

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)
BSc DEGREE EXAMINATION DECEMBER 2018
 (Second Semester)
 Branch - E ELECTRONICS
MATHEMATICS-II

Time : Three Hours

Maximum : 75 Marks

SECTION-A (20 Marks)Answer **ALL** questions**ALL** questions carry **EQUAL** marks (10x2 = 20)

- 1 Use the Binomial theorem find the 7th power of 11 .
 Sum of nth term of the series is,
 (i) $1^2 4 - 2^{2^j} - 3^2 + \dots + n^2 = \dots$
 (ii) $1^3 + 2^3 + 3^3 \dots + n^3 = \dots$
- 2 Write down the Dirichlet conditions.
- 3 Define Even function with example.
- 4 Define finite fourier transform.
- 5 State the convolution theorem.
- 6 Solve $(D^2 - 2D + 1) y = rc$.
- 7 Prove that $\dots = 4\%$.
- 8 What are the direct methods?
- 9 What is the error of trapezoidal & Simpson's one - third rule?

SECTION - B (25 Marks)Answer **ALL** Questions**ALL** Questions Carry **EQUAL** Marks (5x5= 25)

- 11 a Resolve into partial fractions $\frac{2x + 1}{(x-1)(x^2+1)}$
- OR
- b Expand $(a^j - 2a^2 x)^{1/3}$ in ascending power of x.
- 12 a Derive the Fourier series of $f(x) = K$, where K is a constant, the periodicity being $2n$.
- OR
- Find the half range Fourier cosine series for $f(x) = x$, in $0 < x < TC$.
- 13 a Using parsevars identity prove $\int_0^T \left(\frac{\sin t}{t} \right)^2 dt = \frac{\pi}{2}$.
- OR
- b Evaluate $\int_0^{\infty} \frac{dx}{(a^2 + x^2)(b^2 + x^2)}$ using transform methods.
- 14 a Solve $(D - 4D + 4) v = x^2 e^{iX}$.
- OR
- b prove that $P(m,n) = \frac{T_m T_n}{F_m + n}$
- 15 a Solve the system of equations by Gauss Jordan method.
 $x + 2y + z = 3, 2x + 3y + 3z = 10, 3x - y + 2z = 13$.

OR

Evaluate $I = \int_0^6 \frac{dx}{1+x}$ using Simpson's rule (both).

SECTION - C (30 Marks)Answer any **THREE** Questions**ALL** Questions Carry **EQUAL** Marks (3 x 10 = 30)

16 Prove that the infinite series

$$1 - \frac{3^1}{2!} + \frac{4^1}{3!} - \frac{5^1}{4!} + \dots = \frac{1+e}{e}$$

17 Expand $f(x)=x$, when $-7t < x < 7t$ in a Fourier series of periodicity 2π then deduce that

$$\frac{1}{2^2} - \frac{1}{3^2} + \frac{1}{4^2} - \frac{1}{5^2} + \dots = \frac{7}{6}$$

$$(ii) \frac{1}{2^2} - \frac{1}{3^2} + \frac{1}{4^2} - \frac{1}{5^2} + \dots = \frac{7}{6}$$

$$(iii) \frac{1}{1^2} - \frac{1}{3^2} + \frac{1}{5^2} - \dots = \frac{\pi^2}{8}$$

18 Find the fourier cosine transform of e^{-x} 19 Solve $(D^2+4)y = e^x \sin 2x + \cos 2x$.20 Solve the following system by Gauss seidal method.
 $10x - 5y - 2z = 3, 4x - 10y + 3z = -3, x + 6y + 10z = -3.$

Z-Z-Z

END