

# TNPSC CTSE 2025

# PDF TEST BATCH ₹ 500/-

# WORKSHOP CALCULATION SCIENCE

**CODE:** 540

**Pdf Sample Available Our Website** 

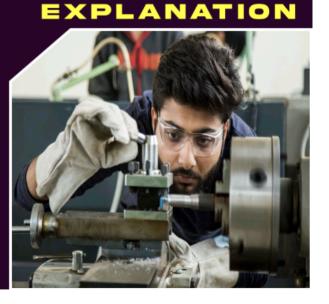
**ENGLISH MEDIUM** 

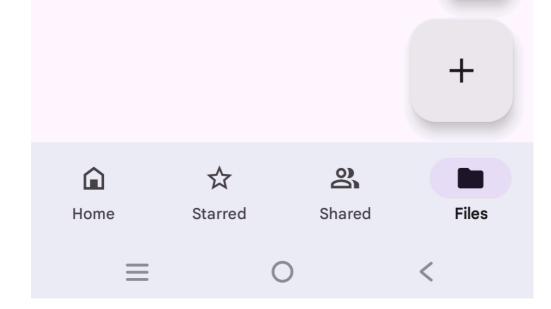
www.rlaacademy.com

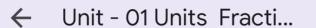
For More Details



96004 20486



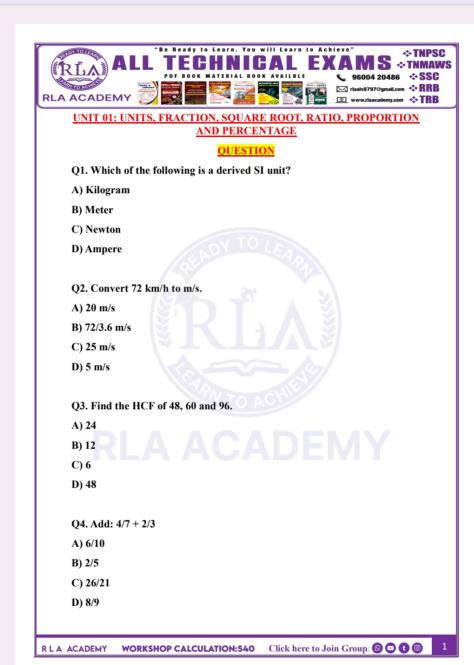










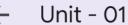




- Q5. Find the square root of 1156.
- A) 32
- B) 34
- C) 38
- D) 36

2/3

Q6. A ladder is 13 m long and reaches 5 m above the ground on a wall. How far is the foot of the ladder from the wall?

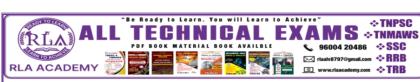


# Unit - 01 Units Fracti...









# UNIT 01: UNITS, FRACTION, SOUARE ROOT, RATIO, PROPORTION AND PERCENTAGE

# ANSWER AND EXPLANATION

- Q1. Which of the following is a derived SI unit?
- A) Kilogram
- B) Meter
- C) Newton
- D) Ampere

# Answer: C

Explanation: Newton is a derived unit of force (kg·m/s²), whereas others are fundamental.

- Q2. Convert 72 km/h to m/s.
- A) 20 m/s
- B) 72/3.6 m/s
- C) 25 m/s
- D) 5 m/s

## Answer: B

Explanation: Divide km/h by 3.6 to convert to m/s  $\rightarrow$  72  $\div$  3.6 = 20 m/s.

- Q3. Find the HCF of 48, 60 and 96.
- A) 24
- B) 12
- C) 6
- D) 48

Answer: B

**WORKSHOP CALCULATION:540** R L A ACADEMY





Explanation: HCF of 48, 60 and 96 = 12 (common factor of all three numbers).

- Q4. Add: 4/7 + 2/3
- A) 6/10
- B) 2/5
- C) 26/21
- D) 8/9





# Unit - 02 Material Sci...









- Q1. Which of the following is a ferrous metal?
- A) Aluminium
- B) Copper
- C) Steel
- D) Titanium
- Q2. Cast iron has high carbon content and exhibits:
- A) High ductility
- B) Excellent toughness
- C) Good compressive strength and poor tensile strength
- D) High malleability
- Q3. The main mechanical property improved in alloy steel over carbon steel is:
- A) Density
- B) Electrical conductivity
- C) Toughness and strength at high temperature
- D) Magnetic permeability
- Q4. Which property primarily distinguishes iron from steel?
- A) Hardness
- B) Magnetic nature
- C) Carbon content and tunable properties
- D) Appearance

