2nd Mid Term Examination, Even Semester 2017-18

B.Tech. (I Year) - II Semester

Subject:- Engineering Mathematics-II   Sub. Code:- AHM-2201

Time: 1 Hour   Max. Marks: 15

Section-A

Attempt all questions: *(3 x 2 = 6 Marks)*

Q.1. Evaluate $\int_0^1 \int_0^y x\, y\, e^{-x^2}\, dx\, dy$.   (2)

Q.2. Change the order of the integration of the double integral

$$\int_0^2 \int_{\sqrt{4-x^2}}^{4-x} f(x,y)\, dy\, dx.$$ (2)

Q.3. Find $div\, \vec{F}$ and $curl\, \vec{F}$,

    where $\vec{F} = grad\ (x^3 + y^3 + z^3 - 3xyz)$.   (2)

Section-B

Attempt all questions: *(3 x 3 = 9 Marks)*

Q.1. (a) Transform the integral to Cartesian form and hence

    evaluate: $\int_0^\pi \int_0^a r^3\, \sin\theta \cos\theta\ dr\ d\theta$.   (1.5)

    (b) Evaluate: $\iiint_R (x + y + z)\, dx\, dy\, dz$,

    where $R: 0 \le x \le 1, 1 \le y \le 2,\ 2 \le z \le 3$.   (1.5)

Q.2. (a) Find the area bounded between the parabolas $y^2 = 4x$ and

    $x^2 = 4y$.   (1.5)

    (b) Find the mass of an octant of the ellipsoid

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1,$$

    the density at any point being $\rho = xyz$.   (1.5)

Q.3. Find a vector towards the outward normal to the surface
    $x^2 + y^2 + z^2 = 11$. Also find the directional derivative of the
    scalar point function $f(xyz) = xyz$ at the point $P(1, 1, 3)$ in
    the direction of this vector.   (3)