

ALAGAPPA UNIVERSTIY STUDY CENTRE TUTICORIN

4TH SEM ASSIGNMENT QUESTION

INTERNAL MARK: 25 / PER SUBJECT

MSC MATHS

31141 GRAPH THEORY

1. State and prove Cayley's theorem.
2. State and prove Vizing's theorem.
3. State and prove five colour theorem.
4. Prove that every connected graph contains a spanning tree ?
5. Prove that $\chi(m,n) = \chi(n,m)$

31142 FUNCTIONAL ANALYSIS

1. State and prove Bessel's inequality.
2. State and prove uniform boundedness theorem.
3. State and prove closed graph theorem.
4. Prove that, U is an isometry if and only if $U^* U = 1$.
5. Let A be a linear transformation on the finite-dimensional space X . Prove that A is completely continuous.

31143 NUMERICAL ANALYSIS

1. Obtain the complex root of the equation $f(z) = z^3 + 1 = 0$ by using Newton-Raphson method
2. Solve the following systems of equations by the decomposition method

$$x_1 + x_2 - x_3 = 2$$

$$2x_1 + 3x_2 + 5x_3 = -3$$

$$3x_1 + 2x_2 - 3x_3 = 6$$

3. Evaluate the integral $I = \int_0^1 \frac{dx}{1+x}$ using Gauss- Legendre three point formula
4. Determine the polynomial of second degree, which is the best approximation in maximum norm to \sqrt{x} on the point set $\{0, \frac{1}{9}, \frac{4}{9}, 1\}$
5. Compute $\int_0^{\frac{\pi}{2}} (\frac{1}{\sin x})^{1/4} dx$ to six decimal places

31144 PROBABILITY AND STATISTICS

1. State and prove the central limit theorem ?
2. Derive the p.d.f of the Beta- distribution with parameters α and β
3. Find the mean and variance of Poisson distribution
4. Prove that (i) $E[E(X_2/X_1)] = E(X_2)$
(ii) $\text{var}[E(X_2/X_1)] \leq \text{var}(X_2)$
5. i) Prove that the probability of the null set is zero
ii) Define independent random variable
iii) Define convergence in distribution
iv) Write down the mean and covariance of the Beta distribution