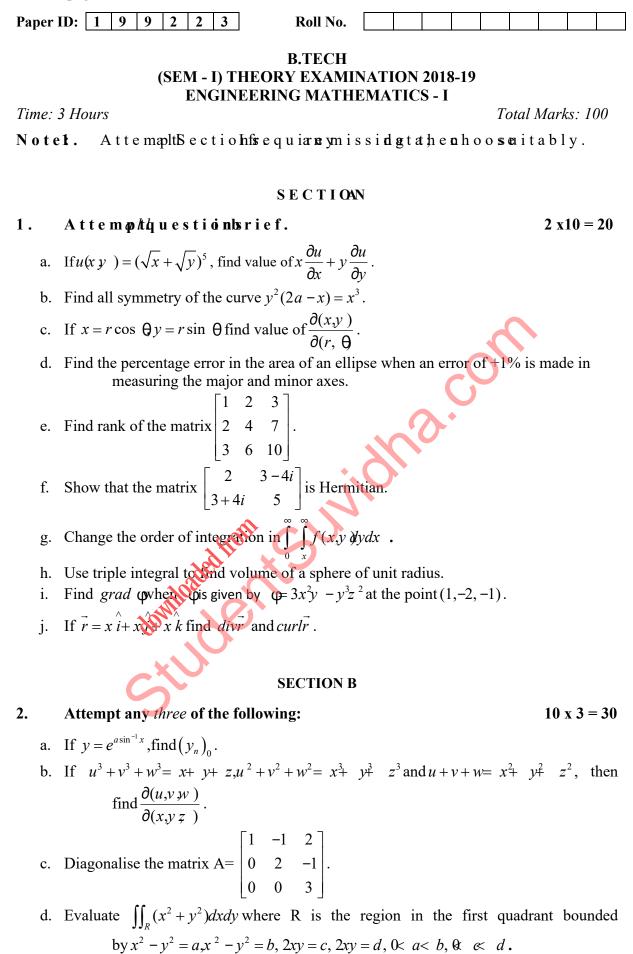
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e. Verify Green's theorem for $\int [(3x^2 - 8y^2)dx + (4y - 6xy)dy]$ where C is the boundary

of the region bounded by the lines x = 0, y = 0, x + y = 1.

SECTION C

3. Attempt any *one* part of the following:

(a) Expand $\tan^{-1} \frac{y}{x}$ in the neighbourhood of (1,1)upto and inclusive of second degree terms. Hence compute f(1.1, 0.9) approximately.

(b) Trace the curve $r = a(1 + \cos \theta)$.

4. Attempt any *one* part of the following:

(a) In estimating the number of bricks in a pile which is measured to be $(5m \cdot 10m \cdot 5m)$, the count of bricks is taken as 100 bricks per m^3 . Find the error in the cost when the tape is stretched 2% beyond its standard length. The cost of the bricks is Rs. 2000 per thousand bricks.

(b) Find the volume of largest rectangular parallelopiped that can be inscribed in the ellipsoid $\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$.

5. Attempt any *one* part of the following:

(a) Determine the values of λ and ∞ such that the system 2x - 5y + 2z = 8, 2x + 4y + 6z = 5, $x + 2y + \lambda z = \infty$

(b) Verify Cayley Hamilton theorem for the matrix $A = \begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$, Hence compute A^{-1} .

6. Attempt any one part of the following:

(a) Determine the area of region bounded by the curves xy = 2, $4y = x^2$, y = 4. (b) Find the solution of the solid surmounted by the surface $\left(\frac{x}{a}\right)^{2/3} + \left(\frac{y}{b}\right)^{2/3} + \left(\frac{z}{c}\right)^{2/3} = 1$.

(a) Show that the vector field $\vec{F} = \frac{\vec{r}}{r^3}$ is irrotational as well as solenoidal.

(b) Verify Stoke's theorem for $\vec{F} = (x^2 + y^2)\hat{i} - 2xy\hat{j}$ taken round the rectangle bounded by the lines $x = \pm a y = 0, y = b$.

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