Code No: RT22012 **R13** SET - 1

II B. Tech II Semester Supplementary Examinations, Nov/Dec-2016
HYDRAULICS AND HYDRAULIC MACHINERY
(Civil Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the questions in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART-A

1. a) What do you know about specific energy.
   b) Explain the statement of Buckingham pi theorem .
   c) What are different applications of radial flow turbines?
   d) Differentiate between Francis turbine and Kaplan turbine.
   e) Explain about different characteristic curves of turbine.
   f) Write about cavitation in the pump.
   g) What are various components of reciprocating pump.

(3M+4M+4M+3M+3M+3M+2M)

PART-B

2. a) Distinguish between Prismatic and Non-prismatic channels.
   b) Write a short note on velocity distribution in open channel flow.
   c) A rectangular channel has a convex curvature in a vertical plane on its bed. At a section the bad has an inclination of 30^0 to the horizontal and the depth measured normal to the flow is 0.75 m. A certain flow produces a normal acceleration of 0.4 g which can be assumed to be Constant throughout depth. Determine the pressure distribution and compare with hydrostatic distribution. Also determine the pressure distribution if the boundary has a concave curvature to the flow and rest of the data remain same?

(4M+4M+8M)

3. a) A spillway model is constructed on a scale of 1:25. Calculate
   (i) the prototype discharge Corresponding to model discharge of 0.12 m3/sec
   (ii) the velocity in model corresponding to Prototype velocity of 3.5 m/s.
   b) What is dimensional homogeneity? Explain Geometric, kinematic and Dynamic similarity.

(8M+8M)

4. a) What is the importance of inclined and curved two values and write clear note on moving feat.
   b) What are the applications of radial flow turbines and explain.

(8M+8M)
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5. a) Explain in detail the various characteristic curves present in the case of turbines.
   b) A turbine develops 7460 kW under a head of 24.7m at 135 rpm. What is the specific speed? What would be its normal speed and output under a head of 20.5m?

(8M+8M)

6. a) With a neat sketch, explain the principle and working of a centrifugal pump.
   b) A centrifugal pump rotating at 1000 rpm delivers 160 liters/s of water against a head of 30 m. The pump is installed at a place where atmospheric pressure is $1x10^5$ P_a(abs.) and vapour pressure of water is 2 kP_a (abs.). The head loss is suction pipe is equivalent to 0.2 m of water. Calculate minimum NPSH.

(8M+8M)

7. a) Briefly explain the classification of power plants based on the storage characteristics.
   b) Write clear note on the importance of load factor? (8M+8M)

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Code No: RT22022 **R13** SET - 1

II B. Tech II Semester Supplementary Examinations, Nov/Dec-2016
SWITCHING THEORY AND LOGIC DESIGN
(Com. to EEE, ECE, ECC, EIE)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the questions in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART-A

1. a) Convert $(53.1575)_{10}$ to $(x)_2$
   b) Realize the X-OR gates using NAND gates.
   c) Draw the diagram of subtractor using truth tables.
   d) Explain the techniques used to eliminate the racing conditions in JK flip flops.
   e) Implement the Boolean functions with a PLA $F(A,B,C)= \sum(0,5,6,7)$
   f) Draw the diagram of three bit shift register with waveforms. (3M+3M+4M+4M+4M+4M)

PART-B

2. a) What is the difference between canonical form and standard form? Explain
   b) Solve the following
      i) $(27.125)_{10}$ = ( )$_8$
      ii) $(10.6875)_{10}$ = ( )$_2$
      iii) $(237.75)_8$ = ( )$_{10}$ (7M+9M)

3. a) Minimize the criterion the following using K-map.
      $f(A,B,C,D).= \Sigma_m (0,1,2,3,5,6,7,8,9,10,11,13)$
   b) Minimize the following expression using K-map and realize using NOR gates.
      $f = \prod M (1, 2, 3, 8, 9, 10, 11, 15)$ (8M+8M)

4. a) Design and draw a full adder which will use two half adders.
   b) Design Binary to Gray converter. (8M+8M)

