oil between two parallel stationary plates. (10 Marks)
  - b. Explain method used to determine viscosity index of an unknown oil. (05 Marks)
  - c. With a neat sketch, explain Saybolt viscometer used to determine viscosity of an oil. (05 Marks)
  
- 2
  - a. Indicating the assumptions, drive the Petroff's equation for a lightly loaded journal bearing. (10 Marks)
  - b. A lightly loaded full journal bearing of an air compressor has the following specifications :  
 Journal diameter = 64 mm,  
 Bearing length = 57 mm,  
 Radial clearance = 0.05 mm,  
 Journal speed = 25000 rpm,  
 Viscosity of the lubricating oil = 2.4 C<sub>P</sub>,  
 Radial load = 890 N.  
 Determine : i) Torque, ii) Coefficient of friction, iii) Frictional force, iv) Power loss. (10 Marks)
  
- 3
 

State the assumptions made in derivation of Reynold's equation. Hence derive the Reynold's equation in two dimensions. (20 Marks)
  
- 4
  - a. The following data refers to a journal bearing :  
 Journal diameter = 30 mm,                      Journal speed = 2000 rpm,  
 Bearing length = 60 mm,                      Radial clearance = 0.02 mm,  
 Inlet pressure = 0.3 MPa,                      Hole location = 300°,  
 Viscosity of oil = 20 cp,                      Attitude = 0.8.  
 Plot the pressure distribution diagram. If the distribution is not satisfactory, what alternatives are required to make? (12 Marks)
  - b. A sider bearing with a rectangular pivoted shoe has the following specifications :  
 Length of the shoe in the direction of motion = 75 mm  
 Width of the shoe = 112.5 mm  
 Velocity of moving member = 2 m/s  
 Expected oil temperature = 70°C  
 Permissible minimum film thickness = 0.0225 mm  
 Lubricating oil used = SAE 40.  
 Assuming the condition of bearing surface corresponds to maximum load carrying capacity of bearing. Determine : i) Load carrying capacity of bearing,                      ii) Power loss.  
 Consider end leakage. Also calculate coefficient of friction. (08 Marks)

**PART – B**

- 5 a. Explain self contained bearings. (06 Marks)
- b. A partial self contained  $120^\circ$  centrally loaded bearing has the following specifications :
- Journal diameter = 100 mm  
 Radial clearance = 0.0625 mm  
 Bearing length = 125 mm  
 Journal speed = 400 rpm,  
 Expected oil temperature =  $98^\circ\text{C}$   
 Lubricating oil = SAE60.
- Assuming steady load and average ventilation of bearing. Determine :
- i) Load carrying capacity of bearing if the permissible minimum film thickness is 0.00625 mm  
 ii) Power loss  
 iii) Maximum pressure  
 iv) Average bearing operating temperature. (14 Marks)
- 6 a. Derive the expression for rate of oil flow and load carrying capacity for an hydrostatic step bearing. (10 Marks)
- b. A hydrostatic step bearing has the following specifications :
- Diameter of shaft = 150 mm                      Diameter of pocket = 100 mm  
 Vertical thrust = 70 kN                              Shaft speed = 1000 rpm  
 Viscosity of the lubricant = 0.025 PaS.      Desirable oil film thickness = 0.125mm.
- Determine : i) Rate of flow through the bearing  
 ii) Power loss due to viscous friction  
 iii) Coefficient of friction. (10 Marks)
- 7 a. Explain any five desirable properties of a good bearing material. (10 Marks)
- b. With neat sketches, explain different types of wear. (10 Marks)
- 8 Explain briefly :
- a. Wear measurement  
 b. Improved design  
 c. Material selection  
 d. Surface engineering. (20 Marks)

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**Eighth Semester B.E. Degree Examination, December 2011**  
**Foundry Technology**

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions, selecting  
at least TWO questions from each part.**

**PART – A**

- 1 a. What is fluidity? Explain the factors affecting fluidity. (08 Marks)  
b. What is degassing? List the different methods of degassing. (08 Marks)  
c. Explain:  
i) Hot tearing  
ii) Shrinkage of liquid metals. (04 Marks)
- 2 a. Explain the characteristics of design for minimum casting stresses. (10 Marks)  
b. With a simple illustration, explain the design for directional solidification. (10 Marks)
- 3 a. Explain:  
i) Nucleation  
ii) Dendrite growth  
iii) Grain size. (10 Marks)  
b. Explain the concept of progressive and directional solidification to obtain a sound casting. (10 Marks)
- 4 a. Explain how chills and padding are used to obtain sound casting. (08 Marks)  
b. What factors must be considered in designing an effective gating system. (06 Marks)  
c. Explain different types of gating ratios in the casting process. (06 Marks)

**PART – B**

- 5 a. With an illustration, explain the vacuum moulding process. (10 Marks)  
b. With an illustration, explain the working of a CUPOLA furnace. (10 Marks)
- 6 a. Explain the melting procedure and casting characteristics of grey cast iron. (10 Marks)  
b. Explain the properties and production of malleable iron. (10 Marks)
- 7 a. Explain the melting procedure and casting characteristics of aluminium alloys, in a foundry. (10 Marks)  
b. Explain the melting procedure and casting characteristics of magnesium alloys in a foundry. (10 Marks)
- 8 a. With an illustration, explain the following to control dust and fume in a foundry.  
i) Bag filter  
ii) Cyclone. (12 Marks)  
b. Explain the different types of material handling equipments, used in a foundry, in order to mechanize. (08 Marks)

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## Eighth Semester B.E. Degree Examination, December 2011

### Automotive Engineering

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions, selecting at least TWO questions from each part.**

#### PART – A

- 1 a. Explain the different methods of connecting the gudgeon pin with the piston and connecting rod. (10 Marks)
- b. What is the necessity of cooling the valve? Explain with a sketch, the sodium cooled valve. (10 Marks)
- 2 a. Differentiate between constant choke and constant vacuum carburetor. (04 Marks)
- b. Explain the working of an acceleration pump. (08 Marks)
- c. What are the methods of governing? Explain briefly. (08 Marks)
- 3 a. With neat sketches, explain the various methods of supercharging. (10 Marks)
- b. Explain the principle of working of turbocharging. (10 Marks)
- 4 a. Explain with a neat sketch, working of a battery ignition system. (10 Marks)
- b. Explain the working of vacuum advance. (06 Marks)
- c. What are the advantages of using an electronic ignition system? (04 Marks)

#### PART – B

- 5 a. With a neat sketch, explain the working of a centrifugal clutch. Mention its advantages and disadvantages. (10 Marks)
- b. With a neat sketch, explain the four speed synchromesh gear box. (10 Marks)
- 6 a. Explain with a sketch, the independent suspension systems for front and rear wheels. (10 Marks)
- b. With a neat sketch, explain the working of a telescopic type shock absorber. (10 Marks)
- 7 a. With a neat sketch, explain the following : (10 Marks)
  - i) Hotch kiss drive      ii) Torque tube drive
- b. Define the following and explain their effect on steering : (10 Marks)
  - i) Camber      ii) Kingpin inclination      iii) Included angle and scrub radius
  - iv) Castor      v) Toe-in and toe out.
- 8 a. Explain the working of a positive crank case ventilation system. (06 Marks)
- b. Explain with a sketch, the working of an EGR system. (08 Marks)
- c. Write a note on emission standards. (06 Marks)