Scheme - G

Sample Test Paper-I

Course Name : Diploma in Mechanical Engineering

Course Code : ME

Semester : Fifth

17529

Subject Title : Power Engineering

Marks : 25 **Time:1 hour**

Instructions:

1. All questions are compulsory
2. Illustrate your answers with neat sketches wherever necessary
3. Figures to the right indicate full marks
4. Assume suitable data if necessary
5. Preferably, write the answers in sequential order

Q1. Attempt any Three **3X3=9**

a) Define i) Mean Effective Pressure
ii) Piston Speed
iii) Swept Volume

b) Draw Carnot cycle on P-V and T-S Diagram

c) State the need of supercharging in I.C. Engines

d) Compare S.I. and C.I. engines on the basis of
i) Basic cycle used
ii) Compression ratio
iii) Ignition method

Q2. Attempt any Two **2X4=8**

a) State the function of catalytic converter, explain 3 way catalytic converter with a neat labeled sketch

b) With the help of simple sketch, explain construction and working of four stroke SI Engine.

c) A Carnot engine working between 377^{o} C and 37^{o} C produces 120 KJ of work. Determine i) Engine Thermal Efficiency ii) Heat added in KJ

Q3. Attempt any Two **2X4=8**

a) Explain Battery ignition system in SI Engine with a neat sketch.

b) List the pollutants in exhaust gases of I.C. engines and state their effects on the environment and human-being.

c) A single cylinder engine running at 1800 rpm develops a torque of 8 Nm. The indicated power of engine is 1.8 KW . Find friction power and mechanical Efficiency.

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Sample Test Paper-II

Course Name : Diploma in Mechanical Engineering

Course Code : ME

Semester : Fifth

17529

Subject Title : Power Engineering

Marks : 25 **Time:1 hour**

Instructions:

1. All questions are compulsory
2. Illustrate your answers with neat sketches wherever necessary
3. Figures to the right indicate full marks
4. Assume suitable data if necessary
5. Preferably, write the answers in sequential order

Q1. Attempt any Three **3X3=9**

a) State the need for multi staging in Air compressor and also state the condition for maximum efficiency.

b) Explain the working of Ram Jet with a neat sketch.

c) Draw P-h and T-S diagram for super heating in vapor compression system.

d) State the methods of energy saving in Air compressor.

Q2. Attempt any Two **2X4=8**

a) With a neat sketch explain the working of constant volume gas turbine.

b) Explain construction and working of Lobe type rotary air compressor with a neat sketch.

c) Define i) Ton of refrigeration ii) Coefficient of Performance (COP)
iii) Specific humidity iv) Due point temperature.

Q3. Attempt any Two **2X4=8**

a) Differentiate between vapor compression cycle and vapor absorption cycle. (any 4 points).

b) Two stage air compressor works between 1 bar and 10 bar . Compressor inlet air temperature is 30 ^{o}C. Index of compression is 1.3. Neglecting clearance determine
i) Intermediate pressure ii) Work done on the compressor.

c) With the help of T-S diagram explain the advantages of reheating in gas turbine.

Scheme - G

Sample Question Paper

Course Name : Diploma in Mechanical Engineering

Course Code : ME

Semester : Fifth

17529

Subject Title : Power Engineering

Marks : 100 **Time:3 hours**

Instructions:

1. All questions are compulsory
2. Illustrate your answers with neat sketches wherever necessary
3. Figures to the right indicate full marks
4. Assume suitable data if necessary
5. Preferably, write the answers in sequential order

Q1. A) Attempt any Three **12 Marks**

a) Draw PV & TS diagram for Otto cycle. State name of the process.

b) Define the following terms related to air compressor. i) Volumetric efficiency ii) Free air Delivery.

c) Give the detail classification of Air compressors.

d) Draw actual valve timing diagram for 4- stroke petrol engine.

Q1. B) Attempt any One **6 Marks**

a) State the purpose of Morse test in petrol engine testing. Write stepwise procedure for conducting Morse test.

b) Write any three pollutants in exhaust gases of petrol & diesel engine with their effects on environment.