5. a) Design a combinational circuit using PAL for the following function
      $y(A,B,C,D).= \Sigma (0,2,3,4,5,6,7,8,10,11,15)$
   b) Clearly differentiate between Programmable Logic Array and Programmable Array Logic with examples. (8M+8M)

6. a) Design a mod-10 Ripple counter using T flip flops and explain its operation.
   b) What are the different types of registers? Explain the Serial Input Parallel Output shift register. (8M+8M)

7. a) Explain about sequential circuits, state table and state diagram.
   b) Explain the procedure of Meelay to Moore conversion. (8M+8M)

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Code No: RT22032 **R13** SET - 1

II B. Tech II Semester Supplementary Examinations, Nov/Dec-2016
THERMAL ENGINEERING-I
(Mechanical Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the questions in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART-A

1. a) What are the important basic components of IC engine? Explain them briefly.
   b) List various methods available for finding friction power of an engine.
   c) Enumerate the applications of compressed air.
   d) What is a centrifugal compressor and what are its advantages?
   e) What do you mean by the term 'gas turbine'? How are gas turbines classified?
   f) What is meant by jet propulsion? What are the basic differences between jet propulsion cycle and shaft power cycle? (3M+4M+4M+4M+4M+3M)

PART-B

2. Draw the ideal and actual indicator diagrams of a two-stroke SI engine. How are they different from a four stroke cycle engine? (16M)

3. Explain the use of prony brake and rope brake dynamometers in measuring the power output of an engine. (16M)

4. An axial flow compressor having eight stages and with 50% reaction compresses air in the pressure ratio of 4:1. The air enters the compressor at 20^0C and flows through it with a constant speed of 90m/s. The rotating blades of compressor rotate with a mean speed of 180m/s. Isentropic efficiency of the compressor may be taken as 82%. Calculate:
   i) Work done by the machine,
   ii) Blades angles. (16M)
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5. A centrifugal compressor used as a supercharger for aero-engines handles 150kg/min of air. The suction pressure and temperature are 1 bar and 290K. The suction velocity is 80m/s. After compression in the conditions are 1.5bar, 345K and 220m/s. Calculate:
   i) Isentropic efficiency.
   ii) Power required to drive the compressor.
   iii) The overall efficiency of the unit.

   It may be assumed that K.E. of air gained in the impeller is entirely into pressure in the diffuser. (16M)

6. The air enters the compressor of an open cycle constant pressure gas turbine at a pressure of 1bar and temperature of 20^0C. The pressure of the air after compression is 4bar. The isentropic efficiencies of compressor and turbine are 80% and 85% respectively. The air fuel ratio used is 90:1. If flow rate of air is 3.0 kg/s, find:

   i) Power developed.

   ii) Thermal efficiency of the cycle. Assume C_p=1.0 kJ/kg.K and γ=1.4 of air and gases. Calorific value of fuel =41800 kJ/kg.

   (16M)

7. A turbo jet engine consumes air at the rate of 60.2 kg/s when flying at a speed of 1000km/h.Calculate:

   i) Exit velocity of the jet when the enthalpy change for the nozzle is 230 kJ/kg and velocity co-efficient is 0.96.

   ii) Fuel flow rate in kg/s when air fuel ratio is 70:1.

   iii) Thrust specific fuel consumption.

   iv) Thermal efficiency of the plant when the combustion efficiency is 92% and calorific value of the fuel used is 42000 kJ/kg.

   v) Propulsive power.

   vi) Propulsive efficiency.

   vii) Overall efficiency. (16M)

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Code No: RT22052 **R13** SET - 1

II B. Tech II Semester Supplementary Examinations, Nov/Dec-2016
JAVA PROGRAMMING
(Com. to CSE, IT)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the questions in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1. a) What is importance of Unicode in java? Explain. (3M)
   b) Explain about the this keyword with examples. (4M)
   c) Explain about the importance of extend and implement keywords. (4M)
   d) What is light weight process? Discuss. (3M)
   e) What is adapter class? Give examples. (4M)
   f) Differentiate between Text field and Text area and also discuss it's constructors and method. (4M)

