

- Q.2** a. Show that the function $f(z) = \sqrt{|xy|}$ is not analytic at the origin even though Cauchy-Riemann equations are satisfied thereof.

Answer: Page Number 742 of Text Book I

- Q.3** a. Find Laurent's series expansion of $\frac{z^2 - 1}{z^2 + 5z + 6}$ about $z=0$ in the region $2 < |z| < 3$.

Answer: Page Number 778 of Text Book I

- b. Use Residue theorem to evaluate $\int_C \frac{1-2z}{z(z-1)(z-2)} dz$, $C: |z| = 1.5$

Answer: Page Number 784 of Text Book I

- Q.4** a. If $u = x^2 + y^2 + z^2$ and $V = xI + yJ + zK$, show that $\text{div}(uV) = 5u$

Answer: Page Number 363 of Text Book I

- b. Find the angle between the normals to the surface $xy = z^2$ at the points $(4, 1, 2)$ and $(3, 3, -3)$.

Answer: Page Number 354 of Text Book I

- Q.5** a. Apply Green's theorem to evaluate $\int_C [(3x - 8y^2)dx + (4y - 6xy)dy]$

Where C is the boundary of the region bounded by $x=0$, $y=0$, $x+y=1$

Answer: Page Number 371 of Text Book I

- Q.6** a. Use Newton's divided difference formula to evaluate $f(8)$ given that

X	4	5	7	10	11	13
f(x)	48	100	294	900	1210	2028

Answer: Page Number 1068 of Text Book I

- b. Find an approximate value of $\log_e 5$ by calculating to four decimal places,

by Simpson's $\frac{1}{3}$ rd rule, $\int_0^5 \frac{dx}{4x+5}$ dividing the range into ten equal parts.

Answer: Page Number 1302 of Text Book II

- Q.7** a. Apply Charpit's method to solve $(a^2 + b^2)y = bz$.

Answer: Page Number 644 of Text Book I

- b. Use method of separation of variables to solve $\frac{\partial u}{\partial x} = 4 \frac{\partial u}{\partial y}$, given that

$$u(0, y) = 8e^{-3y}.$$

Answer: Page Number 658 of Text Book I

- Q.8** a. A committee consists of 9 students two of which are from 1st year, three from 2nd year and four from 3rd year. Three students are to be removed at random. What is the chance that
- the three students belong to different classes.
 - two belong to the same class and third to the different class.

Answer: Page Number 940-941 of Text Book I

- b. In a certain college, 4% of the boys and 1% of girls are taller than 1.8m. Moreover 60% of the students are girls. If a student is selected at random and is found to be taller than 1.8m, what is the probability that the student is a girl?

Answer: Page Number 952 of Text Book I

- Q.9** a. Fit a Poisson distribution to the set of observations:

x	0	1	2	3	4
f	122	60	15	2	1

Answer: Page Number 966 of Text Book I

- b. Assuming that the diameters of 1000 brass plugs taken consecutively from a machine, form a normal distribution with mean 0.7515 cm and standard deviation 0.0020 cm, how many of the plugs are likely to be rejected if the approved diameter is 0.752 ± 0.004 cm? (Given: if z is the normal variable, then area under normal curve for $0 \leq z \leq 1.75$ is 0.4599 and for $0 \leq z \leq 2.25$ is 0.4878.)

Answer: Page Number 975 of Text Book I

Text Book

- Higher Engineering Mathematics –Dr. B.S.Grewal, 40th Edition 2007, Khanna Publishers, Delhi.
- A Text book of engineering Mathematics – N.P. Bali and Manish Goyal , 7th Edition 2007, Laxmi Publication(P) Ltd.