First/Second Semester B.E. Degree Examination, Dec.2013/Jan.2014

Elements of Mechanical Engineering

Time: 3 hrs.   Max. Marks: 100

Note: 1. *Answer any FIVE full questions, choosing at least two from each part.*
2. *Answer all objective type questions only in OMR sheet page 5 of the answer booklet.*
3. *Answer to objective type questions on sheets other than OMR will not be valued.*
4. *Use of steam table is permitted.*

PART – A

1 a. Choose the correct answers for the following :   (04 Marks)
   i)   Coal is an example for _____ energy sources.
         A) renewable   B) non-renewable   C) celestial energy   D) bio-mass
   ii)   Photosynthesis process is also known as
         A) Helio thermal process   B) Helio chemical process
         C) Helio electrical process   D) Pizeo electric process
   iii) Partially dry steam and partially wet particles in steam called as
         A) dry steam   B) super heated steam
         C) saturated water   D) wet steam
   iv)   Babcock and Wilcox boiler is an example for _____.
         A) fire tube boiler   B) vertical boiler
         C) single tube boiler   D) externally fired boiler
   b. Name any four boiler mountings and state their functions.   (02 Marks)
   c. With the help of neat sketch, explain the working of a Francis turbine.   (08 Marks)
   d. Determine the total heat content per unit mass at the following state using the steam tables.
       Assume ambient pressure to be 100 kPa and C_P = 2.0934 kJ/kg.
       i)   10 bar absolute and 300°C
       ii) 100 kPa gauge and 100 kPa abs and 250°C
       iii) Dry steam at 100 kPa abs
       iv) Steam at 12 bar and 95% dry.   (06 Marks)

2 a. Choose the correct answers for the following :   (04 Marks)
   i)   Steam turbine converts _____ in to mechanical energy.
         A) kinetic energy   B) weight   C) velocity   D) potential
   ii)   Compounding consists of one set of nozzle and two or more set of moving blades
         called as
         A) velocity compounding   B) pressure compounding
         C) pressure velocity compounding   D) velocity pressure compounding
   iii) Pelton wheel is example for
         A) reaction water turbine   B) low head water turbine
         C) impulse water turbine   D) steam turbine
   iv)   Combustioned gas is directly converted into the mechanical power called as
         A) reaction turbine   B) impulse turbine
         C) open or closed gas turbine   D) steam turbine
   b. Explain the principle and working of reaction turbine.   (06 Marks)
   c. With the help of a neat sketch, explain the working of a Francis turbine.   (06 Marks)
   d. Explain the working principle of a gas turbine on closed cycle.   (04 Marks)

3 a. Choose the correct answers for the following :   (04 Marks)
       i)   Otto cycle engine is an example for
            A) petrol engine   B) diesel engine   C) dual engine   D) all of these
       ii) 4 stroke engine has power stroke in _____ .
            A) every cycle   B) every alternative cycle
            C) every third cycle   D) in all the revolution of the crank shaft
       iii) In two stroke petrol engine compressive ratio is approximately
            A) 1:22   B) 1:11   C) 1:1   D) 1:80
       iv) Diesel cycle engine is also called as
            A) constant volume cycle   B) constant pressure cycle
            C) dual cycle   D) all of these
    b. Explain with a neat figure 4 stroke petrol engine.   (08 Marks)
    c. Differentiate between 4 stroke and 2 stroke engine.   (04 Marks)
    d. Give advantages of two stroke engine over four stroke engine.   (04 Marks)

