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06ME81

Eighth Semester B.E. Degree Examination, May/June 2010
Industrial Management

Time: 3 hrs.

Max. Marks:100

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

PART - A

- 1 a. Explain the characteristics of 'scientific management'. Discuss further, any two schools of management thought. (10 Marks)
- b. Explain different types of private sector organizations with respect to their formation , risk involved and advantages perceived. (10 Marks)
- 2 a. Explain the meaning of quality and quality improvement. Write about the objectives of 'quality control' and functions of 'quality control department' of an organization. (10 Marks)
- b. Discuss in detail : i) quality costs ii) legal aspects of quality iii) quality philosophy iv) value engineering. (10 Marks)
- 3 a. What are 'control charts for variables'? Explain 'process out of control' and 'process in control' with respect to these charts. (10 Marks)
- b. Explain these attribute charts :
i) Attribute charts for defective items (P – chart) ii) Attribute charts for number of defects per unit (C – chart). (10 Marks)
- 4 a. Describe the procedure for motion study and the principles of 'motion economy' in detail. (10 Marks)
- b. Discuss in detail 'industrial hygiene', 'major job risks', 'safety regulations' and 'safe practices'. (10 Marks)

PART - B

- 5 a. Explain X and Y theory and Herzberg's motivation hygiene theory referred under 'motivation' theories in management. (10 Marks)
- b. Discuss i) Maslow's theory of hierarchy of human needs ii) Incentives as 'motivators'. (10 Marks)
- 6 a. Explain the contribution of Elton Mayo to 'human relations management'. How are psychological factors important in building an organization? (10 Marks)
- b. Discuss directing, changing and controlling the behaviour of employees in an organization. (10 Marks)
- 7 a. What is 'process planning'? What are the steps involved? Comment on the overall process management of an organization, citing examples and listing the factors involved. (10 Marks)
- b. Explain customer involvement in an organisation's working. Can the customer influence the process management decisions? Comment. (10 Marks)
- 8 a. Discuss the primary areas covered by technology management and role of technology management in improving business performance. (10 Marks)
- b. Explain these terms : i) R and D stages and technology fusion ii) Technology strategy and implementation guidelines. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
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06ME82

Eighth Semester B.E. Degree Examination, May/June 2010
Hydraulics and Pneumatics

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 are the important considerations when selecting a pump for a particular application? Explain. (06 Marks)
- b. A displacement type cylinder has a rod of 65 mm diameter and is powered by hand pump with a displacement of 5 ml per double stroke. The maximum operating pressure of the system is to be limited to 350 bar. Calculate :
 - i) The number of double pumping strokes needed to extend cylinder rod by 50 mm.
 - ii) The maximum load which could be raised, using this system. (06 Marks)
- c. A hydraulic motor has a displacement of 130 cm³, operates with a pressure of 105 bar and has a speed of 2000 rpm. If the actual flow rate consumed by the motor is 0.005 m³/s and the actual torque delivered by the motor is 200 N-m, find :
 - i) Volumetric efficiency
 - ii) Mechanical efficiency
 - iii) Overall efficiency
 - iv) Power delivered by motor in kW. (08 Marks)
- 2 a. Explain with a neat sketch, the working of a balanced vane motor. (06 Marks)
- b. Find the flow rate in Lpm that an axis piston pump delivers at 1200 rpm. The pump has 12, 15 mm diameter pistons arranged on an 120 mm piston circle diameter. The offset is set 10°, and volumetric efficiency is 94%. (06 Marks)
- c. A pump is operating at 75.7 Lpm and 12400 kPa. It has an overall efficiency of 0.83. It is driven by an electric motor with an efficiency of 0.87. How much power in kW is the electric motor drawing? (08 Marks)
- 3 a. Explain the working of a pressure reducing valve, with a neat sketch. (06 Marks)
- b. Explain any four center configurations in three position, four way D.C. valve. (06 Marks)
- c. Draw ISO symbolic representation of
 - i) Pressure sequence valve
 - ii) Pressure reducing valve
 - iii) Pressure relief valve
 - iv) Manually operated spring centered, 3 position four way valve. (08 Marks)
- 4 a. Draw the hydraulic circuit diagram of regenerative cylinder operation and obtain an expression for the regenerated speed of the actuator. (10 Marks)
- b. Explain with a hydraulic circuit :
 - i) The application of accumulator as an emergency power source
 - ii) Meter – in and meter – out circuit. (10 Marks)

