FE-B.Tech. All

FY - Engg All First year 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) $(\cos 0 + i\sin 0)$ b) $(\cos\pi + i\sin\pi)$

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

2. *The complex number* $z = -1 + 3i$ *lies in* – – – /C O1

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 _____ /C O2

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

			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 $\lvert z_1 + z_2 \rvert = \lvert z_1 - z_2 \rvert$. 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	2*4=8
	OR		
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 ***