RGPV BCEM Exam-Oriented Answers with Diagrams

1. Characteristics of Good Building Stones

A good building stone should possess the following qualities:

1. Hardness: Resists wear and tear.
2. Durability: Withstands weather conditions.
3. Strength: High compressive strength (>1000 kg/cm²).
4. Porosity: Should be low to avoid water absorption.
5. Resistance to Fire: Should withstand high temperatures.
6. Appearance: Uniform color and texture.
7. Availability: Should be locally available to reduce costs.

2. Describe Various Methods of Quarrying Stones

Quarrying methods include:

1. **Blasting**: Using explosives to break large rock masses.
2. **Wedging**: Inserting wedges into rock fissures to split stones.
3. **Heating**: Uneven expansion due to fire weakens rock structure.
4. **Channeling**: Cutting narrow channels using machines.

3. Explain the Manufacturing Process of Bricks

Brick manufacturing involves:

1. **Preparation of Clay**: Cleaning, mixing with water.
2. **Moulding**: Hand/machine shaping.
3. **Drying**: Open air drying for 7-14 days.
4. **Burning**: Hardening in kilns.
5. **Cooling**: Slow cooling prevents cracks.

Good bricks should have uniform size, low porosity, and high compressive strength.

4. What are the Different Types of Foundations?

Foundations transfer loads to the ground. Types include:

1. Shallow Foundations:

- **Strip Footing**: Supports walls.
- **Raft Foundation**: Large slab supports multiple columns.

2. Deep Foundations:

- **Pile Foundation**: Used in weak soils, extends deep.
- **Well Foundation**: Used in bridge piers.

5. Explain the Principles of Chain Surveying

Chain surveying principles:

1. Main survey lines form a framework.
2. Tie lines help locate details.
3. Stations are marked for reference.
4. Measurements should be precise and corrected for errors.

6. Explain Local Attraction and Its Corrections

Local attraction occurs due to magnetic interference.

Correction methods:

1. Compare fore and back bearings.
2. Use unaffected stations for reference.
3. Apply mathematical adjustments.

7. Define Contour Lines and Their Characteristics

Contour lines join points of equal elevation. Characteristics:

1. Never intersect.
2. Close spacing indicates steep slope.
3. Widely spaced contours indicate gentle slope.
4. Closed contours with lower values inside indicate a depression.

8. What is Remote Sensing? Discuss Its Applications

Remote sensing involves collecting data without direct contact.

Applications:

- Land use mapping
- Disaster monitoring
- Urban planning

- Water resource management.

9. State and Explain Lami's Theorem

Lami's theorem states:

If three forces acting at a point are in equilibrium, then:

$F1/\sin(\alpha) = F2/\sin(\beta) = F3/\sin(\gamma)$

where alpha, beta, and gamma are angles between forces.

10. Define Angle of Repose and Its Significance

Angle of repose is the maximum angle at which a material remains stable.

Significance:

- Important in designing slopes and embankments.
- Helps determine safe storage angles for granular materials.

11. Explain Parallel Axis Theorem with Proof

Parallel Axis Theorem states:

$I = Ic + Ad^2$

where Ic = MI about centroidal axis, A = area, d = distance between axes.

Proof involves shifting the centroidal axis and applying integral calculations.

12. Find the Center of Gravity of a Trapezium

The center of gravity (CG) of a trapezium is found using:

$CG = (h/3) * ((b1 + 2b2) / (b1 + b2))$

where b1, b2 = bases, h = height.