PART - B

- 5 a. What do you mean by beta ratio and beta efficiency? (04 Marks)
- b. What are the probable causes for the following troubles in an hydraulic system?
- Noisy pump
 - No pressure
 - Actuator failure
 - Overheating of hydraulic fluid. (08 Marks)
- c. Explain the four different types of fire resistant fluids in common use. (08 Marks)
- 6 a. Give complete classification of pneumatic actuators. (06 Marks)
- b. Name three reasons for considering the use of pneumatics instead of hydraulics. (06 Marks)
- c. Explain end cushion arrangement in double acting cylinder, with a neat sketch. (08 Marks)
- 7 a. How following functions are generated in pneumatic systems? Explain with a sketch.
- AND
 - OR
 - NOT. (15 Marks)
- b. Explain with a suitable circuit diagram, application of the memory valve. (05 Marks)
- 8 a. Explain the following as applied to electro-pneumatic controls.
- Normally closed relay switch.
 - Normally open relay switch. (04 Marks)
- b. Sketch a circuit to control two pneumatic cylinders using limit switch for sequential motion. (10 Marks)
- c. Explain air filter for pneumatic system, with a neat sketch. (06 Marks)

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06ME831

Eighth Semester B.E. Degree Examination, May/June 2010
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 hand book is permitted.
3. Missing data, if any may be suitably assumed.

PART - A

- 1
 - a. Stating the assumptions, derive Hagen – Poiseuille law. (08 Marks)
 - b. State Newton’s law of viscous flow and deduce the relation for fluidity of a Newtonian fluid. (04 Marks)
 - c. Tanks A and B are connected by a capillary tube and the system filled with a liquid of viscosity 2 cp. The pressures in tanks A and B are 0.01 and 0.04 MPa respectively. The outer diameter of the tube is 0.000835 mm with a wall thickness of 0.0001 mm. The length of the capillary is 2m. Assuming laminar flow, determine the rate of flow-through the capillary tube. (08 Marks)
- 2
 - a. Indicating the assumptions, derive the Petroff’s equation and the expression for coefficient of friction for a lightly loaded journal bearing. (10 Marks)
 - b. A lightly loaded journal bearing is to support a radial load of 1 kN. The diameter of the shaft is 50 mm and length of the bearing is 60 mm. The oil used as the lubricant is SAE 30 at 70°C. Determine the coefficient of friction and power loss in the bearing if the speed is 750 rpm and the diametral clearance ratio is 0.001. (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. Derive an expression for the load carrying capacity of a plane slider bearing with a fixed shoe. (10 Marks)
 - b. A pivoted shoe of a slider bearing has a square shape. The load acting on the bearing is 15 kN. Velocity of the moving member is 5 m/sec. Lubricating oil is SAE 30 and mean temperature of the oil is 70°C. The minimum oil film thickness is 0.02 mm. Take $q = 1.4$. Determine :
 - i) The dimensions of the shoe
 - ii) Coefficient of friction
 - iii) Power loss due to friction.
 Assume that the inclination of bearing surface corresponds to the maximum load carrying capacity of the bearing. (10 Marks)

PART - B

- 5 a. A full journal bearing with a circumferential oil groove is lubricated under pressure and has the following specifications.

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Journal diameter	= 0.0635 m
Total length of the bearing	= 0.127 m
Width of circumferential groove	= 6.35 mm
Radial clearance	= 0.04445 mm
Oil film temperature	= 112.7°C
Minimum oil film thickness	= 4.445×10^{-3} mm
Lubricating oil	= SAE 20

Determine the inlet pressure required in order to control the bearing temperature, if the rate of oil flow through the bearing is $5 \times 10^{-6} \text{ m}^3/\text{s}$. (12 Marks)

b. Write a note on thermal equilibrium of journal bearings. (08 Marks)

6 a. Derive the expressions for rate of flow of oil and load carrying capacity for an hydrostatic step bearing. (10 Marks)

b. A hydrostatic step bearing has the following characteristics.

