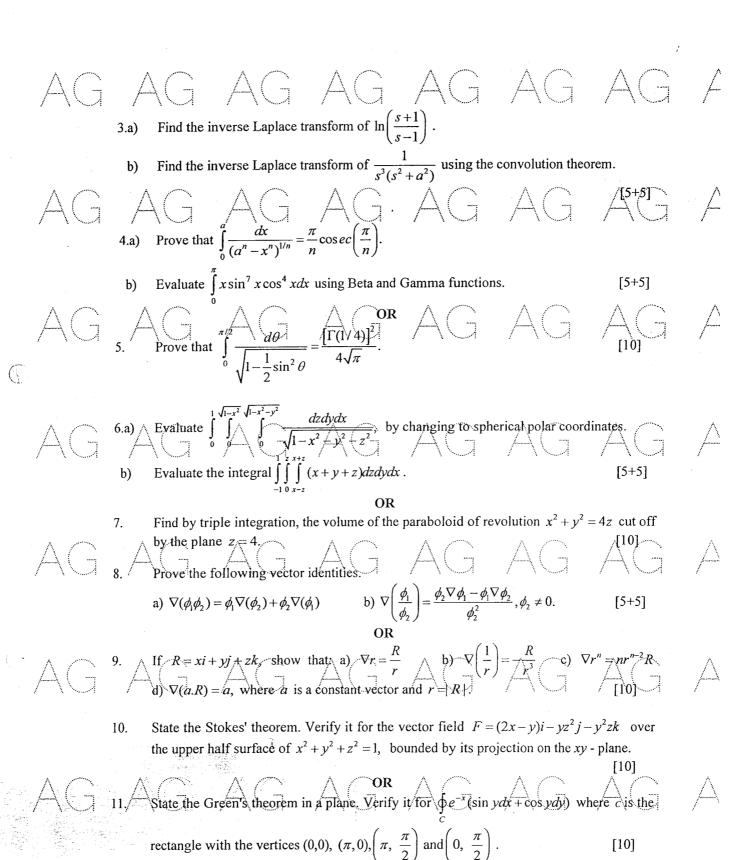


R16 Code No: 131AB JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD B.Tech I Year I Semester Examinations, December - 2017 MATHEMATICS-II (Common to CE, ME, MCT, MMT, AE, MIE, PTM, CEE, MSNT) Note: This question paper contains two parts A and B. Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. question carries 10 marks and may have a, b as sub questions. (25 Marks) Find the Laplace transform of $\cosh^3 2t$. [2] 1.a) Find the Laplace transform of $e^{-3t}(2\cos 5t - 3\sin 5t)$. b) [3] Evaluate the improper integral $\sqrt{x}e^{-x^2}dx$ using Gamma function. Evaluate the improper integral $\int_{0}^{1} \frac{dx}{\sqrt{-\ln x}}$ using Beta and Gamma functions. d) [3] Find the area bounded by the curves $x^2 = y^3$, x = y using double integration. e) [2] Change the order of the integration $\int_{-\infty}^{+\infty} \frac{2y+1}{2x}dxdy$ and evaluate the integral. Find $\nabla \phi$, when $\phi = 3x^2y - y^3z^2$ at the point (1, -2, -1). g) h) Find the directional derivative of the function $f(x, y, z) = 2xy + z^2$ at the point (1, -1, 3)in the direction of the vector i+2j+2k. [3] If $R = t\overline{i} - t^2\overline{j} + (t-1)\overline{k}$ and $S = 2t^2\overline{i} + 6t\overline{k}$, evaluate $\int R.S dt$. i) Evaluate the line integral $\phi(3x^2+8y^2)dx+(4y-6xy)dy$, where C is the boundary of the region $y = \sqrt{x}, y = x$. [3] **PART-B** (50 Marks) Find the Laplace transform of sin \sqrt{t} . Hence find Prove that $\int_{t=0}^{\infty} \int_{u=0}^{t} e^{-t} \left(\frac{\sin u}{u} \right) du dt = \frac{\pi}{4}.$ [5+5]OR







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