

ACTIVITY QUESTIONS

Subject Name-Concepts Of Mechanical Engineering -1

Subject Code-25ME11I

Semester-1

ACTIVITY-1

Select the correct answers from the choices given (MCQ Questions)

1. What is the unit of force in the SI system?
 - a) dyne
 - b) newton
 - c) kilogram
 - d) joule
2. Derived units can be expressed in terms of _____.
 - a. Fundamental units
 - b. Arbitrary units
 - c. Base units
 - d. Standard units
3. The fundamental units of SI system are the same as that of
 - a. MKS System
 - b. CGS System
 - c. FPS System
 - d. None of the above
4. What is the unit of velocity in the SI system?
 - a) cm/s
 - b) m/s
 - c) n/s
 - d) m/s^2
5. Convert 150 cm to meters **SI**
 - a) 15 m
 - b) 1.5cm
 - c) 0.15m
 - d) 1.5m

Fill in the blanks by choosing appropriate answer from those given in the bracket.

(Volume,Force,Gram Per Cc,Aerospace,Meter Per Second Square)

1. Energy and work have the same SI unit because both involve _____ applied over a distance.
2. The unit of density in the CGS system is _____.
3. The amount of space occupied by an object is its _____
4. The SI unit of Acceleration is _____
5. _____ Is the Designing aircraft, spacecraft, and propulsion systems.

IMPORTANT QUESTIONS

Write the SI Units for the following derived quantities: a) Acceleration b) Energy (2 Marks)

1. A small metal block has a mass of 400grams and dimensions of 4cm x 3cm x 2cm. Calculate the volume and density of the block. Represent in SI units. (3 Marks)
 2. A constant Force of 25N moves an object at a distance of 10m. Calculate the work done in Joules (J), Convert it into CGS and FPS units. (5 Marks)
 3. Define Least Count. (2 Marks)
 4. For baking a cake at 356° F, what temperature should you set in your oven in Celsius (°C)? Show the Conversion. (3 Marks)
 5. Define CGS,MKS,FPS & SI Units. (5 Marks)
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ACTIVITY-2

Select the correct answers from the choices given (MCQ Questions)

1. Steel is an alloy of Iron and_____
a) Manganese b) Copper
c) Tin d) Carbon
2. In grey cast iron, carbon is present in the form of _____
a) Cementite b) Free carbon
c) Flakes d) Spheroids
3. Brass is alloy of Copper and _____.
a) Zinc b) Lead
c) Iron d) Silver
4. Composites can be classified based on _____.
a) matrix type b) Reinforcement constituent
c) matrix type & reinforcement constituent
d)neither on matrix type nor on reinforcement constituent type
5. Percentage of Carbon in Low carbon Steel
a. 0.05 to 0.3% b. 0.1 to 0.2%
c. 0.03 to 0.5 % d. 3 to 5%

Fill in the blanks by choosing appropriate answer from those given in the bracket. (Iron, Nickel based alloy, Corrosion, PVC, Alloy,)

1. _____ is a thermoplastic polymer widely used in pipes and cables
2. The formation of iron oxide in the presence of water and oxygen is an example of _____.
3. Non-ferrous materials are metals and alloys that do not contain_____
4. Combination of metals or metal + non metals _____
Inconel & Monel are the types of _____

IMPORTANT QUESTIONS

1. Define an Alloy.(2 marks)
 2. Define Composites. (2 marks)
 3. Explain Types,Properties, composition and applications of Cast Iron. (10 marks)
 4. ExplainTypes,Properties, composition and applications of Steel. (10 marks)
 5. ExplainTypes,Properties, composition and applications of Alloy Steel. (10 marks)
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ACTIVITY-3

Select the correct answers from the choices given (MCQ Questions)

1. Which of these materials is classified as a ferrous material?
 - a. Copper
 - b. Aluminium
 - c. Titanium
 - d. Steel
2. An alloy is a
 - a. Pure metal
 - b. Mixture of metals in any proportion
 - c. Mixture of metals in fixed proportion
 - d. Mixture of two non-metals
3. Medium Carbon steels are tougher than
 - a. High Carbon steel
 - b. Plain carbon steel
 - c. Low carbon steel
 - d. None of the above
4. Gun metal Contains
 - a. 70% copper and 30% zinc
 - b. 90% copper and 10% tin
 - c. 85 to 92% copper rest with tin little with nickel and lead
 - d. 70 – 80 % copper rest with tin
5. The aluminum alloy mainly used for anodized utensil manufacture is
 - a. Y alloy
 - b. Hindalium
 - c. Magnalium
 - d. Duralumin

6. Which industry is the largest user of composite materials?

- a. Transportation
- b. Marine
- c. Construction
- d. Sports

Fill in the blanks by choosing appropriate answer from those given in the bracket. (Iron, Nickel based alloy, Corrosion, PVC, Alloy,)

