10EME14/24

First/Second Semester B.E. Degree Examination, Dec.2015/Jan.2016
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 on OMR sheet page 5 of the answer booklet.*
3. *Answer to objective type questions on sheets other than OMR sheet will not be valued.*
4. *Use of Steam tables is not permitted.*

PART – A

1 a. Choose the correct answers for the following :   **(04 Marks)**
   i) Super heater is used
     A) to convert wet steam in to dry   B) inside the boiler drum
     C) to increase volume of steam
     D) to increase temperature of steam above saturation temperature.
   ii) Lancashire boiler is
     A) water tube boiler B) fire tube boiler   C) gas tube boiler   D) air tube boiler
   iii) Which one of the following not a boiler mounting
     A) Safety valve   B) Fusible plug   C) Pressure gauge   D) Feed pump
   iv) Amount of heat required to convert unit quantity of water at 0^0C to dry saturated steam
     A) Sensible heat   B) Super heat
     C) Degree of super heat   D) Latent heat
  b. List the advantages of renewable energy resources.   **(04 Marks)**
  c. Draw a neat sketch of Babcock and Wilcox boiler and label all the parts. Explain briefly.
                                                        (08 Marks)
  d. Explain briefly i) Enthalpy of steam   ii) Dryness fraction.   **(04 Marks)**

2 a. Choose the correct answers for the following :   **(04 Marks)**
   i) In reaction turbine, the pressure drop occurs in
     A) Nozzles   B) Moving blades
     C) Fixed blades   D) Both fixed and moving blades
   ii) Kaplan Turbine is a
     A) High head mixed flow turbine   B) Outward flow, impulse turbine
     C) Reaction turbine, outward flow   D) Low head, axial flow reaction turbine
   iii) De Laval turbine is a
     A) Impulse turbine   B) Reaction turbine
     C) Velocity compounded turbine   D) Pressure compounded turbine
   iv) In gas turbine, if the working substance is continuously recirculated, then it is called as
     A) Open cycle gas turbine   B) Closed cycle gas turbine
     C) Mixed flow gas turbine   D) None
  b. With neat sketch, explain closed cycle gas turbine.   **(08 Marks)**
  c. Explain the working principle of Pelton wheel, with a neat sketch.   **(08 Marks)**

3 a. Choose the correct answers for the following :   **(04 Marks)**
   i) In a 4 stroke CI Engine during suction stroke
     A) only air is sucked   B) only diesel is sucked
     C) both air and diesel are sucked   D) either air or diesel is sucked.

ii) The inner diameter of engine cylinder is called as
    A) stroke   B) clearance   C) bore   D) pitch

iii) In diesel engine, the fuel is ignited by
    A) Spark   B) Ignitor
    C) Combustion
    D) Heat resulting from compressing air that is supplied for combustion.

iv) Piston speed is equal to
    A) Stroke × rpm   B) 2 × Stroke × rpm
    C) $\dfrac{\text{Stroke} \times \text{r.p.m}}{2}$ D) Stroke × rpm × Bore.

b. With neat sketch, explain working of 4 – stroke petrol engine. Also draw P-V diagram.
                                                            (09 Marks)

c. A two stroke diesel engine has a piston diameter of 200mm and stroke length 300mm, the engine has a mean effective pressure of 3.6 bar and a speed of 400 rpm. The effective diameter of brake drum is 1m and load on this is 81 kg. Determine IP, BP and Mechanical efficiency of the engine.   **(07 Marks)**

4   a. Choose the correct answers for the following :   **(04 Marks)**
    i) An ideal refrigerant should have
      A) low viscosity   B) low boiling point
      C) low freezing point   D) All of these
    ii) The boiling point of ammonia is
      A) 100^0C B) 0^0C C) -33.3^0C D) 33^0C.
    iii) Throttle valve is used in refrigerator to
      A) expand the refrigerant   B) compress the refrigerant
      C) absorb the heat from refrigerant   D) condense the refrigerant
    iv) Most commonly used refrigerant in vapour absorption refrigeration is
      A) NH_3 B) CO_2 C) SO_2 D) Freon

b. Explain with a neat sketch vapor absorption refrigeration.   **(08 Marks)**
c. Draw a neat sketch of Room Air conditioner and explain its working.   **(08 Marks)**

PART - B

5   a. Choose the correct answers for the following :   **(04 Marks)**
    i) The process of enlarging predrilled hole is
      A) Reaming   B) Tapping   C) Facing   D) Boring
    ii) The process of generating internal threads is called
      A) Tapping   B) Milling   C) Knurling   D) None
    iii) The slowest speed in lathe is adopted for
      A) Turning   B) Thread cutting   C) Knurling   D) None
    iv) Twist drills are usually made of
      A) HSS   B) MS   C) Carbides   D) Diamond

b. How to specify the size of the lathe? List the different operations performed on a lathe.
                                                            (08 Marks)
c. Draw a neat sketch of Radial drilling machine and explain its operation.   **(08 Marks)**

6   a. Choose the correct answers for the following :   **(04 Marks)**
    i) The cutting tool in a milling machine is mounted on
      A) Table   B) Column   C) Arbor   D)Tool holder
    ii) The abrasive material used in grinding is
      A) Aluminium chloride   B) Calcium chloride
      C) Silicon carbide   D) None

iii) The chip thickness is maximum at the beginning of the cut and minimum at the end of the cut in case of

    A) Upmilling   B) Down milling   C) Face milling   D) Form milling

iv) Which of the following milling operations used to produce square or hexagonal surfaces

    A) Slot milling   B) Straddle milling   C) End milling   D) Angular milling

b. Differentiate between up milling and down milling.   **(04 Marks)**

c. With a neat sketch, explain Horizontal milling machine.   **(07 Marks)**

d. With neat sketches, explain cylindrical grinding.   **(05 Marks)**

7   a. Choose the correct answers for the following :   **(04 Marks)**

    i) The hard filter material used in brazing

        A) Solder   B) Flux   C) Spelter   D) Electrode

    ii) Element which provide the support for rotating shaft is

        A) Bearing   B) Hook   C) Lubricant   D) Axle

    iii) Carburizing flame has

        A) One zone   B) Two zones   C) Three zones   D) No zones

    iv) In arc welding, the electrode which melt along with the work piece and fill the joint is

        A) Consumable electrode   B) Non – consumable electrode

        C) Both consumable and non consumable   D) None

b. With neat sketches, explain different types of flames used in gas welding and specify their application.   **(06 Marks)**

c. Define soldering. List the advantages of welding.   **(05 Marks)**

d. Explain with a neat sketch, splash lubrication.   **(05 Marks)**

8   a. Choose the correct answers for the following :   **(04 Marks)**

    i) The gear used to convert rotary into rectilinear motion is

        A) Spur gear   B) Bevel gear   C) Rack & Pinion   D) Helical gear

    ii) Ratio of speed of driven pulley to speed of driver pulley is called

        A) Velocity ratio   B) Tension ratio   C) Module   D) Pitch

    iii) The gear used to connect perpendicular axes shaft is

        A) Helical gear   B) Spur gear   C) Bevel gear   D) Worm gear

    iv) The ratio of PCD to number of teeth is

        A) Module   B) Pitch   C) Addendum   D) Deddendum

b. Derive an expression for length of open belt drive.   **(08 Marks)**

c. In a belt drive velocity ratio is 3. The driving pulley rotates at 500 rpm. The diameter of driven pulley is 300mm. Find the speed of the driven pulley and the diameter of driving pulley.   **(04 Marks)**

d. Define slip and creep related to belt drives.   **(04 Marks)**

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