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10EME14/24

First/Second Semester B.E. Degree Examination, June/July 2013
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.*

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

PART – A

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

i) Lunar is ____ form of energy
A) Stored B) Transitional
C) Celestial D) Capital

ii) Enthalpy is also called as _____
A) Sufficient heat B) Insufficient heat
C) Total heat D) Incomplete heat

iii) Steam pressure is ___ in water tube boilers
A) Low B) High
C) Medium D) Absolute

iv) Feed check valve is a boiler mounting for _____
A) Safety B) Operation
C) Testing D) Security

b. Compare and contrast renewable and non renewable energy sources. **(06 Marks)**

c. Enumerate the advantages and disadvantages of superheated steam. **(04 Marks)**

d. Explain briefly air preheater, superheater and Chimney with respect to boilers. **(06 Marks)**

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

i) An example for a reaction turbine is
A) Laval turbine B) Curtis turbine
C) Zoelly turbine D) Parson's turbine

ii) The weight to power ratio of a gas turbine is
A) High B) Less
C) Moderate D) Equal

iii) Draft tube is a _____ steel pipe
A) Closed B) Open
C) Converging D) Diverging

iv) Kaplan turbine is a _____ head turbine
A) High B) Low
C) Medium D) Simple

b. With a neat sketch, explain the working principle of an impulse turbine. **(06 Marks)**

c. List any four differenees between closed cycle and open cycle gas turbines. **(04 Marks)**

d. Define radial flow, axial flow and mixed flow with respect to water turbine. **(06 Marks)**

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

i) Flywheel is used as an energy _____
A) Receiver B) Reservoir
C) Mixer D) Multiplier

ii) Mechanical efficiency of a four-stroke engine is
A) Medium B) High
C) Low D) Balanced

iii) The output shaft in IC engines is
A) Camshaft B) Crankshaft
C) Rotary shaft D) Axial shaft

iv) In C.I. engines, charge means
A) Air and fuel B) Only fuel
C) Air and water D) Only air

b. List any four differences between two-stroke and four-stroke engines. **(04 Marks)**

c. A six cylinder 4-stroke I.C. engine develops 50 kW of indicated power at mep of 700 kPa. The bore and stroke length are 70mm and 100mm respectively. If the engine speed is 3700 rpm, find the average misfires per unit time. **(06 Marks)**

d. Draw a schematic diagram of I.C. engines and name the parts. **(06 Marks)**

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

i) Brine is an example for
A) Coolant B) Effluent
C) Deodourant D) Refrigerant

ii) The value of COP is greater than
A) Infinity B) Ten
C) Unity D) Hundred

iii) A thermostat in A.C. is used to control
A) Pressure B) Temperature
C) Volume D) Efficiency

iv) The viscosity of an ideal refrigerant should be
A) Low B) High
C) Moderate D) Unity

b. Mention the uses of any four refrigerants. **(04 Marks)**

c. With a neat sketch, explain the working of a vapour absorption refrigerator. **(06 Marks)**

d. List the differences between vapour compression refrigeration and vapour absorption refrigeration. **(06 Marks)**

PART – B

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

i) Compound side swiveling method is used to produce
   A) Hole B) Threads
   C) Knurl D) Taper

ii) Lathe Dog is
   A) A part B) A component
   C) An accessory D) An assembly

iii) _____is an operation to produce a conical surface at the end of a predrilled hole
   A) Counter Boring B) Counter sinking
   C) Tapping D) Reaming

iv) The supporting section (core) of a drill is called
   A) Web B) Tang
   C) Land D) Margin

b. With a neat sketch, explain the principle and operation to produce a 'taper' on lathe by tail stock set over method. **(06 Marks)**

c. Differentiate between cross slide and compound slide. **(04 Marks)**

d. With a neat sketch, explain the operation of a radial drilling machine. **(06 Marks)**

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

i) Conventional milling is also called
   A) End milling B) Climb milling
   C) Peripheral milling D) Up milling

ii) The milling process used to produce V – blocks is called
   A) Form milling B) Slot milling
   C) Angular milling D) Slab milling

iii) Flint is an example for a _____abrasive
   A) Artificial B) Natural
   C) Strong D) Weak

iv) The bond used for manufacturing elastic grinding wheels is called
   A) Shellac B) Vitrified
   C) Resinoid D) Oxy – chloride

b. Differentiate between up milling and down milling. **(06 Marks)**

c. List any four differences between horizontal milling machine and vertical milling machine **(04 Marks)**

d. With a neat sketch, explain the principle of centreless cylindrical grinding. **(06 Marks)**

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

i) Spelter is used in,
A) Welding B) Brazing
C) Soldering D)Electroplating

ii) _____ is used as flux in welding,
A) Sodium phosphate B) Sodium carbonate
C) Sodium silicate D) Sodium chloride

iii) A good lubricant should be,
A) Highly volatile B) Non-volatile
C) Less volatile D) Moderately volatile

iv) Collar bearing is an example for,
A) Radial bearing B) Journal bearing
C) Thrust bearing D) Sleeve bearing

b. With a neat sketch explain a foot step bearing. **(06 Marks)**

c. Explain splash lubrication with a neat sketch. **(06 Marks)**

d. Differentiate between welding and brazing. **(04 Marks)**

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

i) V-belts are,
A) Repairable B) Not repairable
C) Quickly repairable D) Easily repairable

ii) Belts transmit motion by _____,
A) Friction B) Abrasion
C) Suction D) Expulsion

iii) The surface of the tooth below the pitch circle is called ___ _____,
A) Clearance B) Flank
C) Backlash D) Face

iv) Module indicates the _____ of the pitch,
A) Whole B) Fraction
C) Total D) Integration

b. Differentiate between an open belt drive and cross belt drive. **(04 Marks)**

c. Enumerate the advantages and disadvantages of gear drives. **(06 Marks)**

d. A V-belt drive transmits 10 kW power at 240 rpm. The grooved pulley has a mean diameter of 1.2 m and groove angle of 45°. Taking $\mu = 0.3$ and angle of lap equal to π radians, determine the tensions on each side of the belt. **(06 Marks)**

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