

USN

|  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|
|  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|

10EME14/24

**First/Second Semester B.E. Degree Examination, June / July 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 on 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 tables is not permitted.

**PART—A**

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

- The centrifugal forces generated by the earth rotation on the far side results in another bulge rise on this side of the earth.  
 A) Artar tides      B) Earth quakes      C) Volcanoes      D) None of these
- The condition of steam in the boiler is always,  
 A) Dry      B) Wet      C) Saturate4      D) Superheated
- Super heater is used,  
 A) Inside the boiler drum      B) To convert wet steam into dry steam  
 C) In the path of the gases to increase volume of steam  
 D) To increase temperature of steam above saturation temperature.
- Babcock and Wilcox boiler is \_\_\_\_\_ boiler.  
 A) Fire tube      B) Water tube      C) Air tube      D) Flue tube

b. With the help of a temperature — enthalpy diagram, explain the mechanism of its formation of steam. (10 Marks)

c. Name any five boiler mounting and accessories and state their functions. (06 Marks)

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

- In reaction turbine, the pressure drops,  
 A) In nozzles      B) In moving blades  
 C) In fixed blades      D) in both fixed and moving blades.
- Kaplan turbine is,  
 A) A high head mixed flow turbine      B) An impulse turbine, outward flow  
 C) A reaction turbine, outward flow      D) Low head, axial flow.
- DeLaval turbine is a \_\_\_\_\_  
 A) Impulse turbine      B) Reaction turbine  
 C) Velocity compounded turbine      D) Pressure compounded turbine.
- In a 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 of these

Differentiate between open cycle and closed cycle gas turbine with neat sketches. (08 Marks)

c. Sketch and explain the working of a Kaplan turbine. (08 Marks)

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

- 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
- The inner diameter of engine cylinder is called as,  
 A) Stroke      B) Clearance      C) Bore      D) Pitch

Q. NO. 3 (a) contd...

iii) In a diesel engine the fuel is ignited by,

- A) Spark
- B) Ignitor
- C) Heat resulting from compressing air that is supplied for combustion
- D) Combustion

iv) Piston speed is equal to,

- A) Stroke \* rpm
- B) 2\*stroke\*rpm
- C) 48 stroke\*rpm
- D)  $\frac{\text{stroke} \times \text{rpm}}{60}$

b. With the neat sketch, explain the working of 4 stroke diesel engine. (08 Marks)

c. The following observations were obtained during a trial on a four stroke diesel engine:

Cylinder diameter = 25 cm; Stroke of the piston = 40.44 cm  
 Crank shaft speed = 250 rpm; Brake load = 70 kg  
 Brake drum diameter = 2 m; Mean effective pressure = 6 bar  
 Diesel oil consumption = 0.1 m<sup>3</sup>/min; CV = 43900 kJ/kg  
 Specific gravity of diesel = 0.78  
 Find : (i) BP (ii) IP (iii) F (iv) wee (08 Marks)

4 a. Choose the correct answer for the following (04 Marks)

- i) The boiling point of ammonia is,  
 A) 100°C B) -33.3°C C) 33.3°C D) 0°C
- ii) Most commonly used refrigerant in vapour absorption refrigeration system is,  
 A) Freon B) CO<sub>2</sub> C) SO<sub>2</sub> D) NH<sub>3</sub>
- iii) Throttle valve is used in refrigerator to,  
 A) Compress refrigerant B) Expand the refrigerant  
 C) Absorb the heat from the refrigerant D) Condense the refrigerant
- iv) An ideal refrigerant should have,  
 A) Low viscosity B) Low freezing point  
 C) Low boiling point D) All of the above

b. What are the desirable properties of refrigerant? (06 Marks)

c. With a neat sketch, explain the construction and working of vapour absorption refrigeration system. (10 Marks)

### PART - B

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

- i) The process of enlarging an already drilled hole is  
 A) Spot facing B) Reaming C) Tapping D) Boring
- ii) \_\_\_\_\_ is the process of generating internal threads  
 A) Tapping B) Turning C) Knurling D) None of these
- iii) The slowest speed in Lathe is adopted for the following operation :  
 A) Turning B) Thread cutting C) Taper turning D) Knurling
- iv) Twist drills are usually made of  
 A) HSS B) Diamond C) Carbides D) MS

b. List the four elements which specify the size of the Lathe. (06 Marks)

c. Explain the difference between facing and turning operations. (04 Marks)

d. Draw the neat sketch of radial drilling machine and label all its parts. (06 Marks)

- 6 a. Choose the correct answers for the following : (04 Marks)
- The cutting tool in a milling machine is mounted on \_\_\_\_  
 A) Tool holder      B) Arbor      C) Column      D) Table
  - \_\_\_\_ is the one of the abrasive material used in grinding machine.  
 A) Aluminum chloride      B) Calcium chloride  
 C) Silicon carbide      D) Tungsten carbide
  - The thickness of chip is maximum at the beginning of the cut and minimum at the end of the cut, cut in each case of  
 A) Up milling      B) Down milling      C) Straddle milling      D) None of these  
 One of the milling operation used to produce dovetail groove is  
 Slot milling      B) Straddle milling  
 End milling      D) Angular milling
- b. Difference between Up milling and Down milling. (04 Marks)
- c. With a neat sketch explain the working of a vertical milling machine. (06 Marks)
- d. With suitable sketches, explain the operation of centreless grinding machine. (06 Marks)
- 7 a. Choose the correct answers for the following : (04 Marks)
- The hard filler material used in brazing \_\_\_\_  
 A) Solder      B) Flux      C) Spelter      D) Electrode
  - Support provided for rotating shaft is  
 A) Bearing      B) Lubricant      C) Axle      D) Hook
  - Carburizing flame has  
 A) One Zone      B) Two zones      C) Three Zone      D) No Zone
  - In arc welding the electrode melts along with the work pieces and fill the joint is called as  
 A) Consumable electrode      B) Non consumable electrode  
 C) Both (a) and (b)      D) None of these
- b. Sketch and explain electric arc welding process. (06 Marks)
- c. With a neat sketch, explain the different types of flames used in gas welding and specify their application. (04 Marks)
- d. Explain with a neat sketch, the method of splash lubrication. (06 Marks)
- 8 a. Choose the correct answers for the following : (04 Marks)
- For converting rotary motion into rectilinear motion type of gear used is  
 A) Spur gear      B) Rack and pinion      C) Spiral gear      D) Bevel gear
  - The ratio of diameter of driver and driven pulley is called  
 A) module      B) Pitch circle diameter  
 C) Ratio of tension      D) Velocity ratio.
  - The gear used to connect perpendicular shaft is  
 A) Helical gear      B) Spur gear      C) Bevel gear      D) Worm gear
  - The ratio of pitch circle diameter to number of teeth is  
 A) Pitch      B) Circular pitch      C) Module      D) Addendum
- List five advantages of gear drives over belt drives. (05 Marks)
- c. Define slip and creep with respect to belt drives. (05 Marks)
- d. Write the different types of gear trains with their applications. (06 Marks)