R L A ACADEMY

WORKSHOP CALCULATION:540 Click here to Join Group: 

Output

Description:





- Q5. Bars of structural steel often undergo normalizing to:
- A) Obtain martensite
- B) Increase internal stresses
- C) Refine grain structure uniformly
- D) Produce annealed softness

Q6. Annealing differs from hardening in that annealing:







# Unit - 02 Material Sci...









# **UNIT 02: MATERIAL SCIENCE AND HEAT TREATMENT**

# ANSWER AND EXPLANATION

- Q1. Which of the following is a ferrous metal?
- A) Aluminium
- B) Copper
- C) Steel
- D) Titanium

## Answer: C

Explanation: Steel contains iron; ferrous metals are iron-based alloys.

- Q2. Cast iron has high carbon content and exhibits:
- A) High ductility
- B) Excellent toughness
- C) Good compressive strength and poor tensile strength
- D) High malleability

## Answer: C

**Explanation:** Cast iron is brittle in tension, strong in compression.

- Q3. The main mechanical property improved in alloy steel over carbon steel is:
- A) Density
- B) Electrical conductivity
- C) Toughness and strength at high temperature
- D) Magnetic permeability

Answer: C

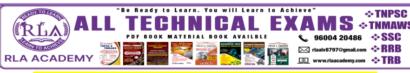
R L A ACADEMY

WORKSHOP CALCULATION :540 Click here to Join Group: 

O

O





Explanation: Alloying elements (Ni, Cr, Mo) enhance strength & corrosion resistance.

- Q4. Which property primarily distinguishes iron from steel?
- A) Hardness
- B) Magnetic nature
- C) Carbon content and tunable properties
- D) Appearance





# Unit - 03 Mass, Weig...









# UNIT 03: MASS, WEIGHT, VOLUME, DENSITY, SPEED, VELOCITY AND WORK POWER ENERGY

## **OUESTION**

- Q1. A metal cube has a mass of 250 grams and a volume of 50 cm3. What is its density?
- A) 5 g/cm<sup>3</sup>
- B) 0.2 g/cm<sup>3</sup>
- C) 12.5 g/cm<sup>3</sup>
- D) 2.5 g/cm<sup>3</sup>
- Q2. If the weight of an object on Earth is 98 N, what is its mass? (Assume g  $= 9.8 \text{ m/s}^2$
- A) 10 kg
- B) 9.8 kg
- C) 98 kg
- D) 0.98 kg
- Q3. A liquid has a density of 1.2 g/cm<sup>3</sup>. What is its specific gravity?
- B) 0.12
- C) 12
- D) 0.012
- Q4. An object weighs 30 N on Earth. What would be its weight on the Moon where gravity is 1/6th of Earth's?
- A) 5 N
- B) 6 N

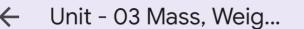
R L A ACADEMY





- C) 180 N
- D) 25 N
- Q5. Which of the following quantities is scalar?
- A) Weight
- B) Velocity
- C) Acceleration
- D) Mass





11:35









## UNIT 03: MASS. WEIGHT, VOLUME, DENSITY, SPEED, VELOCITY AND WORK POWER ENERGY

## NSWER AND EXPLANATION

- Q1. A metal cube has a mass of 250 grams and a volume of 50 cm3. What is its density?
- A) 5 g/cm<sup>3</sup>
- B) 0.2 g/cm<sup>3</sup>
- C) 12.5 g/cm<sup>3</sup>
- D) 2.5 g/cm<sup>3</sup>

# Answer: A

Explanation: Density = Mass / Volume =  $250 \text{ g} / 50 \text{ cm}^3 = 5 \text{ g/cm}^3$ .

