# unit-2 (MCQ)

1) unit normal vector to surface $x^2y + 2xz = 4$ at point $(2,-2,3)$ is

→ $-\frac{\hat{i}}{3} + \frac{2}{3}\hat{j} + \frac{2}{3}\hat{k}$

2) If $\bar{r}$ is position vector of point $(x,y,z)$ with respect to origin then $\nabla \cdot \bar{r}$ is

→ 3

3) If divergence of vector is zero then vector is said to be

→ Solenoidal vector.

4) The relation between line integral and double integral is

→ Green's theorem.

5) If $\vec{F} = (x+3y)\vec{i} + (y-2z)\vec{j} + (x+az)\vec{k}$, is solenoidal, then value of 'a' is

→ $-2$

6) The value of $\int_c x\,dy - y\,dx$ around circle $x^2+y^2=1$ is

→ $2\pi$

7) if $\vec{u}$ and $\vec{v}$ are irrotational, then $\bar{u} \times \bar{v}$ is

→ ~~Solenoidal zero vector~~ solenoidal

8) The value of $\iint_S \bar{r} \cdot \bar{n}\, ds$, where S is surface of sphere $x^2+y^2+z^2=a^2$ is

→ $4\pi a^3$

9) Curl (grad $\phi$) is

→ 0

10) Find constant 'a', if the vector $\vec{F} = (x+3y)\vec{i} + (y-2z)\vec{j} + (x+az)\vec{K}$ is solenoidal

→ $-2$

11) The condition for $\vec{F}$ to be conservative is, $\vec{F}$ should be

→ Irrotational vector.

12) If $\bar{a}$ is constant vector and $\bar{r}$ is position vector of point $(x, y, z)$ with respect to the origin then grad $(\bar{a} \cdot \bar{r})$ is

→ $\bar{a}$

13) The unit normal vector to surface $x^2+y^2-z^2=1$ at $(1,1,1)$ is

→ $\dfrac{i+j-K}{\sqrt{3}}$

14) If $\phi = xyz$ then $\nabla\phi$ is

→ $yz\vec{i} + zx\vec{j} + xy\vec{K}$

15) If $\phi$ is scalar function, then curl (grad $\phi$) is

→ 0

16) If $\bar{r}$ is position vector of point $(x, y, z)$ with respect to origin then div $\bar{r}$ is

→ 3

17) The connection between a line integral and double integral is known as

→ Green's theorem

18) If $\vec{F} = a y^4 z^2 \vec{i} + 4x^3 z^2 \vec{j} + 5x^2 y^2 \vec{k}$ is solenoidal, then value of $a$ is

→ $a$ can take any real value.

19) Evaluate line integral $\int_C \vec{F} \cdot d\vec{r}$ where C is line $y=x$ in xy plane from (1,1) to (2,2)

→ 3

20) The work done by conservative force when it moves a particle around a closed curve is

→ $\nabla \times \vec{F} = 0$

21) The connection between a surface integral and a volume integral is known as

→ Gauss divergence theorem.

22) Angle between two level surfaces $\phi_1 = c$ and $\phi_2 = c$ is given by

→ $$\cos\theta = \frac{\nabla\phi_1 \cdot \nabla\phi_2}{|\nabla\phi_1||\nabla\phi_2|}$$

23) A vector $\bar{V}$ is said to be solenoidal if

→ div $\bar{V} = 0$

24) The unit normal to surface $x^2+2y^2+z^2=7$ at point $(1,-1,2)$ is

→ $\frac{\hat{i}-2\hat{j}+2\hat{k}}{3}$

25) If $\bar{r}$ is position vector of the point $(x,y,z)$ with respect to the origin, the div $\bar{r}$ is

→ 3

26) If $\phi = xyz$ then $\nabla\phi$ is

→ $yz\vec{i}+zx\vec{j}+xy\vec{k}$

27) If integral $\int_A^B \vec{F}\cdot d\bar{r}$ depends only on end points but not on the path C, then F is called.

→ Conservative vector

28) Using Gauss divergence theorem, find value of $\iint_S \bar{r}\cdot d\bar{s}$ where r is position vector and V is volume.

→ 3V

29) If $\vec{F}$ is irrotational vector, then curl $\vec{F}$ =

→ 0

30) According to Green's theorem $\int_C (Pdx + Qdy) =$

→ $\iint_R \left( \frac{\partial Q}{\partial x} - \frac{\partial P}{\partial y} \right) dx\,dy$

31) If $\bar{F}$ is conservative vector field, then

→ div $\bar{F} = 0$

32) If $V = (x+3y)\vec{i} + (y-2z)\vec{j} + (x+\lambda z)\vec{k}$ is solenoidal then value of $\lambda$ is

→ $-2$

33) If $\bar{F}$ is a solenoidal vector then

→ $\nabla \cdot \vec{F} = 0$

34) The maximum value of directional derivative is

→ $|\nabla \phi|$

35) Area of a region by using Green's theorem is

→ $\frac{1}{2} \int_C (x\,dy - y\,dx)$

36) By stokes theorem $\int_C \vec{F} \cdot d\vec{r}$ is

→ $\iint_S \nabla \times \vec{F} \cdot \hat{n} \, ds$

37) the area bounded by a simple closed curve C is

→ $\frac{1}{2} \int_C (x\,dy - y\,dx)$

38) div $\bar{r}$ is

→ 3

39) the maximum directional derivative of $\phi = xyz^2$ at $(1,0,3)$ is

→ 9

40) Find constant 'a', if the vector $\vec{F} = (x+3y)\vec{i} + (y-2z)\vec{j} + (x+az)\vec{k}$ is solenoidal.

→ -2

41) the unit normal vector of $\phi = xy + yz + zx$ at point $(-1,1,1)$ is

→ $i$