5. _____ is a thermoplastic polymer widely used in pipes and cables

6. The formation of iron oxide in the presence of water and oxygen is an example of _____.

7. Non-ferrous materials are metals and alloys that do not contain _____

8. Combination of metals or metal + non metals _____

Inconel & Monel are the types of _____

IMPORTANT QUESTIONS

1. Explain Types, Properties, composition and applications of Aluminum & Aluminum alloys. (10 marks)

2. Explain Types, Properties, composition and applications of Copper & Copper alloys. (10 marks)

3. Explain Types, Properties, composition and applications of Zinc Based Alloys. (10 marks)

4. Explain Types, Properties, composition and applications of Nickel Based Alloys. (10 marks)

ACTIVITY-4

Select the correct answers from the choices given (MCQ Questions)

1. The ability of materials to develop a characteristic behavior under repeated loading known as

- a) Toughness
- b) Resilience
- c) Hardness
- d) Fatigue

2. The response of a material due to the function of heat is known as _____
- a) Mechanical property
 - b) Electrical property
 - c) Chemical property
 - d) Thermal property
3. Which of the following is an electrical property of a material?
- a. Resistivity.
 - b. Electrical resistance.
 - c. Magnetic permeability.
 - d. Thermal expansion
4. What is a common property of ceramic materials?
- a. High thermal conductivity
 - b. Excellent ductility
 - c. High melting points and good chemical stability
 - d. Good electrical conductivity
5. The tendency of a deformed solid to regain its actual proportions instantly upon unloading known as _____.
- a. Perfectly elastic
 - b. inelastic effect.
 - c. Plasticity
 - d. Delayed elasticity.
6. The property of a material to resist any elastic deformation is termed as:
- (a) Stiffness
 - (b) Hardness
 - (c) Malleability
 - (d) Strength
7. The property of a material to resist deformation under load is termed as:
- (a) Strength
 - (b) Hardness
 - (c) Stiffness
 - (d) Brittleness
8. Resilience is the:
- (a) Measure of a material's resistance to localized plastic deformation
 - (b) Fluctuating load
 - (c) Instantaneous area
 - (d) Capacity of a material to absorb energy when it is deformed elastically
9. What is the basic property of electrical conducting materials?
- (a) Allows the passage of current through the materials
 - (b) Blocks the passage of current through the materials
 - (c) Stores electrical energy
 - (d) None of the above
10. Which of the following materials has the highest thermal conductivity?
- (a) Wood
 - (b) Glass
 - (c) Aluminum
 - (d) Plastic

IMPORTANT QUESTIONS

1. Explain any two Mechanical Properties of Materials with examples.(5 Marks)
 2. Explain Malleability and Ductility of a material with examples.(5 Marks)
 3. Explain the classification of Engineering materials.(5 Marks)
 4. Which two mechanical properties are critical for a cutting tool used on hardened steel at high speeds? Justify your choices.(10 Marks)
 5. Discuss the Chemical properties of engineering materials.(5 Marks)
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ACTIVITY-5

Select the correct answers from the choices given (MCQ Questions)

1. Which of the following is an example of a thermoplastic polymer?
 - a. Polyurethane
 - b. Epoxy
 - c. Bakelite
 - d. ABS
2. Which industry is the largest user of composite materials?
 - a. Transportation
 - b. Marine
 - c. Construction
 - d. Sports

Fill in the blanks by choosing appropriate answer from those given in the bracket. (Polymers, PVC)

1. _____ is a thermoplastic polymer widely used in pipes and cables
2. Epoxy, polyester, and vinyl ester are types of _____ used as matrices in composites.

IMPORTANT QUESTIONS

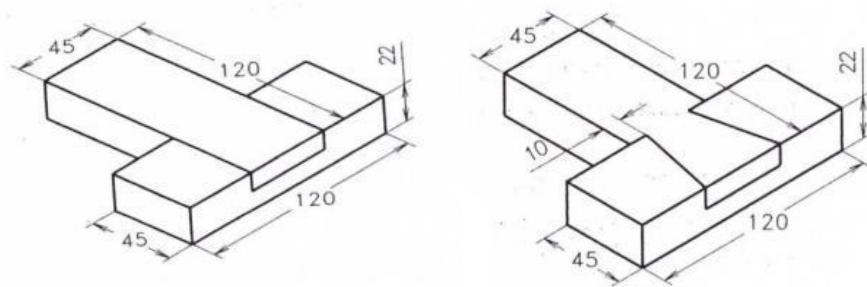
1. What are biodegradable polymers? (2 Marks)
2. Differentiate Thermosetting Plastics and Thermoplastics.(5 Marks)
3. Explain the classification of Engineering materials.(5 Marks)
4. Select the suitable polymer used in the electrical switch board. Mention its properties.(5 Marks)

