ALPHA COLLEGE OF ENGINEERING AND TECHNOLOGY
FREQUENTLY ASKED QUESTIONS (FAQS)
SUYBJECT: ELEMENTS OF MECHANICAL ENGINREERING (2110006)
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Chapter -1: INTRODUCTION

1	Define Pressure and explain Absolute Pressure, Guage Pressure and Atmospheric pressure.
2	Classify thermodynamic system and give example of each.
3	Define the following terms: Prime mover, Boundary, Latent Heat, Temperature, zeroth law of thermodynamics, First law of thermodynamics, difference between heat and work, specific heat, power, specific value, entropy, enthalpy, calorific volue, force, pressure, temperature, energy
4	How prime movers are classified ? Explain different sources of energy used by them.
5	Explain various forms of energy.

Chapter -2: ENERGY

1	Which are common solid fuels ?Write in brief about each of them Define calorific value of fuel
2	State the advantages of gaseous fuels over solid and liquid fuels.
3	What are the various forms of energy? List the non conventional Sources of energy
4	Explain different types of coal with their properties.
5	List various liquid fuels. State its merits over solid fuels.
6	Write sort note on: 1.CNG 2. LPG 3. Hydrogen Gas 4. Ozon Depletion 5. Green House Effect And Global Warming.

Chapter -3: PROPERTIES OF GASES

1	Derive Expression PV/T=constant with the help of Boyle's law and Charle's law.
2	Explain Isothermal Process. For Isothermal process, find expression of work done, Change in Internal Energy, Change in Enthalpy and Heat transfer.
3	What are basic gas processes? How are they shown graphically on p-v diagram?
4	Define adiabatic process and derive PV = constant. Derive the relation between P, V and T for this process. Also derive the expression for work done and change in internal energy for this process.
5	Define specific heat for gas and derive relation between Cp and Cv.

Chapter -4: PROPERTIES OF STEAM

1	Define : 1.Sensible heat 2. Latent heat 3.Dryness fraction 4.Enthalpy of evaporation 5. Degree of superheat 6. Dry saturated steam 7. Enthalpy of superheated steam
2	With neat sketch explain construction and working of throttling calorimeter
3	Explain Separating Calorimeter with neat sketch.
4	Describe Combined calorimeter with a neat sketch.

Chapter -5: HEAT ENGINES

1	Explain working of Rankine cycle with P-V diagram. Derive the formula for efficiency of Rankine cycle.
2	Explain Carnot cycle and derive expression for the efficiency of the Carnot cycle.
3	The efficiency of an Otto cycle depends upon its compression ratio prove it. Derive expression.
4	Define cut off ratio. Derive efficiency of air std. diesel cycle.

Chapter -6: STEAM BOILERS

1	Draw neat and labeled sketches of following: i) Economizer ii) Fusible Plug iii) Lancashire boiler
2	Enlist different mountings. Explain any one with figure.
3	Explain with neat sketch construction and working of a cochran boiler.
4	Classify boiler. Differentiate between fire tube and water tube boiler.
5	Explain with neat sketch the construction and working of Babcock and Wilcox boiler.
6	Explain with neat sketch Bourdon tube type pressure gauge.
7	Enlist different accessories. Explain any one with figure.

Chapter -7: I C ENGINES

1	Classification of I.C. Engines.
2	Four Stroke Diesel Engine.
3	Two Stroke Petrol Engine.
4	Comparisons of Petrol Otto or (S.I.) & Diesel (C.I.) Engine.
5	Comparisons of 2-Stroke & 4-Stroke Engines.
6	A 6 cylinder 4- stroke I.C. engine is to develop 89.5 kW I.P. at 800 rpm. The stroke to bore ratio is 1.25:1, Assuming mechanical efficiency of 80% and brake mean effective pressure of 5 bars, determine the diameter and stroke of the engine.
7	The following readings were taken during the test of single cylinder 4-stroke oil engine. Cylinder diameter = 270mm Net load on brake = 1000 N Stroke length = 380mm Effective diameter of brake = 1.5m Mean effective pressure = 6 bar Fuel used = 10 kg/hr

	Engine speed = 250 rpm C.V. of fuel = 44400kJ/kg Calculate: Brake Power, Indicated Power, Mechanical Efficiency, Indicated Thermal Efficiency
8	During a test on a single cylinder four stroke engine having compression ratio of 6, following data is recorded. Bore = 10 cm, Stroke = 12.5 cm, imep = 2.6 bar, Dead load on dynamo-meter = 60 N, Spring balance reading = 19 N, Effective radius of flywheel = 40 cm, Fuel consumption = 1 Kg/hr, Calorific value = 42,000 kJ/Kg, Speed = 2000 rpm, Determine its, 1. Indicated power 2. Brake power 3. Mechanical efficiency 4. Overall efficiency 5. Air std. efficiency 6. Relative efficiency

Chapter -8: PUMPS

1	Classify centrifugal pumps. With neat sketch explain the function of each part of centrifugal pump.
2	Compare centrifugal pump and reciprocating pump.
3	What is priming? Why is it required for a centrifugal pump? Describe one methods of priming.
4	Explain working of single acting reciprocating pump with air vessels.
5	Classify the rotary pumps and describe with neat sketch working of a rotary gear pump and screw pump.

Chapter -9: AIR COMPRESSORS

1	Classify rotary air compressors. Explain the construction and working of centrifugal compressor with neat sketch.
2	Differentiate reciprocating and rotary compressors.
3	State uses of compressed air and explain how compressors are classified.
4	Derive an expression of work done for single stage reciprocating air compressor without clearance.
5	Prove that volumetric efficiency of reciprocating compressor is, $1-C[(p_2/p_1)^{1/n}-1]$

Chapter -10: REFRIGERATION AND AIR CONDITIONING

1	Define following terms: 1. Refrigeration 2. Tons of Refrigeration 3. Refrigerant 4. Air conditioning
2	Explain VCR system in detail.
3	Explain VAR system in detail.
4	Explain window air conditioning in detail.

Chapter -11: CLUTCHS, COUPLINGS AND BRAKES

1	Explain Oldham's coupling with neat sketch.
2	Differentiate between a clutch and a brake.
3	Distinguish between a coupling and a cluth.
4	With simple sketch explain working of disc clutch.

5	Explain Band brake with neat sketch.
6	Explain centrifugal clutch with neat sketch.
7	Give the classification of brake and describe with neat sketch the working principle of an internal expanding shoe brake.
8	Explain with neat sketch the working of cone clutch. What are the advantages of cone clutch compare to disc clutch?

Chapter -12: TRANSMISSION OF MOTION AND POWER

1	What do you understand by gear train? Discuss various types of gear train.
2	What are belt drives? List various belt drives and explain cross and open belt drive.
3	Sketch and describe helical, worm, rack and pinion and bevel gear and state applications of each.
4	Comparison or Discuss the relative merits and demerits of belt, chain and gear drives.

Chapter -13: ENGINEERING MATERIALS

1	State or enlist important properties of engineering materials.
2	Difference between ferrous and non-ferrous materials. List various ferrous and non- ferrous materials with their applications.
3	Explain non-metallic materials in detail.
4	Define: Ductility, Elasticity, Plasticity, Weldability, Hardness, Malleability, Compressive Strength, Toughness, Brittleness, Creep, Resilience, Composite Materials, Polymers

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