FY - Engg All first year all: FE-B.Tech. All

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Mid Semester Examination – March 2019

Course: - : First Year B. Tech(Group- A and B) | **Sem: II**

Subject Name: Engineering Mathematics -II | **Subject Code: BTBS 201**

Max Marks: 20 | **Date:- 11/03/2019**

Duration:- 1 Hr.

Instructions to the students:

1. **All questions are compulsory.**
2. **Use of non-programmable calculator is allowed.**
3. **Figures to the right indicate full marks.**

(Level/CO) Marks

Q. 1 Attempt the following Questions **1*6=6**

1.The polar form the complex number z =1 is /CO1

a) $(\cos 0 + i\, sin0)$ b) $(\cos \pi + i\, sin\pi)$

c) $\sqrt{2}(\cos 0 + i\, sin0)$ d) $(\cos\frac{\pi}{2} + i\, sin\frac{\pi}{2})$

2. *The complex number* $z = -1 + 3i$ *lies in* $- - -$ /CO1

a) *First quadrant* b) *Second quadrant*

c) *Third quadrant* d) *Fourth quadrant*

3.*The circular function sinx is equal* $- - - -$ /CO1

a) $\frac{e^{ix}+e^{-ix}}{2i}$ b) $\frac{e^{ix}-e^{-ix}}{2i}$ c) $\frac{e^{ix}+e^{-ix}}{2}$ d) $\frac{e^{ix}-e^{-ix}}{2}$

4. The necessary condition for the differential equation M(x,y) dx + N(x,y) dy =0 to be exact is /CO2

a) $\frac{\partial N}{\partial y} = \frac{\partial N}{\partial x}$ b) $\frac{\partial M}{\partial y} = \frac{\partial M}{\partial x}$ c) $\frac{\partial M}{\partial y} = \frac{\partial N}{\partial x}$ d) $\frac{\partial M}{\partial x} = \frac{\partial N}{\partial y}$

5.*The differential equation of an electric circuit containing an inductance L, r Voltage E, the current i* is given by _____ /CO2

a) $L\frac{di}{dt} + Ri = E$ b) $L\frac{di}{dt} - Ri = E$

c) $L\frac{di}{dt} + Ri = -E$ d) $\frac{di}{dt} + \frac{R}{L}i = E$

6.The differential equation of family of curves xy= k^2 is ------ /CO2

a) $x\frac{dy}{dx} + y = 0$ b) $y\frac{dx}{dy} + x = 0$ c) $-x\frac{dy}{dx} + y = 0$ d) $-y\frac{dx}{dy} + x = 0$

upto 13th Morning

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2*3=6

Q.2 Attempt any TWO of the following:

(A) Prove that $(x+iy)^{\frac{m}{n}} + (x-iy)^{\frac{m}{n}} = 2\sqrt{x^2+y^2}^{\frac{m}{n}} \cos\left(\frac{m}{n} tan^{-1}\frac{y}{x}\right)$ — Moderate/ CO1

(B) Solve $\frac{dy}{dx} = -\frac{(y.cosx + siny + y)}{(sinx + x.cosy + x)}$ — Moderate/ CO2

(C) Prove that $cos\left[i\, log\frac{a-ib}{a+ib}\right] = \frac{a^2-b^2}{a^2+b^2}$ — Easy/ CO1

2*4=8

Q. 3 Attempt the following

(A) *If z_1 and z_2 are two complex numbers such that $|z_1 + z_2| = |z_1 - z_2|$. Prove the difference of their amplitudes is $\frac{\pi}{2}$.* — Moderate /CO1

(B) A resistance of 100 ohms and inductance of 0.1 henries are connected in series with a battery of 20 volts. Find the current in the circuit at any time t , if the relation between L,R and E is $L\frac{di}{dt} + Ri = E$ — Difficult CO2

OR

2*4=8

Q. 3 Attempt the following

(A) Solve $x^{10} + 11x^5 + 10 = 0$ — Difficult /CO1

(B) Solve $\frac{dy}{dx} - y\, tanx = y^4 secx$ — Moderate /CO2

***** End *****

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