- Q2. If the weight of an object on Earth is 98 N, what is its mass? (Assume g  $= 9.8 \text{ m/s}^2$
- A) 10 kg
- B) 9.8 kg
- C) 98 kg
- D) 0.98 kg

Explanation: Weight = Mass  $\times$  g  $\Rightarrow$  Mass = Weight / g = 98 N / 9.8 m/s<sup>2</sup> = 10

- Q3. A liquid has a density of 1.2 g/cm3. What is its specific gravity?
- A) 1.2
- B) 0.12
- C) 12
- D) 0.012

R L A ACADEMY

WORKSHOP CALCULATION :540 Click here to Join Group: 

O

O



# Answer: A

Explanation: Specific gravity = Density of substance / Density of water =

- Q4. An object weighs 30 N on Earth. What would be its weight on the Mc where gravity is 1/6th of Earth's?
- A) 5 N
- B) 6 N
- C) 180 N







# Unit - 04 Heat and T...









# **QUESTION**

- Q1. Which of the following statements correctly distinguishes between heat and temperature?
- A) Heat is a measure of the average kinetic energy of particles; temperature is the total energy.
- B) Heat is energy in transit due to temperature difference; temperature is a measure of thermal energy.
- C) Heat is measured in Kelvin; temperature is measured in Joules.
- D) Heat can be negative; temperature cannot.
- Q2. Which instrument is used to measure the temperature of a furnace without direct contact?
- A) Thermocouple
- B) Mercury thermometer
- C) Pyrometer
- D) Manometer
- Q3. What is the primary mode of heat transfer in solids?
- A) Convection
- **B)** Radiation
- C) Conduction
- D) Evaporation
- Q4. Which of the following materials has the highest thermal conductivity?
- A) Copper
- B) Aluminum

R L A ACADEMY





- C) Silver
- D) Diamond
- Q5. What is the coefficient of linear expansion?
- A) Change in volume per unit temperature change.
- B) Change in area per unit temperature change.
- C) Change in length per unit length per degree temperature change.
- D) Change in mass per unit temperature change.







# Unit - 04 Heat and T...









# **UNIT 04: HEAT AND TEMPERATURE**

# ANSWER AND EXPLANATION

- Q1. Which of the following statements correctly distinguishes between heat and temperature?
- A) Heat is a measure of the average kinetic energy of particles; temperature is the total energy.
- B) Heat is energy in transit due to temperature difference; temperature is a measure of thermal energy.
- C) Heat is measured in Kelvin; temperature is measured in Joules.
- D) Heat can be negative; temperature cannot.

Explanation: Heat refers to the energy transferred between systems due to a temperature difference, whereas temperature measures the thermal energy within a system.

- Q2. Which instrument is used to measure the temperature of a furnace without direct contact?
- A) Thermocouple
- B) Mercury thermometer
- C) Pyrometer
- D) Manometer

# Answer: C

Explanation: A pyrometer measures high temperatures from a distance by detecting thermal radiation, making it suitable for furnaces.

- Q3. What is the primary mode of heat transfer in solids?
- A) Convection
- B) Radiation

R L A ACADEMY

WORKSHOP CALCULATION :540 Click here to Join Group: 

O

O





- C) Conduction
- D) Evaporation

# Answer: C

Explanation: In solids, heat is primarily transferred through conduction, where energy is passed between adjacent particles.

Q4. Which of the following materials has the highest thermal conductivit

- A) Copper
- R) Aluminum





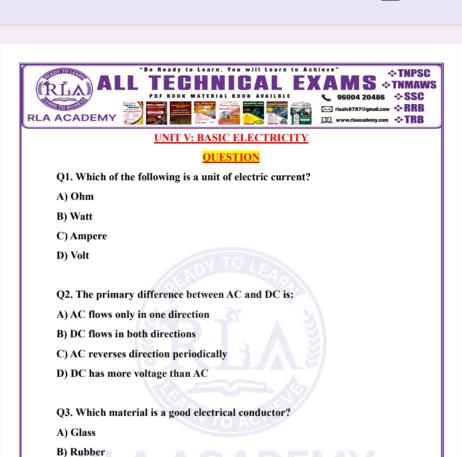


# Unit - 05 Basic Electr...









- Q4. What is the SI unit of resistance?
- A) Ampere

C) Copper D) Plastic

- B) Ohm
- C) Watt
- D) Henry

R L A ACADEMY

WORKSHOP CALCULATION :540 Click here to Join Group: 

O

O



- A) Reactance
- B) Resistance
- C) Rotation
- D) Rectifier

Q6. Which device is used to convert AC to DC?

A) Transformer











# Unit - 05 Basic Electr...









# **UNIT V: BASIC ELECTRICITY**

# ANSWER AND EXPLANATION

- Q1. Which of the following is a unit of electric current?
- A) Ohm
- B) Watt
- C) Ampere
- D) Volt

## Answer: C

Explanation: Ampere (A) is the SI unit of electric current.