4 a. Choose the correct answers for the following :   (04 Marks)
       i)   Good refrigerant should be
            A) high boiling point   B) flammable
            C) low thermal conductivity   D) non-toxic
       ii) Unit of refrigeration is
            A) COP of refrigeration   B) Ton of refrigeration
            C) Ampere of refrigeration   D) None of these
       iii) Ammonia refrigerant is used in _____ refrigerator.
            A) Household   B) absorption
            C) vapour compression   D) air conditioner
       iv) Function of the throttle valve in a refrigerator is to
            A) reduce the pressure
            B) increase the pressure
            C) converts vapour refrigerant into liquid
            D) liquid refrigerant into vapour conversion
    b. Describe with a neat sketch, the working of vapour absorption refrigerator. (08 Marks)
    c. With a neat sketch of a room air-conditioner, explain its working principle. (08 Marks)

PART – B

5 a. Choose the correct answers for the following :   (04 Marks)
       i)   Function of the lathe is
            A) produce cylindrical parts   B) produce key holes
            C) produce slots   D) all of these
       ii) Speed lathe is example for
            A) geared head lathe   B) simple lathe   C) universal lathe   D) caption lathe
       iii) Reaming operation is a _____ .
            A) drill operation   B) lathe operation
            C) milling operation   D) grinding operation
       iv) Radial drilling machine is used for
            A) small works   B) medium works
            C) medium and heavy works   D) all of these
    b. With a neat sketch, explain construction and operation of radial drilling machine. (08 Marks)
    c. Explain with figure taper turning with compound slide swiveling method.   (08 Marks)

6 a. Choose the correct answers for the following : **(04 Marks)**
   i) Milling machine removes the metal using
   A) multi point cutting tool   B) single point cutting tool
   C) abrasive wheel   D) drill bit
   ii) Work piece and cutting tool moves in the same direction called as
   A) up milling   B) down milling
   C) combination of up and down milling   D) all of these
   iii) Emery is an example for _____ abrasive.
   A) natural   B) synthetic   C) artificial   D) clay
   iv) Center less grinding is used for
   A) long work piece   B) short work piece
   C) both long and short work piece   D) internal grinding

   b. With the help of a neat sketch, explain the working of a universal milling machine. **(08 Marks)**
   c. Explain with figure working principle of center less grinding machine. **(06 Marks)**
   d. Explain any two milling operation. **(02 Marks)**

7 a. Choose the correct answers for the following : **(04 Marks)**
   i) Fusion welding is an example for
   A) resistance welding   B) arc welding
   C) forge welding   D) Thermit pressure welding
   ii) Copper base filler metal is used for
   A) soft soldering   B) hard soldering   C) brazing   D) welding
   iii) Grease is an example for _____ lubrication.
   A) solid   B) liquid   C) semi liquid   D) all of these
   iv) Collar bearing is also known as
   A) journal bearing   B) thrust bearing   C) foot step bearing   D) radial bearing

   b. Explain the principle of arc welding with a figure. **(06 Marks)**
   c. Name the three types of oxy-acetylene flame. Explain the application of each of them. **(06 Marks)**
   d. Describe the drop feed oil lubrication with neat sketches. **(04 Marks)**

8 a. Choose the correct answers for the following : **(04 Marks)**
   i) Jockey pulley is used for
   A) increase arc of contact   B) increase speed
   C) decrease arc of contact   D) decrease in speed
   ii) When a belt moves forward without carrying pulleys called _____.
   A) slip   B) creep
   C) both slip and creep   D) all of these
   iii) Chain drive is used in
   A) center distance less than 8m   B) high power transmission
   C) positive power transmission   D) all of these
   iv) Spur gear is example for
   A) parallel axis   B) non-parallel axis   C) co-axial   D) non-intersecting

   b. With a neat sketch, explain past and loose pulley. **(06 Marks)**
   c. Explain following gears:
   i) Spur gear   ii) Helical gear   iii) Bevel gear   iv) Rack and pinion **(06 Marks)**
   d. In a compound train of wheels, the wheels A. B. C and D have 15, 30, 20 and 40 teeth respectively. The wheels B and C are keyed to the same spindle. If the wheel A runs at 400 rpm, find the speed of the wheel D. Sketch the arrangements. **(04 Marks)**

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