are the mean and standard deviation of distribution ?

SECTION – D

8. Fit a Poisson distribution to the following data and test the goodness of fit by Chi square test

x	0	1	2	3	4	5
f	6	13	13	8	4	3

9. Minimize $Z = 2x_1 + 2x_2 + 4x_3$

subject to $2x_1 + 3x_2 + 5x_3 \geq 2$,

$$3x_1 + x_2 + 7x_3 \leq 3,$$

$$x_1 + 4x_2 + 6x_3 \leq 5,$$

$$x_1, x_2, x_3 \geq 0$$

by using dual simplex method.

24022

B. Tech. (Fire Tech. & Safety)

4th Semester

Examination – May, 2017

MATHEMATICS - III

Paper : Math-201-F

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

प्रश्नों के उत्तर देने से पहले परीक्षार्थी यह सुनिश्चित कर लें कि उनको पूर्ण एवं सही प्रश्न-पत्र मिला है। परीक्षा के उपरान्त इस सम्बन्ध में कोई भी शिकायत नहीं सुनी जायेगी।

Note : Attempt *five* questions in total, selecting *one* questions from each Section. Question No. **1** is *compulsory*.

1. (a) Obtain co-efficient a_0 of the Fourier series for $f(x) = |\cos x|$; $-\pi < x < \pi$.

(b) Write C.R. equations in polar form.

(c) Define Residue at a pole,

(d) Write the dual of the LPP :

Maximize $Z = 10x_1 + 13x_2 + 19x_3$,

subject to $6x_1 + 5x_2 + 3x_3 \leq 26$,

$$4x_1 + 2x_2 + 5x_3 \leq 7,$$

$$x_1, x_2, x_3 \geq 0$$

SECTION – A

2. (a) Give an example of full rectified wave form and hence obtain the Fourier series expansion for the same.

(b) Obtain half range cosine series for

$$f(x) = \begin{cases} x & ; 0 < x < \dfrac{\pi}{2} \\[2mm] \pi - x & ; \dfrac{\pi}{2} < x < \pi \end{cases}$$

3. (a) Using Fourier integral representation, show that

$$\int_0^\infty \frac{\cos x\omega}{1 + \omega^2} d\omega = \frac{\pi}{2} e^{-x}, x \geq 0.$$

(b) Find the Fourier sine transform of

$$f(x) = \begin{cases} \sin x, & 0 < x < a \\ 0 & , x > a \end{cases}$$

SECTION – B

4. (a) Determine the analytic function

$$w = u + iv, \quad \text{if } u = e^{-2xy} \sin(x^2 - y^2).$$

(b) Separate into real and imaginary parts

$\log \sin(x + iy)$.

5. (a) Evaluate $\oint_c \dfrac{3z^2 + z}{z^2 - 1} dz$, where c is the circle $|z - 1| = 1$.

(b) Evaluate $\int_c (z - z^2) dz$, where c is the upper half of the circle $|z| = 1$. What is the value of this integral if c is the lower half of above circle ?

SECTION – C

6. (a) Evaluate the integral :

$$\oint_C \frac{z^2}{(z - 1)^2 (z + 2)} dz, \text{where } c \; ; |z| = \frac{5}{2} \text{ by residue}$$

theorem.

(b) Evaluate $\displaystyle\int_0^\pi \frac{d\theta}{a + b\cos\theta}$, where $a > |b|$.

7. (a) A factory has two machines A and B. Past record shows that machine A produced 60% of the items of output and machine B produced 40% of the items. Further, 2% of the items produced by machine A were defective and 1% produced by machine B were defective. If a defective item is drawn at random, what is the probability that it was produced by machine A ?

(a) In a distribution, exactly normal 9.85% of the items are under 40 and 89.97% are under 60. What