Question Bank 5

School of Basics and Applied Science

**Mathematics**

Course Name: Multivariable Calculus Course Code:BBS01T1001

| S. No. | Questions | CO | Bloom’s Taxonomy Level | Difficulty Level | Area | Topic |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | Find the gradient of the scalar field | 5 | K2 | M | Differentiation of Vector function | Gradient |
| 2 | Find the gradient of the scalar field. | 5 | K2 | M | Differentiation of Vector function | Gradient |
| 3 | Find the gradient of the scalar field. | 5 | K2 | H | Differentiation of Vector function | Gradient |
| 4 | Find the gradient of the scalar field. | 5 | K2 | H | Differentiation of Vector function | Gradient |
| 5 | If**,**  and  **,** then show that where is unit vector. | 5 | K3 | M | Differentiation of Vector function | Gradient |
| 6 | Find a unit normal vector to the surfaceat the point . | 5 | K3 | M | Differentiation of Vector function | Gradient |
| 7 | Define directional derivative. | 5 | K1 | L | Differentiation of Vector function | Gradient |
| 8 | Find the directional derivative of at the point in the direction of | 5 | K3 | M | Differentiation of Vector function | Gradient |
| 9 | Find the directional derivative of at the point in the direction of unit vectorwhich makes an angle ofwith *x*-axis. | 5 | K3 | M | Differentiation of Vector function | Gradient |
| 10 | Define divergence and curl of a vector field. | 5 | K1 | L | Differentiation of Vector function | Divergence and curl |
| 11 | Find the divergence of the vector field | 5 | K2 | M | Differentiation of Vector function | Divergence and curl |
| 12 | Find the curl of the vector field | 5 | K2 | M | Differentiation of Vector function | Divergence and curl |
| 13 | Let be a differentiable scalar field. Show that **.** | 5 | K3 | M | Differentiation of Vector function | Divergence and curl |
| 14 | Let be a differentiable vector field. Show that **.** | 5 | K3 | M | Differentiation of Vector function | Divergence and curl |
| 15 | Let be a differentiable vector field. Show that **.** | 5 | K3 | M | Differentiation of Vector function | Divergence and curl |
| 16 | Let be a differentiable scalar field. Show that **.** | 5 | K3 | M | Differentiation of Vector function | Divergence and curl |
| 17 | Show that the vector field is conservative. Find its potential function. | 5 | K4 | H | Differentiation of Vector function | Divergence and curl |
| 18 | Find whether the vector field is conservative. If it is, find the potential function. | 5 | K4 | H | Differentiation of Vector function | Divergence and curl |
| 19 | Show that the vector field is irrotational. | 5 | K3 | M | Differentiation of Vector function | Divergence and curl |
| 20 | Show that the vector field is incompressible. | 5 | K3 | M | Differentiation of Vector function | Divergence and curl |
| 21 | Evaluate , where *C* is the curve defined by . | 5 | K4 | H | Integration of Vector function | Line integral |
| 22 | Evaluate , where *C* is the curve defined by from to . | 5 | K4 | H | Integration of Vector function | Line integral |
| 23 | Evaluate line integral of , over the curve *C* whose parametric representation is given by . | 5 | K4 | H | Integration of Vector function | Line integral |
| 24 | Evaluate line integral of , over the straight-line path from to . | 5 | K4 | H | Integration of Vector function | Line integral |
| 25 | Evaluate , where *C* is the curve defined by . | 5 | K4 | H | Integration of Vector function | Line integral |
| 26 | Evaluate , where *C* is the curve defined by | 5 | K4 | H | Integration of Vector function | Line integral |
| 27 | Find the work done by the force in moving a particle over the circular path from to . | 5 | K4 | H | Integration of Vector function | Line integral |
| 28 | Show that is independent of any path of integration which does not pass through the origin. Find the value of the integral from the point to the point | 5 | K4 | H | Integration of Vector function | Line integral |
| 29 | Show that is independent of any path of integration from to . Evaluate the integral. | 5 | K4 | H | Integration of Vector function | Line integral |
| 30 | State Green’s theorem. | 5 | K1 | M | Integration of Vector function | Green theorem |
| 31 | Evaluate , where *C* is the boundary of the region in the first quadrant that is bounded by the curves by Green’s theorem. | 5 | K5 | H | Integration of Vector function | Green theorem |
| 32 | Find the work done by the force in moving a particle along the closed path *C* containing the curves in the 1st and 4th quadrants by Green’s theorem. | 5 | K5 | H | Integration of Vector function | Green theorem |
| 33 | Evaluate , where *C* is the square with vertices at by Green’s theorem. | 5 | K5 | H | Integration of Vector function | Green theorem |
| 34 | Evaluate , where *C* is the boundary of the region by Green’s theorem. | 5 | K5 | H | Integration of Vector function | Green theorem |
| 35 | Evaluate , where *C* is the boundary of the region by Green’s theorem. | 5 | K5 | H | Integration of Vector function | Green theorem |
| 36 | Evaluate , where *C* is the rectangle with vertices at by Green’s theorem. | 5 | K5 | H | Integration of Vector function | Green theorem |
| 37 | Evaluate the surface integral where and *S* is the portion of the plane which is in the first octant. | 5 | K5 | H | Integration of Vector function | Surface integral |
| 38 | Evaluate the surface integral where and *S* is the portion of the surface of the cylinder included in the first octant. | 5 | K5 | H | Integration of Vector function | Surface integral |
| 39 | Use the Gauss theorem to evaluate , where and *S* is the boundary of the region bounded by the paraboloid and the plane . | 5 | K5 | H | Integration of Vector function | Gauss theorem |
| 40 | Use the Gauss theorem to evaluate , where and *S* is the boundary of the region bounded by the cylinder and the planes . | 5 | K5 | H | Integration of Vector function | Gauss theorem |
| 41 | Use the Gauss theorem to evaluate , where and *S* is the boundary of the cube cut from the first octant by the planes . | 5 | K5 | H | Integration of Vector function | Gauss theorem |
| 42 | Use the Gauss theorem to evaluate , where and *S* is the boundary of sphere . | 5 | K5 | H | Integration of Vector function | Gauss theorem |
| 43 | Evaluate where and *S*(oriented upward) is the part of above the plane | 5 | K5 | H | Integration of Vector function | Stokes’s theorem |
| 44 | Evaluate where and *S*(oriented upward) is the paraboloid for | 5 | K5 | H | Integration of Vector function | Stokes’s theorem |
| 45 | Evaluate using the Stokes’s theorem where and *C* is the intersection of the surface of the sphere and the cylinder | 5 | K5 | H | Integration of Vector function | Stokes’s theorem |
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Signature of Course Coordinator/DC:

Signature of Dean:

IQAC: