Sree Dattha Institute of Engineering & Science
Sheriguda(V), Ibrahimpatnam (M), R.R. Dt. Hyderabad -501510.

Department of Humanities & Sciences

M2 UNIT: 4 QUESTION BANK **VECTOR DIFFERENTIATION**			
SOLVE THE FOLLOWING			
S.NO	**QUESTION**	**Learning Objectives**	**CO**
1	Define vector point function and scalar point function	L1	CO4
2	Write the properties of gradient and define it	L3	CO4
3	Prove that $\nabla(r^n) = nr^{n-2}\bar{r}$	L1	CO4
4	Show that $\nabla[f(r)] = \frac{f'(r)}{r} * \bar{r}$ $where\ \bar{r} = x\bar{\imath} + y\bar{\jmath} + z\bar{k}$	L1	CO4
5	Find the directional derivative of xyz^2 +xz at (1,1,1) in a direction of the normal to the surface $3xy^2$+y=z at (0,1,1)	L1	CO4
6	Find the angle between the surfaces $x^2 + y^2 + z^2$=9 and z=$x^2 + y^2 - 3$	L1	CO4
7	Find div $\bar{f}$ where $\bar{f} = r^n\bar{r}$ find n if it is solenoidal	L1	CO4
8	Evaluate $\nabla(\overline{r\ /r^3})$ where $\bar{r} = x\bar{\imath} + y\bar{\jmath} + z\bar{k}\ and\ r = \lvert\bar{r}\rvert$ (or) Show that $\frac{\bar{r}}{r^3}\ is$ solenoidal	L5	CO4
9	find curl $\bar{f} = grad\ (x^3 + y^3 + z^3 - 3xyz).$	L1	CO4
10	show that curl $(r^n\bar{r}) = 0$	L1	CO4
11	prove that div.(gradr^n) $= m(m+1)r^{m-2}$ $(or)\nabla^2(r^m) = m(m+1)r^{m-2}$	L1	CO4
12	prove that $\nabla * \left(\frac{\bar{A}*\bar{r}}{r^n}\right)$=$(\frac{(2-n)\bar{A}}{r^n}$+$\frac{n(\bar{r}.\overline{A})}{r^{n+2}}\bar{r}$	L1	CO4
13	prove that div$(\bar{a} * \overline{\bar{b}}) = \bar{b}$ .curl$\bar{a} - \bar{a}.curl\bar{b}$	L1	CO4
14	curl $(\bar{a} * \bar{b}) = \bar{a}div\bar{b} - \bar{b}div\bar{a} + (\bar{b}.\nabla)\bar{a} - (\bar{a}.\nabla)\bar{b}$	L1	CO4
15	prove that $(\nabla f * \nabla g) is\ solenoidal$	L1	CO4
16	find (A.$\boldsymbol{\nabla}$)$\emptyset$ at (1,-1,1) if A=3xy	L1	CO4
17	Show that curl$(r^n\bar{r})$ = 0	L1	CO4
18	If w is a constant vector evaluate curl v where v = w x $\bar{r}$	L5	CO4
19	Find $\nabla(x^2 + y^2z)$	L1	CO4
20	Prove that $\nabla r^n = nr^{n-2}\bar{r}$	L1	CO4

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M2 UNIT: QUESTION BANK VECTOR DIFFERENTIATION			
SOVE THE FOLLOWING			
S.NO	**QUESTION**	**Learning Objectives**	**CO**
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