- Q2. The primary difference between AC and DC is:
- A) AC flows only in one direction
- B) DC flows in both directions
- C) AC reverses direction periodically
- D) DC has more voltage than AC

## Answer: C

Explanation: AC (alternating current) changes direction periodically; DC flows in one direction.

- Q3. Which material is a good electrical conductor?
- A) Glass
- B) Rubber
- C) Copper
- D) Plastic

Answer: C

Explanation: Copper has low resistance, making it ideal for conduction.

R L A ACADEMY

WORKSHOP CALCULATION :540 Click here to Join Group: 

O

O





- Q4. What is the SI unit of resistance?
- A) Ampere
- B) Ohm
- C) Watt
- D) Henry

Answer: B

Explanation: Resistance is measured in ohms  $(\Omega)$ .

Q5.  $\blacksquare$  hm's Law, V = IR. What des R" stand for?



# Unit - 06 Mensuratio...







# UNIT 06: MENSURATION - AREA OF CUT-OUT REGULAR AND **IRREGULAR SURFACES**

## **OUESTION**

- Q1. A square has a perimeter of 48 cm. What is its area?
- A) 144 cm<sup>2</sup>

11:38

- B) 196 cm<sup>2</sup>
- C) 256 cm<sup>2</sup>
- D) 576 cm<sup>2</sup>
- Q2. A rectangle has a length of 15 cm and a width of 10 cm. What is its area?
- A) 150 cm<sup>2</sup>
- B) 125 cm<sup>2</sup>
- C) 100 cm<sup>2</sup>
- D) 200 cm<sup>2</sup>
- Q3. The area of a parallelogram is 120 cm<sup>2</sup>, and its base is 10 cm. What is its height?
- A) 10 cm
- B) 12 cm
- C) 15 cm
- D) 20 cm
- Q4. A triangle has a base of 8 cm and a height of 5 cm. What is its area?
- A) 20 cm<sup>2</sup>
- B) 30 cm<sup>2</sup>
- C) 40 cm<sup>2</sup>

R L A ACADEMY





- D) 50 cm<sup>2</sup>
- Q5. The radius of a circle is 7 cm. What is its area? (Use  $\pi = 22/7$ )
- A) 154 cm<sup>2</sup>
- B) 144 cm<sup>2</sup>
- C) 164 cm<sup>2</sup>
- D) 134 cm<sup>2</sup>







# Unit - 06 Mensuratio...









# UNIT 06: MENSURATION - AREA OF CUT-OUT REGULAR AND **IRREGULAR SURFACES**

## ANSWER AND EXPLANATION

- Q1. A square has a perimeter of 48 cm. What is its area?
- A) 144 cm<sup>2</sup>
- B) 196 cm<sup>2</sup>
- C) 256 cm<sup>2</sup>
- D) 576 cm<sup>2</sup>

# Answer: A

**Explanation:** Perimeter of a square  $= 4 \times \text{side}$ 

So, side = 48 cm / 4 = 12 cm

Area =  $side^2 = 12^2 = 144 \text{ cm}^2$ 

- Q2. A rectangle has a length of 15 cm and a width of 10 cm. What is its area?
- A) 150 cm<sup>2</sup>
- B) 125 cm<sup>2</sup>
- C) 100 cm<sup>2</sup>
- D) 200 cm<sup>2</sup>

# Answer: A

Explanation: Area = length  $\times$  width = 15 cm  $\times$  10 cm = 150 cm<sup>2</sup>

- Q3. The area of a parallelogram is 120 cm<sup>2</sup>, and its base is 10 cm. What is its height?
- A) 10 cm
- B) 12 cm
- C) 15 cm

R L A ACADEMY

WORKSHOP CALCULATION :540 Click here to Join Group: 

O

O



D) 20 cm

Answer: B

Explanation: Area = base  $\times$  height

So, height = Area / base =  $120 \text{ cm}^2 / 10 \text{ cm} = 12 \text{ cm}$ 

Q4. A triangle has a base of 8 cm and a height of 5 cm. What is its area?

