USN

**First/second semester B.E.degree Examination Dec08/Jan09**

**Model Question Paper**

**Subject: Elements of Mechanical Engineering (06EME 14/24)**

Time: 3Hrs Max Marks: 100

**Note: 1. Answer any FIVE full question selecting atleast TWO questions from each Part**

**2. Answer all objective types questions only in first and second writing pages.**

**3. Objective types questions should not be repeated.**

## PART-A

1. a) **Choose the correct answer** 1x4=4

**i)** The process in which, using the principle of Photovoltaic effect, The solar energy is directly converted into Electrical Energy is Known as

A) HelioElectrical Process B) HelioThermal Process
c) Mechanical Process D) None

**ii)** The centrifugal forces generated by the earth rotation on the Far side results in another bulge rises on this side of the earth are called

A) Lunar Tides B) Volcanoes
C) Earth Quakes D) None

**iii)** The difference between superheated temperature and the Saturation temperature of steam is called

A) Degree of Superheat B) Latent Heat of Vaporization
C) Sensible Heat D) None

**iv)** Babcock and Wilcox boiler is an example of ---------- boiler

A) Fire tube B) Water tube
C) Air tube D) Gas tube

b) Classify different sources of energy and give examples 06

C) With a neat sketch explain the working of lancashire boiler 10

2. a) **Choose the correct answer** 1x4=4

**i)** In Parson's turbine the ---------- pressure steam does not initially expand in the nozzle

A) High B) Low
C) Medium D) Critical

**ii)** De Laval Turbine is also called

A) Impulse steam turbine B) Gas turbine
C) Reaction steam turbine D) Water turbine

**iii)** Kaplan turbine is a ---------- turbine

A) Low Head reaction B) High head reaction
C) Impulse D) Fire tube

iv) A prime mover in which the heat energy of the steam is transformed in to Mechanical energy directly in the form of rotary motion is called-------

A) Steam turbine
B) water turbine
C) Alternator
D) Generators

b) Explain the working principle of a Pelton wheel with a neat sketch **07**

C) Explain the working of an open cycle gas turbine with a power plant line diagram. Enumerate the advantages of closed cycle gas turbine over open cycle gas turbine **09**

3. a) **Choose the correct answer** **1x4=4**

i) In two stroke engines, number of rotation of the crank shaft to complete a cycle

A) 2
B) 4
C) 6
D) 1

ii) In petrol engines, Heat is supplied at constant

A) Temperature
B) Pressure
C) Volume
C) Area

iii) Mechanical Efficiency is defined as the ratio of ---------- Efficiency and ---------- Efficiency.

A) Break Thermal & Indicated Thermal
B) Indicated & Break Thermal
C) IP&BP
D) None

iv) In IC Engines, connecting rod connects ----------&----------

A) Piston & crank Shaft
B) inlet & outlet valves
C) Spark Plug
D) None

b) Explain with sketch working of four stroke petrol engine with PV diagram **10**

c) Find the indicated power of a four stroke petrol engine of swept volume of six liters and running at 1000 rpm Take the mean efficient pressure as 600KN/m$^2$. **06**

4. a) **Choose the correct answer** **1x4=4**

i) A ---------- is an appliance in which the heat from the refrigerant is rejected at Higher temperature to another medium.

A) Condenser
B) refrigerant
C) Evaporator
D) Radiator

ii) The performance of a refrigeration system is expressed by a factor known as -------

A) Coefficient of performance
B) Mechanical Efficiency
C) overall Efficiency
D) None

iii) One tone of refrigeration is equal to ----------kj/sec.

A) 3.5
B) 4.5
C) 5.5
D) 210

iv) Mono Chloro-difuloro Methane is a popular refrigerant called ----------

A) Water
B) Freon22
C) $NH_3$
D) Carbon

## PART-B

5. a) **Choose the correct answer** **1x4=4**

i) The method of machining operation in which the work piece is reduced to cylindrical section of required diameter is called-------- operation.

A) Taper turning B) Plane Turning
C) Ec centric turning D) None

ii) ---------- is an operation to produce conical surface on the cylindrical work piece

A) Plane turning B) Taper turning
C) Boring D) Grinding

iii) ---------- is the process of generating internal threads

A) Tapping B) Turning
C) Milling D) Knurling

iv) ---------- is the finishing operation to produce a flat round surface around already drilled hole.

A) Spot facing B) Tapping
C) counter sinking D) None

b) Explain with sketch the mechanism of Taper turning by swiveling the Compound rest 07
c) Sketch and explain bench drilling machine 09

6. a) **Choose the correct answer** **1x4=4**

i) ---------- is the milling operation used to mill flat surfaces by mounting cutters with their axes perpendicular to the milled surfaces

A) Form Milling B) Angular Milling
C) Gang Milling D) straddle.

ii) The horizontal shaft used to mount the milling cutter is called

A) Spindle B) Connecting rod
C) Saddle D) arbor

iii) ---------- is the mineral employed for sharpening, grinding and polishing operations

A) Grinder B) Shellac
C) Abrasive D) Tool

iv) Grinding is also called

A) Abrasive Machining B) Twisting
C) Lapping D) Honing

b) Draw a schematic sketch of horizontal milling machine and explain the parts 07
c) With a neat sketch explain the principle of center less grinding process 07

7. a) **Choose the correct answer** **1x4=4**

i) Fusion welding is also known as

A) Pressure Welding B) Resistance welding
C) Non Pressure Welding D) Thermit Welding

ii) --------- is the method of joining thin metal pieces using a dissimilar metal or an alloy by the application of heat

A) Soldering B) Brazing
C) Welding D) Grinding

iii) The material used in brazing

A) Spelter B) Electrode
C) Solder C) All the above

iv) --------- is the measure of internal frication of lubricating oil

A) Viscosity B) Porosity
C) Electricity D) None

b) Distinguish amongst soldering, brazing and Welding 05
c) Describe drop feed Lubricator with a neat sketch 05
d) How bearings are classified? Sketch and explain bushed bearing 06

8 a) **Choose the correct answer** **1x4=4**

i) For converting rotary motion into linear motion, ---------- type of gears are used

A) Bevel Gears B) Spiral Gears
C) Spur Gears D) Rack & Pinion

ii) When the axes of the driver and follower shafts are intersecting, ---------- gears Are used

A) Bevel B) Spiral
C) Helical D) Elliptical

iii) In an open belt drive, to increase the arc of contact of the belt and driven pulley ---------- is used.

A) Jockey Pulley B) Stepped Cone Pulley
C) Fast & Loose Pulley D) Cross Belt.

iv) The ratio of diameters of the driver and driven pulleys is called --------

A) Module B) Velocity Ratio
C) Ratio of belt tension D) Pitch Circle diameter

b) Derive with usual notations, the relation to determine the length of belt in a cross Belt drive system 09

c) In a compound gear train, the wheels A, B, C&D have number of teeth 15, 30, 20&40 respectively. The wheels B&C are keyed to the same spindle. If the Wheel A runs at 40 rpm, Find the speed of the wheel D also sketch the Arrangement 07