5. Which material is used for Plastics,Pipes? Explain any two types of its composition, properties & application. (5 Marks)
 6. Describe types of composites & its composition, properties & application. (5 Marks)
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ACTIVITY-6

Carpentry Practice

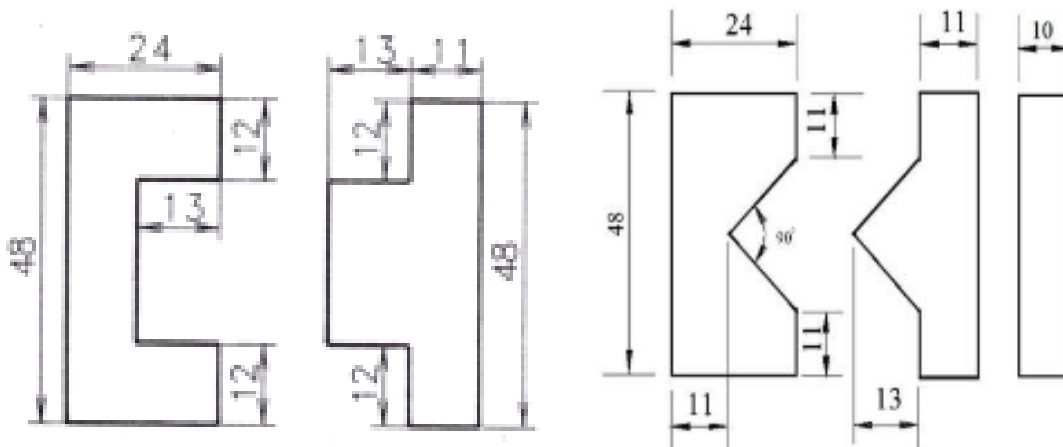
Prepare the model as per give drawing .



ACTIVITY-7

Fitting Practice

Prepare the model as per give drawing .



ACTIVITY-8

Select the correct answers from the choices given (MCQ Questions)

- 1) A piston and cylinder arrangement in an internal combustion engine is an example of which type of kinematic pair?
 - a) Turning pair
 - b) Sliding pair
 - c) Rolling pair
 - d) Spherical pair
- 2) Lower pairs in kinematics are characterized by which type of contact between their elements?
 - a. No contact
 - b. Surface contact
 - c. Point contact
 - d. Line contact
- 3) A mechanism is an assemblage of
 - a. Two links
 - b. Four or more than four links
 - c. Three links
 - d. All the above

Fill in the blanks by choosing appropriate answer from those given in the bracket.(Link, Kinematic pair)

- 1) A connection between two rigid bodies (links) in a mechanism that imposes constraints on their relative motion is called a _____.
- 2) In a mechanism, a rigid body or an assembly of rigid bodies that has motion relative to other parts is called a _____.

IMPORTANT QUESTIONS

- 1) What is Mechanism.(2 Marks)
- 2) List the types of kinematic links. (3 Marks)
- 3) Explain 4-bar mechanism.(5Marks)
- 4) Discuss the type of kinematic pair used in the following applications. (5Marks)
 - i) Piston and cylinder
 - ii) Nut and Bolt

- 5) Discuss the components of a four-bar chain Mechanism and their functions.(10 Marks)
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ACTIVITY-9

Select the correct answers from the choices given (MCQ Questions)

- 1) Which of the following is an inversion of a single slider crank chain?
- | | |
|-------------------------------------|---------------------|
| a) Whitworth quick return mechanism | b) Four-bar linkage |
| c) Scotch yoke mechanism | d) Beam engine |
- 2) The number of links in a double slider crank chain is:
- | | | | |
|------|------|------|------|
| a. 2 | b. 4 | c. 3 | d. 5 |
|------|------|------|------|

Fill in the blanks by choosing appropriate answer from those given in the bracket. (Slider crank,Pantograph)

- 1) The _____ is a four-bar linkage used to copy or scale movements in control devices and plotting instruments.
- 2) The Whitworth quick return mechanism is a modified version of the _____ mechanism.