A) 20 cm<sup>2</sup>

B) 30 cm<sup>2</sup>









# Unit - 07 Friction - Q...









# **UNIT: 07 FRICTION**

# **QUESTION**

- Q1. What is friction?
- A) Resistance to motion between two surfaces
- B) Force that increases speed
- C) Energy conversion in motion
- D) None of the above
- Q2. Which one is not an advantage of friction?
- A) Enables walking
- B) Helps in braking
- C) Produces heat in machines
- D) Aids in holding tools
- Q3. Which law of friction states that the force of friction is proportional to the normal force?
- A) First law
- B) Second law
- C) Third law
- D) Coulomb's law
- Q4. The coefficient of friction  $(\mu)$  is defined as:
- A) Ratio of normal force to frictional force
- B) Product of normal force and frictional force
- C) Ratio of frictional force to normal force
- D) Difference between normal force and frictional force

R L A ACADEMY

WORKSHOP CALCULATION :540 Click here to Join Group: 

O

O





- Q5. What is the unit of coefficient of friction?
- A) Newton
- B) No unit
- C) Joule
- D) Pascal

Q6. Which of the following factors does not affect the force of friction hetween two surfaces?









# Unit - 07 Friction - A...









## **UNIT: 07 FRICTION**

# ANSWER AND EXPLANATION

- Q1. What is friction?
- A) Resistance to motion between two surfaces
- B) Force that increases speed
- C) Energy conversion in motion
- D) None of the above

## Answer: A

**Explanation:** Friction is a resistive force that occurs when two surfaces move or try to move across each other.

- Q2. Which one is not an advantage of friction?
- A) Enables walking
- B) Helps in braking
- C) Produces heat in machines
- D) Aids in holding tools

## Answer: C

Explanation: Heat generation is a disadvantage of friction as it leads to energy loss and wear.

- Q3. Which law of friction states that the force of friction is proportional to the normal force?
- A) First law
- B) Second law
- C) Third law
- D) Coulomb's law

Answer: B

R L A ACADEMY

WORKSHOP CALCULATION :540 Click here to Join Group: 

O

O





**Explanation:** The second law of friction states that frictional force is directly proportional to the normal reaction force.

- Q4. The coefficient of friction  $(\mu)$  is defined as:
- A) Ratio of normal force to frictional force
- B) Product of normal force and frictional force
- C) Ratio of frictional force to normal force
- D) Difference between normal force and frictional force





# Unit - 08 Centre of G...









# UNIT 08: CENTRE OF GRAVITY, LEVERS AND SIMPLE MACHINES AND ELASTICITY

- Q1. The center of gravity of a uniform semicircular lamina lies at a distance of:
- A) r/2 from the center along the axis
- B)  $4r/3\pi$  from the center along the axis
- C)  $2r/\pi$  from the center along the axis
- D) 3r/4 from the center along the axis
- Q2. Which of the following statements is true regarding the center of gravity?
- A) It always lies within the material body
- B) It coincides with the centroid for homogeneous bodies
- C) It is affected by the orientation of the body
- D) It depends on the shape but not the mass distribution
- Q3. The center of gravity of a composite body can be found by:
- A) Averaging the centers of gravity of individual parts
- B) Using the principle of moments
- C) Considering only the largest part
- D) Ignoring the mass distribution
- Q4. For a uniform solid cone, the center of gravity lies at a distance of:
- A) h/4 from the base
- B) h/3 from the base
- C) 3h/4 from the base

R L A ACADEMY





- D) 2h/3 from the base
- Q5. The center of gravity of a uniform thin rod of length L is located at:
- A) One-fourth from one end
- B) Midpoint of the rod
- C) Three-fourths from one end
- D) At one end







# Unit - 08 Centre of G...









# UNIT 08: CENTRE OF GRAVITY, LEVERS AND SIMPLE MACHINES AND ELASTICITY

## ANSWER AND EXPLANATION

- Q1. The center of gravity of a uniform semicircular lamina lies at a distance of:
- A) r/2 from the center along the axis
- B)  $4r/3\pi$  from the center along the axis
- C)  $2r/\pi$  from the center along the axis
- D) 3r/4 from the center along the axis

## Answer: B

Explanation: For a semicircular lamina, the center of gravity lies at a distance of  $4r/3\pi$  from the center along the axis perpendicular to the diameter.

- Q2. Which of the following statements is true regarding the center of
- A) It always lies within the material body
- B) It coincides with the centroid for homogeneous bodies
- C) It is affected by the orientation of the body
- D) It depends on the shape but not the mass distribution

# Answer: B

Explanation: For homogeneous bodies, the center of gravity coincides with the centroid, which is the geometric center of the body.