Q2. Attempt any Two **16 Marks**

a) Explain the construction & working of Screw compressor with a neat label sketch.

b) Draw the outline of psychometric chart and show all the properties of moist air on it.(at least 06)

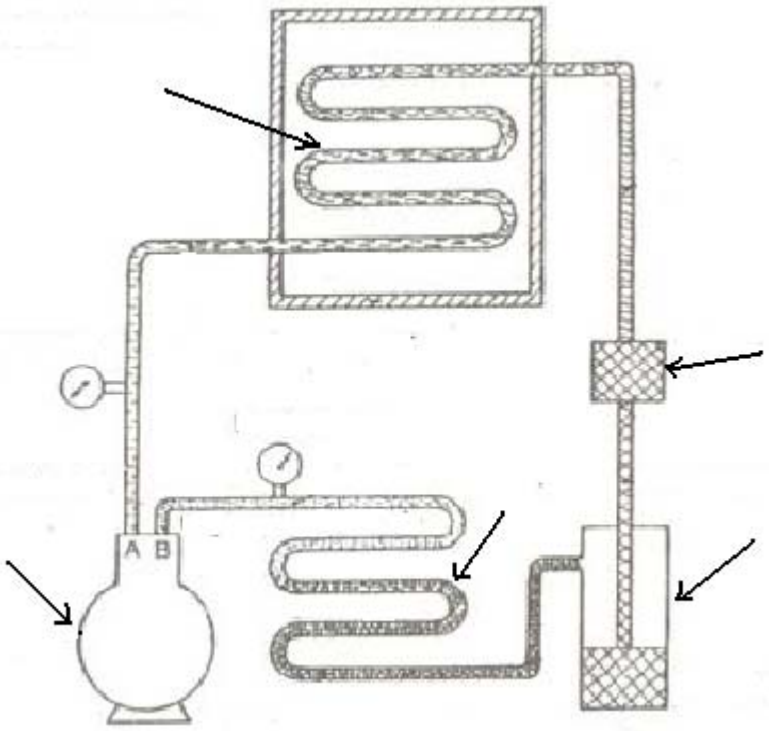
c) An I.C. Engine uses 5 kg of fuel per hour having calorific value of 42,500 KJ/kg. The brake power developed is 21 kW. The temperature rise of cooling water is 23^{0} c, when the rate of flow is 11 kg/min. The temperature rise of exhaust gases is 260^{0} c, when rate of flow of exhaust gases is 4.6kg/min. Specific heat of water and exhaust gases are 4.187 kJ/kg^{o} K and 1 kJ/kg^{o} K respectively. Prepare heat balance sheet on minute basis.

Q3. Attempt any Four **16 Marks**

a) What is catalytic converter? Explain two way catalytic converter with neat sketch.

b) Give four application of gas turbine.

c) State the name of Refrigeration cycle shown in figure below. Label the parts (indicated by arrow) and give function of each part.



d) What is scavenging in I.C. engine? State its types.

e) Describe types of Sensors along with their application.

Q4. A) Attempt any Three **12 Marks**

a) Explain MPFI with neat diagram.

b) State the norms of Bharat stage III & IV.

c) What are the causes of detonation in I.C. engine.

d) Define the terms i) Indicated power ii) Mechanical efficiency
iii) Brake power iv) BSFC

Q4.B) Attempt any One **6 Marks**

a) State different methods for improving thermal efficiency of gas turbine and explain Regeneration method along with P-V & T-S diagram.

b) List the additives of lubricant used in S.I. engine & states their advantages.

Q 5. Attempt any Two **16 Marks**

a) Ammonia refrigerator produces 1 ton of ice at -10 ^{0}c from water at 20 ^{0}c in 24 hrs. when 1 KWh energy is supplied. Find COP of refrigerator take latent heat of ice as 335 KJ/Kg & specific heat of ice 2 KJ/Kg ^{0}k.

b) A two stage single acting reciprocating compressor takes in air at ratio of 0.3 m^3/sec. Intake pressure & temperature 1 bar & 16 ^{0}c. The air is compressed to final pressure of 7 bar. Intermediate pressure is ideal and intercooling is perfect. Compression ratio is 1.25; Compressor runs at 600 rpm. Find
i) Intermediate pressure ii) Power required to drive the compressor.

c) Explain construction and working of Turbo propeller with a neat labeled diagram.

Q 6. Attempt any Four **16 Marks**

a) Define 1) Dew point temp. , 2) Relative humidity, 3) WBT, 4)Degree of saturation.

b) Write four uses of compressed air.

c) An engine working on Otto cycle has diameter of 150mm & stroke of 225mm. Clearance volume is 1.25 X10^{-3} m^3. Find air standard efficiency.

d) Draw split air conditioner with a neat sketch & labelled it.

e) Differentiate between open cycle & closed cycle gas turbine. (minimum 4 points)