PART -B

2. What are java Buzzwords? Explain about them. (16M)

3. a) What is an array? How arrays are declared and initialized? Explain with examples. (8M)
   b) Write a java program to check the given string is a palindrome or not. (8M)

4. a) Differentiate method overloading with method overriding with examples. (8M)
   b) What is interface? How to create it and access it? Explain with example. (8M)

5. a) Explain about java.lang.thread package. (8M)
   b) How to set priorities for threads? Discuss with examples. (8M)

6. a) Discuss about different event classes. (6M)
   b) Write a java program using listeners for handling keyboard events (10M)

7. a) Explain about the components and containers of AWT. (8M)
   b) Discuss different Layout managers. (8M)

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Code No: R22032 **R10** SET - 1

II B. Tech II Semester Supplementary Examinations, Nov/Dec-2016
KINEMATICS OF MACHINERY
(Com. to ME, AME, MM)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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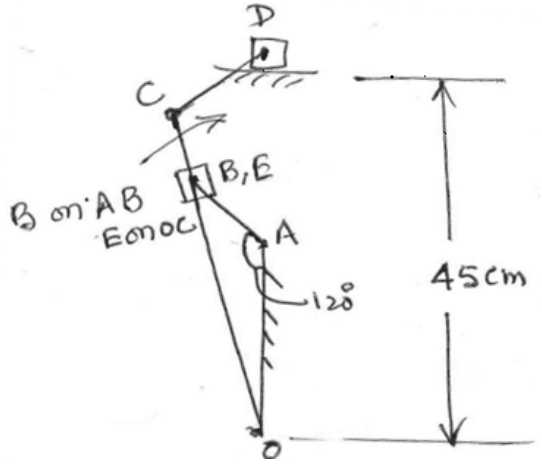
1. a) Sketch and explain the inversion when the crank of a slider-crank chain is fixed.
   b) With a suitable diagram, explain how a pantograph works. What are its uses?

2. What is the difference between copied and generated straight line motions? Give example for each of them.

3. The following data refer to a quick return motion of crank and slotted refer shown in figure. OA = 25cm, AB = 10cm, OC = 40cm, CD = 15cm Angle OAB = 120^0, crank speed in clockwise = 60 rpm. Line of stroke of ram is perpendicular to OA. Determine velocity and acceleration of D.



4. a) What is the difference between Davis Steering gear mechanism and Ackermans steering gear
   b) Show that input and output shaft's of a double Hooke's joint rotate at uniform speed.

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5. a) Classify with neat sketches the cam follower according to their shape, location and motion. State also their advantages, if any, with respect to other followers.
   b) Sketch neatly the displacement, velocity and acceleration curves of a cycloidal motion.

6. a) Derive the conditions for maximum power to be transmitted by a belt drive
   b) Design a set of stepped pulleys to drive a machine from countershaft that runs at 220 rpm. The distance between centres of the two sets of pulleys is 2m the diameter of the smallest step on the countershaft is 160mm. The machine is to run at 80, 100 and 130rpm and should be able to rotate in either direction

7. a) State and prove law of gear tooth action for constant velocity ratio.
   b) Two mating involute spur gears 20° pressure angle have a gear ratio of 2. the number of teeth on the pinion is 20 and its speed is 250 rpm. The module pitch of the teeth is 12 mm. if the addendum on each wheel wheel recess on each side is half the maximum possible length each, find
   (i) the addendum for pinion and gear wheel
   (ii) the length of arc of contact
   (iii) the maximum velocity of sliding during approach and recess. Assume pinion to be driver**.**

8. The arm of an epicyclic gear train rotates at 100 rpm in the anti clock wise direction. The arm carries two wheels A and B having 36 and 45 teeth respectively. The wheel A is fixed and the arm rotates about the centre of wheel A. Find the speed of wheel B. What will be the speed of B, if the wheel A instead of being fixed, makes 200 rpm (clockwise).

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