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 150cm^3, operates with a pressure of 75bar and a speed of 1800rpm. If the actual flow rate consumed by the motor is 0.005m^3/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 30μm enter the filter and 2000 of these particles go through it. Compute the Beta ratio and Beta efficiency of this filter. **(04 Marks)**

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)
      (04 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
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. Describe photosynthesis, stating all the necessary conditions. **(08 Marks)**
   b. Discuss the concept, objective, advantages and application of energy plantation. **(08 Marks)**
   c. What do you mean by biomass? What are the various resources available for biomass? **(04 Marks)**

2 a. Briefly explain the various types of biofuels. **(04 Marks)**
   b. What are the different forms of bio-conversion process? With a neat flow diagram, describe each of the processes stating their salient characteristics. **(16 Marks)**

3 a. Describe with a neat sketch, the working of a municipal solid waste incineration process. **(06 Marks)**
   b. Define pyrolysis. With a neat sketch, explain the working of a simple pyrolysis unit and explain the various stages and reactions involved. **(10 Marks)**
   c. State the various direct thermal applications of biomass energy systems. **(04 Marks)**

4 a. Explain with a neat sketch, the working of a down draft type gasifier with the reactions involved. **(12 Marks)**
   b. Explain the working of a dual – fuel engine using production gas. What are the factors affecting combustion in dual – fuel engine. **(08 Marks)**

PART – B

5 a. What are the various factors affecting biodigestion in a biogas plant? **(04 Marks)**
   b. Explain the working of a fixed dome type biogas plant with a neat sketch. **(08 Marks)**
   c. The following datas are given for a family biogas digestion, suitable for the output of 5 cows.
   Retention time is 20 days and the temperature is 30°C,
   Dry matter consumed per day   = 2 kg
   Biogas yield   = 0.24 m³/kg
   Efficiency of the burner   = 60%
   Methane proportion   = 0.8
   Heat of combustion of methane   = 28 MJ/m³
   Density of dry material in fluid   = 50 kg/m³
   Calculate: i) Volume of the biogas digester ; ii) Power available from the digester. **(08 Marks)**

6 a. Describe with a line diagram, the production of ethanol from various biomass sources. What are the basic modifications to be made in an engine using ethanol as a fuel? **(12 Marks)**
   b. Discuss the conversion of a diesel engine to SI mode and dual fuel mode for using producer gas as fuel. **(08 Marks)**

7 a. What are bio – diesels? What are the various sources for the production of bio – diesel in the global context? **(06 Marks)**
   b. What is transesterification? What are the various parameters that affect transesterification? Explain briefly. **(10 Marks)**
   c. What are the basic engine modifications to be done for an engine using bio – diesel as fuel? **(04 Marks)**

8 a. Mention the various basic thermodynamic cycles in bio – power generation. **(04 Marks)**
   b. With a neat sketch, explain the working of a Brayton cycle. **(08 Marks)**
   c. Explain the working of a biomass based steam power plant with a neat sketch. **(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 :
        i) Hotch kiss drive   ii) Torque tube drive   **(10 Marks)**
    b. Define the following and explain their effect on steering :
        i) Camber   ii) Kingpin inclination   iii) Included angle and scrub radius
        iv) Castor   v) Toe-in and toe out.   **(10 Marks)**

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)**

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