Arya College of Engineering

GUESS PAPER

(B. Tech. I Semester 2025-2026)

1FY3-07: Basic Mechanical Engineering

Unit 1

Short Answers (2 Marks)

Q. 1	Describe the Zeroth, First and Second laws of thermodynamics.
Q. 2	What do you mean by System, surrounding and boundary?
Q.3	Describe Charls law and Boyls Law.
Q. 4	What are the main objectives of industrial engineering?
Q. 5	Give the steps of designing of a product.
Q. 6	What are the function of moderator and control rod (Nuclear power plant)?
Q.7	What is steam turbine? give name.
Q.8	Differentiate nuclear fusion and nuclear fission reaction.
Q. 9	Write any 3 properties of steam.
Q.10	Explain the Enthalpy & Entropy.

Long Answers (5 to 20 Marks)

Q.1	Differentiate between fire tube boiler and water tube boiler.
Q.2	Explain any one type of water tube boiler and fire tube boiler.
Q.3	Explain the construction and working of nuclear power plant.
Q.4	Explain the construction and working of hydroelectric power plant.
Q.5	Explain the working and layout of thermal power plant.

Unit 2

Short Answers (3 Marks)

Q.1	What is Discharge in Pump?
Q.2	Define cavitations and priming in centrifugal pump.
Q.3	Define scavenging?
Q.4	Define the term CC in engine.
Q.5	What do you mean by I.C. Engine?
Q.6	What is Compression Ratio of an IC Engine?

Long Answers (5 to 20 Marks)

Q.1	Describe the working of 4 stroke Petrol/ diesel engine.
Q.2	Describe different components and terminology of IC engine.
Q.3	Explain the working of 2 stroke engine.
Q.4	Write the difference between 2-stroke and 4-stroke Engine.
Q.4	Describe centrifugal pump with advantage, limitation and application.
Q.5	What is Pump? Explain the working of reciprocating pump.
Q.6	Compare Otto cycle engine (Petrol Engine) and Diesel cycle Engine (Diesel Engine)

Unit 3

Short Answers (3 Marks)

Q.1	What is COP?
Q.2	Define 1 tone of refrigeration.
Q.3	Name out any 4 Refrigerant used in refrigeration and air-conditioning system.
Q.4	What are the properties of refrigerant?

Q.5	Compare VCRS and VARS.

Long Answers (5 to 20 Marks)

Q.1	Define construction & working of vapors compression Refrigeration system.
Q.2	Explain Ice Plan (Vapors Absorption Refrigeration system).
Q.3	Explain Window and Split AC.
Q.4	A refrigeration works between -8^{o}C and 31^{o}C. Heat leakage from evaporator is 11 KJ/Sec. Find out : i) C.O.P. ii) Work Done

Unit 4

Short Answers (3 Marks)

Q.1	Define velocity ratio and gear ratio.
Q.2	What is creep and slip of belt?
Q.3	What are the types of Belt Drive?
Q.4	What are the means of power transmission?
Q.5	What are the types of rope and chain drive?

Long Answers (5 to 20 Marks)

Q.1	Derive the following formulae for Tension ratio: $T_1 / T_2 = e^{\mu\theta}$
Q.2	Derive the length of open belt and cross belt drive.
Q.3	What are the types of gear? Explain Basic Gear Terminology.
Q.4	A prime mover runs at the speed of 1200 RPM. The diameter of driver and driven pulley are 200 mm and350 mm respectively. find out the speed of driven/ follower if: i) Thickness of belt and slip is considered. iii) Thickness of belt is considered (take t=8mm) iv) Slip is also considered (5% slip in each pulley)

Q.5	Two pulleys of 50 cm and 30 cm diameter are at the distance of 1.5 meter. Find out the length of belt in case of i) Open belt drive system ii) Cross belt drive system
Q.6	An open-belt drive connects two pulleys 75 cm and 30 cm diameters, on parallel shafts 1.5 m apart. The Maximum Tension is 900 N. The co-efficient of friction is 0.25. The pulley of diameter 30 cm runs at 200 r.p.m. Calculate: (i) Tension on slack side. (ii) The power transmitted

Unit 5

Short Answers (3 Marks)

Q.1	What is Welding Electrode made of?
Q.2	What is Alloy? Write any 2 Alloys.
Q.3	What are Pattern and Mold?
Q.4	Define out any 5 properties of molding sand.
Q.5	Compare welding, brazing and soldering process.
Q.6	What are the steps of Heat treatment?

Long Answers (5 to 20 Marks)

Q.1	Describe casting process with various casting defects.
Q.2	What is metal forming? Describe in brief the following metal forming process: i. Forging ii. Rolling iii. Extrusion iv. Drawing
Q.3	Explain any one metal joining process. (Gas welding or Arc welding)
Q.4	Explain the construction and working of Electric Arc Furnace.
Q.4	What are the various engineering materials? Also write any 5 properties of materials.

Q.5	What do you mean by heat treatment? Explain various heat treatment process.