- Q3. The center of gravity of a composite body can be found by:
- A) Averaging the centers of gravity of individual parts
- B) Using the principle of moments
- C) Considering only the largest part

R L A ACADEMY

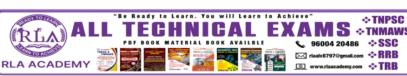
WORKSHOP CALCULATION :540 Click here to Join Group: 

© 

© 

©





D) Ignoring the mass distribution

# Answer: B

Explanation: The center of gravity of a composite body is determined by taking moments of individual parts about a reference axis and dividing the sum of moments by the total mass.

Q4. For a uniform solid cone, the center of gravity lies at a distance of:

- A) h/4 from the base
- B) h/3 from the base





# Unit - 09 Algebra & T...









# **UNIT 09: ALGEBRA & TRIGONOMETRY**

# ANSWER AND EXPLANATION

- Q1. What is the value of  $(a + b)^2 (a b)^2$ ?
- A) 2ab
- B) 4ab
- C)  $a^2 + b^2$
- D)  $a^2 b^2$
- Answer: B

Explanation:  $(a + b)^2 - (a - b)^2 = a^2 + 2ab + b^2 - (a^2 - 2ab + b^2) = 4ab$ 

- Q2. Simplify: 3x(2x-5)-4x(3x+1)
- A)  $-6x^2 19x$
- B)  $-6x^2 13x$
- C) 6x<sup>2</sup> 19x
- D)  $-6x^2 + 13x$
- Answer: B

**Explanation:**  $3x(2x-5) = 6x^2 - 15x$ 

 $4x (3x + 1) = 12x^2 + 4x$ 

Now,  $6x^2 - 15x - 12x^2 - 4x = -6x^2 - 19x$ 

- Q3. If  $x^2 5x + 6 = 0$ , then the value of x is:
- A) 2, 3
- B) -2, -3
- C) 1, 6
- D) 3, -2

Answer: A

R L A ACADEMY

WORKSHOP CALCULATION :540 Click here to Join Group: 

O

O



- Q4. The value of 81<sup>^</sup> (1/4) is:
- A) 2
- B) 3
- C) 9
- D) 4

Answer: B







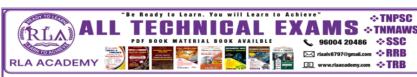


# Unit - 10 Estimation...







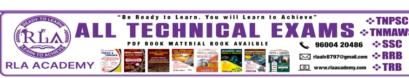


# UNIT 10: ESTIMATION AND COSTING, PROFIT AND LOSS

- Q1. What is the term used for the method of calculating various quantities and expenditure on a particular job or process?
- A) Estimation
- **B)** Drawing
- C) Specification
- D) Plan
- Q2. Which authority publishes the schedule of rates used in estimation?
- A) Individual
- B) Corporate
- C) Partnership firm
- D) Government department
- Q3. What is the main factor to be considered while preparing a detailed
- A) Shape of material
- B) Brand of the materials
- C) Quantity, availability, and transportation of materials
- D) Location of material
- Q4. What is the term for an estimate that falls short of the actual expenditure?
- A) Overestimate
- B) Underestimate
- C) Accurate estimate

R L A ACADEMY





- D) Revised estimate
- Q5. What is the most reliable type of estimate?
- A) Preliminary estimate
- B) Plinth area estimate
- C) Cube rate estimate
- D) Detailed estimate

# Unit - 10 Estimation...









# UNIT 10: ESTIMATION AND COSTING, PROFIT AND LOSS

## ANSWER AND EXPLANATION

- Q1. What is the term used for the method of calculating various quantities and expenditure on a particular job or process?
- A) Estimation
- **B)** Drawing
- C) Specification
- D) Plan

# Answer: A

Explanation: Estimation involves calculating the quantities and costs required for a specific job or process.

- Q2. Which authority publishes the schedule of rates used in estimation?
- A) Individual
- B) Corporate
- C) Partnership firm
- D) Government department

# Answer: D

Explanation: Government departments publish the schedule of rates, which are standardized rates for various items of work.

- Q3. What is the main factor to be considered while preparing a detailed estimate?
- A) Shape of material
- B) Brand of the materials
- C) Quantity, availability, and transportation of materials
- D) Location of material

R L A ACADEMY

WORKSHOP CALCULATION :540 Click here to Join Group: 

O

O



# Answer: C

Explanation: Accurate estimation requires considering the quantity, availability, and transportation costs of materials.

- Q4. What is the term for an estimate that falls short of the actual expenditure?
- A) Overestimate
- **B)** Underestimate
- C) Accurate estimate







