KATHMANDU UNIVERSITY
End Semester Examination [C]
July, 2017

Marks Scored:

Level : B. Sc.
Year : I
Exam Roll No. :

Course : MATH 104
Semester: II
Time : 30 mins.
F. M. : 20

Registration No.:

Date JUL 14 2017

SECTION "A"
[10 Q. × 1 = 10 marks]

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

1. $\Gamma(-1)$ ____________ .

2. The series $f(x)=\sum_{n=1}^{\infty} b_n \sin nx$ is a Fourier series of an ____________ function $f(x)$.

3. In Cylindrical coordinate system (r, θ, z), the equation $r = 0$ describes ____________ .

4. $\lim_{(x,y)\to(\infty,2)} \frac{xy+4}{x^2+2y^2} =$ ____________ .

5. The double integral $\iint_R r\,dr\,d\theta$ gives the ____________ of a closed and bounded region R in polar form.

6. The mass of a wire is ____________ if the wire lies along the curve $\vec{r}(t)=3t\,\vec{i}+2\vec{k}, 0\le t\le 1$ with density $\delta = 2$.

7. If $\vec{u} = x^2yz\,\vec{i} + xy^2z\,\vec{j} + xyz^2\,\vec{k}$, then div $\vec{u}$ = ____________ .

8. If $\kappa(\neq 0)$ be the curvature of a curve and ρ be the radius of curvature of that curve, then $\rho =$ ____________ .

9. If $f(x,y)=e^{xy}\sin y$, then $f_x =$ ____________ .

10. If $\vec{F}$ is conservative vector field, then curl $\vec{F}$ = ____________ .

SECTION "B"

[10 Q. × 1 = 10 marks]

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

11. For the binomial vector $\vec{b}$, $\frac{d\vec{b}}{ds}$ = ____________, where the symbols have their usual meanings.

[$\kappa\vec{\eta}$; $-\kappa\vec{\eta}$; $\tau\vec{\eta}$; $-\tau\vec{\eta}$]

12. The graph of the curve $r = a(1-\cos\theta)$, $a > 0$ is symmetric about ____________.

[origin, the x-axis, the y-axis, the line y = x]

13. The relation $\frac{1}{\text{area of } R}\iint_R f\, dA$ gives ____________ of f over R.

[instantaneous; rate; average value; velocity]

14. $\lim_{t\to 0}\left(e^t\,\vec{i} + te^t\,\vec{j}\right) =$ ____________.

[1; $\vec{i}$; $\vec{j}$; $t\vec{i}$]

15. $\Gamma\left(\frac{1}{4}\right)\Gamma\left(\frac{3}{4}\right) =$ ____________.

[0, $\sqrt{2}$, π, $\sqrt{2}\pi$]

16. The domain of a function $f(x,y) = \frac{\sqrt{y-1}}{(x-2)^2}$ is ____________.

[$y \geq 1, x \neq 2$; $y > 1, x \neq 2$; $y \geq 1$; $y > 1$]

17. $\frac{d}{dt}\left(\vec{u}\cdot\vec{v}\right) =$ ____________.

[$\vec{u}\cdot\frac{d\vec{v}}{dt}$; $\vec{v}\cdot\frac{d\vec{u}}{dt}$; $\vec{u}\cdot\frac{d\vec{v}}{dt} + \vec{v}\cdot\frac{d\vec{u}}{dt}$; $\vec{u}\frac{d\vec{v}}{dt} + \vec{v}\frac{d\vec{u}}{dt}$]

18. Consider the function $f(x,y) = \begin{cases} 0, & xy \neq 0 \\ 1, & xy = 0 \end{cases}$. Then ____________.

[only f_x does not exist at the origin; both derivatives f_x and f_y does not exist at the origi
f is not continuous at the origin; f is continuous at the origin]

19. B(4, 3) = ____________.

[1/3, 1/60, 1/90, 1/120]

20. $\int_0^1\int_x^1 e^{y^2}\, dydx =$ ____________.

[e; e - 1; (e - 1)/2; 1]