J B Institute of Technology

Dehradun

First Internal (EVEN Semester) Exam 2021-22
Time: 2 :00 Hrs *M. Marks: 50*
Branch: B.Tech (EE ,ME,CE CS, EC) SemesterII

Subject with code:mathematics II (TME-201)

Note: All questions are compulsory.

Q.1 Attempt any Fivequestions. 5*4=20

Q.A Solve $(D^2 + 4D + 8) y = \sin 2x$

Q. B Solve $(y'' - 4y' + 4y) = e^{-2x} \sin x \sin 3x$.

Q.C - Solve $x^2 y'' - xy' + y = \log x$

Q.D - Solve $(y'' - 4y' + 8) = 8x^2 e^{2x} \sin 2x$.

Q.E -Find the fourier series $f(x) = x^2$ for $-\pi$ to π.

Q.F Find the fourier series $f(x) = x \sin x$ for $-\pi$ to π.show that

$$\pi^2/8 = \frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \ldots\ldots\ldots\ldots$$

Q.2 Attempt any TWO questions. 5*2=10

Q.a- Find the fouire series $f(x) = x + x^2$ for $-\pi$ to π then show that $\frac{\pi^2}{6} = 1 + \frac{1}{4} + \frac{1}{9} + \cdot$

Q.b. Solve the partials differentials equation $(D^2 - 3DD' + 2D'^2)Z = e^{x+y} + \cos(x + 2y)$

Q.c. Solve the partials differentials equation $(D^2 - DD' - 2D'^2)Z = (y-1)e^x$

Q.3 Attempt any five questions. 5*2=10

Q.aSolve(D2 + 16) y = Cos 4x + e2x x3 where D = d/dx

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Q. B Solve by simultaneouseq.

$dx/dt + dy/dt - 2y = 2\cos t - 7\sin t$

$dx/dt - dy/dt + 2x = 4\cos t - 3\sin t$

Q.C Solve by méthode of variation of parameters

. $y'' + 4y = 4 \tan 2x$.

Q.4 Attempt any TWO questions. 5*2=10

A. Show that the function $u(x,y) = 4xy - 3x + 2$ harmonic. Construct the corresponding anal functionf$(z) = u(x,y) + iv(x,y)$. Express f(z) in terms of complex variable z.

Q.B - Find half range cosine series of $f(x) = \sin x$ in $0 \le x \le \pi$.

Q. C Solve r + s − 6t = y six.

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