

1. A vector field is a:
 - a. Scalar field
 - b. Vector field
 - c. Tensor field
 - d. None of the above
2. A vector field is a mathematical construct that:
 - a. Associates a vector with every point in space
 - b. Associates a scalar with every point in space
 - c. Associates a tensor with every point in space
 - d. None of the above
3. The components of a vector field:
 - a. Must be continuous
 - b. May be discontinuous
 - c. Must be differentiable
 - d. None of the above
4. A vector field is said to be conservative if:
 - a. The curl of the vector field is zero
 - b. The divergence of the vector field is zero
 - c. The gradient of the vector field is zero
 - d. All of the above
5. If a vector field is conservative, then:
 - a. The line integral of the vector field is independent of the path taken
 - b. The line integral of the vector field is path dependent
 - c. The line integral of the vector field is zero
 - d. None of the above
6. The gradient of a scalar field:
 - a. Is a vector field
 - b. Is a scalar field
 - c. Is a tensor field

d. None of the above

7. The gradient of a scalar field is:

a. A vector field that is perpendicular to the level surfaces of the scalar field

b. A vector field that is parallel to the level surfaces of the scalar field

c. A scalar field

d. None of the above

8. The divergence of a vector field:

a. Is a vector field

b. Is a scalar field

c. Is a tensor field

d. None of the above

9. The divergence of a vector field is:

a. A measure of how the vector field changes with respect to distance

b. A measure of how the vector field changes with respect to direction

c. A scalar field

d. None of the above

10. The curl of a vector field:

a. Is a vector field

b. Is a scalar field

c. Is a tensor field

d. None of the above

11. The curl of a vector field is:

a. A measure of how the vector field changes with respect to distance

b. A measure of how the vector field changes with respect to direction

c. A vector field

d. None of the above

12. A vector field is said to be irrotational if:

a. The curl of the vector field is zero

b. The divergence of the vector field is zero

c. The gradient of the vector field is zero

d. All of the above

13. If a vector field is irrotational, then:

a. The line integral of the vector field is independent of the path taken

b. The line integral of the vector field is path dependent

c. The line integral of the vector field is zero

d. None of the above

14. The gradient, divergence, and curl:

a. Are all vector fields

b. Are all scalar fields

c. Are all tensor fields

d. None of the above

15. The gradient, divergence, and curl:

a. Are all measures of how a vector field changes with respect to distance

b. Are all measures of how a vector field changes with respect to direction

c. Are all measures of how a scalar field changes with respect to distance

d. None of the above

Answer Key:

1. B

2. A

3. B

4. D

5. A

6. A

7. A

8. B

9. B

10. A

11. C

12. D

13. A

14. A

15. B