Shaft diameter	= 130 mm
Diameter of pocket	= 55 mm
Shaft speed	= 1800 rpm
Inlet oil pressure	= 3.75 MPa
External pressure	= 0 (atmospheric)
Expected mean oil film temperature	= 60°C
Lubricating oil	= SAE 60
Desirable oil film thickness	= 0.0875 mm

Determine :

- Load the bearing can support
- Rate of oil flow through the bearing
- Power loss due to viscous friction. (10 Marks)

7 a. Discuss briefly any ten desirable properties of a good bearing material. (10 Marks)

b. Discuss briefly the different types of wear, with simple sketches. (10 Marks)

8 Write short notes on :

- Wear of ceramic materials
- Improved design
- Material selection
- Surface engineering. (20 Marks)

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06ME838

Eighth Semester B.E. Degree Examination, May/June 2010
Foundry Technology

Time: 3 hrs.

Max. Marks:100

Note: 1. Answer any FIVE full questions, selecting atleast TWO questions from each part.

2. Draw a neat sketches wherever necessary.

PART - A

- 1 a. Name the various methods used for degassing. Explain any two of them with sketches. (10 Marks)
- b. Define fluidity. Name the factors affecting fluidity. How is the fluidity of the molten metal determined? (10 Marks)
- 2 a. Explain clearly the casting design considerations for : i) design for minimum casting stresses ii) design for metal flow iii) design for low pattern cost. (12 Marks)
- b. With simple sketches, describe the methods used to eliminate hot spots in T – sections. (08 Marks)
- 3 a. Explain homogeneous and heterogeneous nucleation. (06 Marks)
- b. Discuss briefly with a neat sketch, directional solidification and progressive solidification. (08 Marks)
- c. Name the various methods used to achieve directional solidification, in a casting. (06 Marks)
- 4 a. What are the various functions of a riser? (04 Marks)
- b. Differentiate between a pressurized and an unpressurized gating system. (06 Marks)
- c. Explain the law of continuity and the Bernoulli's theorem. (10 Marks)

PART - B

- 5 a. With a neat sketch, explain flaskless moulding and list out the advantages and disadvantages of the process. (12 Marks)
- b. List the common problems associated with cupola melting in India. What are the advantages offered by a hot blast cupola? (08 Marks)
- 6 a. With a neat sketch, explain the principle of indirect electric arc furnace for the melting of grey cast iron. (10 Marks)
- b. Explain the casting characteristics and the properties of grey and cast iron. (10 Marks)
- 7 a. Explain with a neat sketch, the principle of pot furnace for the melting of aluminium alloys. (10 Marks)
- b. Explain the casting characteristics and the properties of aluminium alloys. (10 Marks)
- 8 a. Explain the need for modernization and mechanization of foundry. (05 Marks)
- b. With sketches, explain briefly two methods of dust collecting equipment used in foundry. (05 Marks)
- c. With the help of a line diagram, explain the working of a mechanized sand casting foundry. Also draw the flow chart for sand circulation. (10 Marks)

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06ME843

Eighth Semester B.E. Degree Examination, May/June 2010
Bio-Mass Energy Systems

Time: 3 hrs.