IMPORTANT QUESTIONS

- 1) Define "kinematic pair." (2 Marks)
 - 2) Name any two inversions of the 4 bar chain. (2 Marks)
 - 3) Explain the mechanism used in Shaping machine. (5Marks)
 - 4) Discuss any two applications of inversions of slider crank mechanism with suitable sketches.
 - 5) Discuss Double slider crank and Scotch Yoke mechanisms with suitable sketches.(10 Marks)
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ACTIVITY-10

Select the correct answers from the choices given (MCQ Questions)

1. In which application is a flat belt drive commonly used?
 - a) Gearbox of a car
 - b) Elevator system
 - c) Flour mill drive
 - d) Bicycle transmission
2. Rope drives are best suited for which of the following applications?
 - a) Compact household appliances
 - b) Connecting gearbox and crankshaft
 - c) Elevators and cranes
 - d) Bicycles and motorcycles
3. Which of the following is not a type of belt drive?
 - a. Open belt drive
 - b. Cross belt drive
 - c. Compound belt drive
 - d. Radial belt drive
4. The pulley which receives power from the belt is called:
 - a. Driver
 - b. Driven
 - c. Idler
 - d. Shaft
5. V-belts are usually used for
 - a. long drives
 - b. short drives
 - c. long and short drives
 - d. none of the mentioned
6. Which type of chain is commonly used for power transmission?
 - a. Leaf chain
 - b. Roller chain
 - c. Silent chain
 - d. Bead chain

IMPORTANT QUESTIONS

1. Mention the different Materials used for Belts. (3 Marks)
2. Discuss the advantages of V-belt drives over flat belt drives. (5 Marks)
3. Differentiate between Chain and rope drives. (5 Marks)

4. A flour mill uses a motor running at 1440 rpm connected to a shaft through an open belt drive. The diameter of the motor pulley is 200 mm, and the shaft pulley is 500 mm. If the belt drive has a 5% slip, determine: a) The speed of the shaft. b) Is the system suitable for constant load transmission? Justify. (10 Marks)
 5. An engine, running at 150 r.p.m., drives a line shaft by means of a belt. The engine pulley is 750 mm diameter and the pulley on the line shaft being 450 mm. A 900 mm diameter pulley on the line shaft drives a 150 mm diameter pulley keyed to a dynamo shaft. Find the speed of the dynamo shaft, when 1. there is no slip, and 2. there is a slip of 2% at each drive. (10 Marks)
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ACTIVITY-11

Select the correct answers from the choices given (MCQ Questions)

1. Which type of gear has teeth parallel to the axis of the gear?
 - a) Helical gear
 - b) Bevel gear
 - c) Spur gear
 - d) Worm gear
2. The module of a gear is defined as
 - a. Pitch diameter $\times$ Number of teeth
 - b. Pitch diameter / Number of teeth
 - c. Number of teeth / Pitch diameter
 - d. Face width / Addendum
3. The main disadvantage of gear drive is:
 - a. Low efficiency
 - b. Slipping of motion
 - c. Inaccurate speed ratio
 - d. Frequent lubrication needed

IMPORTANT QUESTIONS

1. Explain the working of Epicyclical Gear train. (5 Marks)
2. Explain the working of Simple Gear train. (5 Marks)
3. Explain the working of Reverted Gear train. (5 Marks)

4. Identify and briefly explain the type of gear drives used for the following conditions: a) When the axes of the shafts are parallel
b) When the axes of the shafts are Perpendicular
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ACTIVITY-12

Select the correct answers from the choices given (MCQ Questions)

1. A nut and bolt combination is an example of:
a) A welded joint b) A permanent joint
c) A threaded fastener d) A riveted joint
2. In TIG welding, the electrode used is:
a) Consumable b) Non-consumable tungsten
c) Copper rod d) Coated iron rod
3. The main classification of welding processes is based on:
a. Shape of metal b. Base material
c. Source of heat d. Type of joint
4. Which of the following is not a type of nut?
a. Hex nut b. Wing nut
c. Castle nut d. Dowel nut
5. Which joint type is not typically used in brazing?
a. Lap Joint b. Threaded Join
c. Butt Joint d. Corner joint

IMPORTANT QUESTIONS

1. A workshop needs to join two mild steel plates permanently. Recommend a suitable welding process and describe the steps involved in performing a fillet lap joint.(10 Marks)

(or)

Explain Arc welding process.(5 Marks)
2. Explain TIG (GTAW) welding process.(5 Marks)

3. Explain MIG (GMAW) welding process.(5 Marks)
 4. Differentiate between temporary and permanent joining process.
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ACTIVITY-13

Select the correct answers from the choices given (MCQ Questions)

1. Which joint type is not typically used in brazing?
 - a. Lap Joint
 - b. Threaded Join
 - c. Butt Joint
 - d. Corner joint
2. The color of a neutral oxy-acetylene flame is:
 - a. Blue
 - b. Yellow
 - c. Orange
 - d. White

IMPORTANT QUESTIONS

1. Write the Principle of Soldering. (3 Marks)
 2. Explain Oxy-Acetylene gas welding process.(5 Marks)
 3. Why is brazing suitable for repairing a broken cast iron bracket without melting the base metal? Suggest a suitable filler material and justify. (10 Marks)
 4. Explain Co₂ gas welding process.(5 Marks)
 5. Explain Brazing process.(5 Marks)
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