Mark Secured:

KATHMANDU UNIVERSITY
End Semester Examination [C]
January, 2018

Level : B.E./B. Sc./B. Tech
Year : I
Course : MATH 104
Semester : II

Exam Roll No. :
Time: 30 mins
F. M. : 20

Registration No. :
Date JAN: 0 5 2018

SECTION "A"
[10Q. × 1 = 10 marks]

Fill in the blank space(s) by writing the most appropriate word(s) or symbol(s).

1. The equivalent Cartesian equation of $1 = cos\theta sin\theta$ is .....

2. The gradient of f(x, y, z) = $x^2 + y^2 + z^2$ at point (1, 2, 3) is .....

3. The double integral $\iint rdrd\theta$ over **R** gives the .....of the closed and bounded region **R** in polar form.

4. If $1-\frac{x^2y^2}{3} < \frac{tan^{-1}xy}{xy} < 1$ for all real values of x and y, $\lim_{(x,y)\to(0,0)} \frac{tan^{-1}xy}{xy}$ is .....

5. $\left(\frac{\partial w}{\partial y}\right)_x$ is ....., if w = $x^2 + y^2 - z^2$, z = x - y.

6. The polar equation for the circle through the origin with radius 2 and center at (3, 0) is .....

7. $\int_0^2 \int_0^2 \int_0^2 dzdxdy$ = ...

8. The value of $\Gamma\left(\frac{1}{4}\right)\Gamma\left(\frac{3}{4}\right)$ is....., where Γ(n) denotes the gamma function of n.

9. The fourier coefficient a_n of a function f(x) of period 2π is defined by the formula
a_n = ...

10. The gradient field of f(x,y,z) = xyz is.....

SECTION "B"
[10Q. × 1 = 10 marks]

Fill in the blank space(s), DO NOT TICK, by selecting the most appropriate answers from among the given ones.

11. The primitive period of Tan nx is.....

$\left[2\pi; \quad \pi; \quad \frac{\pi}{n}; \quad \frac{2\pi}{n}\right]$

12. The curver = 5 +5cos θis symmetric about .....

$[x-axis;$ $y-axis;$ $origin;$ $line\ y=x]$

13. β(2, 3) =..... where β(m, n) denotes the beta function of m, n

$\left[\frac{1}{10};\right.$ $\frac{1}{12};$ $\frac{1}{14};$ $\left.\frac{1}{16}\right]$

14. The vector field $\vec{F}$ is conservative if and only if $\vec{F}$ = ..., where f is the scalar potential function.

$[\nabla f;$ $\nabla F;$ $\nabla \times f;$ $\nabla . f]$

15. The directrix of the parabola $r=\frac{25}{10+10cos\theta}$is .....

$\left[5;\right.$ $2;$ $\frac{5}{2};$ $\left.\frac{2}{5}\right]$

16. The curvature of a circle with radius r is .....

$\left[r;\right.$ $2r;$ $\frac{r}{2};$ $\left.\frac{1}{r}\right]$

17. If f(x, y, z) = xy+zwith x = cost, y = sint, z = t, then $\frac{df}{dt}$ at t = 0 is .....

[0; 1; 2; 3]

18. The plane containing unit tangent vector and binormal vector is called .....

[*principal plane;* *rectifying plane;* *osculating plane;* *normal plane*]

19. The polar equation r^2 = cos2θ is the .....

[*circle;* *cardioid;* *lemniscate;* *four leaved rose*]

20. If f(x) is odd function, $\int_{-a}^{a} f(x)$ =.....

$\left[0;\right.$ $2\int_0^a f(x);$ $\int_a^{-a} f(x);$ $\left.2\int_{-a}^{a} f(x)\right]$