Max. Marks:100

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

PART – A

- 1 a. Define biomass stating its resources in different forms briefly. (06 Marks)
b. Describe photosynthesis process stating all its necessary conditions. (06 Marks)
c. What is “energy plantation”? State all its advantages mentioning salient proposed plants for energy plantation. (08 Marks)
- 2 a. Briefly describe various types of bio-fuels. (06 Marks)
b. What are the different forms of bio-conversion processes? Briefly describe them stating salient characteristics. (14 Marks)
- 3 a. Draw a neat line diagram of possible energy conversion routes and products from bio-mass. (08 Marks)
b. Define : Briquetting and pelletization. (06 Marks)
c. Describe with neat sketch the working of a MSW incineration plant. (06 Marks)
- 4 a. What are the salient characteristics of gasification process over other bio-conversion methods? (06 Marks)
b. Describe with neat sketch the working of the fixed bed down draught gasifier. (08 Marks)
c. State the chemistry of the gasification process in details. (06 Marks)

PART – B

- 5 a. State all the advantages of anaerobic digestion. (06 Marks)
b. Describe briefly all the factors affecting biodigestion of gas. (08 Marks)
c. With neat sketch, describe working of a dome and drum type biogas plant. (06 Marks)
- 6 a. With neat sketches, state the modifications necessary for S.I. and C.I. engines for use of biogas. (12 Marks)
b. Describe with line diagram ethanol production from various types of biomass. (08 Marks)
- 7 a. How biodiesel is produced from edible and non – edible oils. (06 Marks)
b. Describe the performance analysis of diesel engine using the bio-diesel. (08 Marks)
c. State the various effects of using bio-diesel in I.C. engines. (06 Marks)
- 8 a. Mention various basic thermo – dynamic cycles in bio-power generation. (04 Marks)
b. Describe with a neat sketch the working of sterling cycle. (08 Marks)
c. With a neat sketch, describe a bio-mass based steam power plant. (08 Marks)

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06ME844

Eighth Semester B.E. Degree Examination, May/June 2010
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. List out the components of automotive engine. Give its functions, materials and method of manufacturing. (10 Marks)
- b. What are the various methods of engine cooling? Explain with sketch the thermosyphon system of cooling. (06 Marks)
- c. Explain the splash lubrication, with a sketch. (04 Marks)
- 2 a. What are the octane and cetane numbers? (04 Marks)
- b. Sketch and explain zenith carburetor. (08 Marks)
- c. Explain with a sketch, the A.C. mechanical pump. (08 Marks)
- 3 a. What are the effects of supercharging on the engine performance? (02 Marks)
- b. With a neat sketch, explain centrifugal type and Root's supercharger. (08 Marks)
- c. Explain any three methods of turbocharging. (06 Marks)
- d. What are the advantages and disadvantages of turbocharging? (04 Marks)
- 4 a. Describe a battery ignition system, for six cylinder, inline engine. (06 Marks)
- b. Compare battery ignition and magneto ignition systems. (04 Marks)
- c. Explain the principle of electronic ignition system. (05 Marks)
- d. Explain with a sketch vacuum advance mechanism. (05 Marks)

PART – B

- 5 a. With a neat sketch, explain the construction and working of single plate clutch. (10 Marks)
- b. With a neat sketch, explain the working of sliding mesh gear box. (06 Marks)
- c. Determine the maximum pressure in a plate clutch, when the axial force is 4 kN, the inside radius of the contact surface is 50 mm and outside radius is 100 mm. Assume uniform wear. (04 Marks)
- 6 a. With a neat sketch, explain the torque tube drive. What are its merits over Hotch-Kiss drive? (08 Marks)
- b. Define the following and explain their effects on steering:
i) camber ii) king pin inclination iii) Castor iv) Toe in and Toe out. (08 Marks)
- c. Sketch the semi-floating axle arrangement. (04 Marks)
- 7 a. Explain the telescopic type shock absorber, with a neat sketch. (10 Marks)
- b. Explain the drum brake, with a sketch. (05 Marks)
- c. A car of mass 800 kg is traveling at 36 km/hr. Determine
i) The kinetic energy it possesses and ii) Average braking force to bring it to rest in 20 m. (05 Marks)
- 8 a. Explain the sources of automotive exhaust gas emissions. (04 Marks)
- b. Explain the controlling of crank case emissions, with a sketch. (06 Marks)
- c. Explain controlling the air fuel mixture way to reduce pollutants in the exhaust gas. (05 Marks)
- d. Write a note on alternative fuels for automotive engines. (05 Marks)

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