G.R. No. [   ]   U118 –109 (BE–FS)

DEC 2018 / BACKLOG

F. Y. B. TECH. (COMMON) (SEMESTER - II)

Engineering Mathematics-II   (ES12171)

(2017 PATTERN)

Time: [2 Hours]   [Max. Marks: 50]

Instructions to candidates:
1)   Answer Q.1 OR Q.2, Q.3 OR Q.4 and Q.5
2)   Figures to the right indicate full marks.
3)   Use of scientific calculator is allowed
4)   Use suitable data whereever required

Q.1) a)   Find the equation of sphere passing through the points   6
          $(0,0,0); (0,1,0); (1,0,0); (0,1,0)$ as its diameter.

     b)   Obtain the equation of the right circular cone, which passes through the point $(-2, 0,3)$ 6
          with vertex is at $(0,0,2)$ and axis parallel to the line $\dfrac{x}{2} = \dfrac{y}{-2} = \dfrac{z}{1}$.

     c)   Find the equation of right circular cylinder whose guiding curve is   4
          $x^2 + y^2 + z^2 = 25, 2x - 2y + z = 3$

OR

Q.2) a)   Find the radius of circle which is section to the sphere   6
          $x^2 + y^2 + z^2 - 2y - 4z - 11 = 0; x + 2y + 2z - 15 = 0$

     b)   Obtain the equation of the right circular cone, with vertex is at origin and axis $\dfrac{x}{1} = \dfrac{y}{2} = \dfrac{z}{3}$ 6
          and semi vertical angle 30^0

     c)   Find the equation of right circular cylinder whose axis is the line $\dfrac{x-1}{2} = \dfrac{y-2}{1} = \dfrac{z-3}{2}$ and   4
          radius is 2.

Q.3) a)   Evaluate the following integral $\displaystyle\int_{0}^{\infty}\int_{0}^{\infty}\int_{0}^{\infty} \dfrac{dz\,dx\,dy}{\left(1+x^2 + y^2 + z^2\right)^2}$ 6

     b)   Evaluate $\displaystyle\int_{0}^{1}\int_{4y}^{4} e^{x^2}\,dx\,dy$ 4

     c)   Find the total area of cardioide $r = a (1 - \cos \theta)$ 4

OR

Q.4) a) Evaluate $\int\limits_0^1 \int\limits_0^{\sqrt{a^2-x^2}} \sqrt{a^2-x^2-y^2}\,dxdy$ 6

b) Evaluate $\int\limits_0^\infty \int\limits_y^\infty \dfrac{e^{-x}}{x}\,dxdy$ 4

c) Find the volume bounded by $x^2+y^2=a^2$ & $x^2+z^2=a^2$ 4

Q.5) Attempt following questions:[20 marks]

1 Find I.F. of the D.E. $\dfrac{dy}{dx}+\tan x\,y=x^2$. 2

2 Find order and degree of the differential equation $\left(\dfrac{d^2y}{dx^2}\right)+\left(\dfrac{dy}{dx}\right)^4+y=0$ 2

3 Find orthogonal trajectory for the family of $x^2+y^2=a^2$ 2

4 Evaluate $\int\limits_0^\infty e^{-X}x^2dx$ 2

5 Using DUIS rule find $\dfrac{d}{dx}(erfc(ax))$ 2

6 If $f(x)=x^2$ in $0<x<\pi$ then find value of a_0 in Fourier series 2

7 . What is amplitude of the first harmonic of Fourier series 2

8 Evaluate I= $\int\limits_0^{2\pi} \sin^5 x dx$ 2

9 Find asymptotes of the curve $y^2(x-a)=x^2(2a-x)$. 2

10 Evaluate $\int\limits_0^{\pi/2} \sqrt{\tan x}dx$. 2