DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY,

LONERE – RAIGAD -402 103

Mid Semester Examination – Summer - 2018

Branch: F.Y. B. Tech (Group A/Group B) **Sem.:- II**

Subject with Subject Code:- Engineering Mathematics –II (MATH 201)

Marks: 20

Date:-12/03/2018 **Time:- 1 Hr.**

Instructions:- 1. All Questions are Compulsory.
2. Use of Non-programmable calculator is allowed.
3. Figures to the right indicate full marks.

(Marks)

Q.No.1 Attempt the following **(06)**

a) The real part of $\frac{2+3i}{3-4i}$ is,

i) $\frac{-6}{25}$ ii) $\frac{6}{25}$ iii) $\frac{17}{18}$ iv) None

b) If z_1 and z_2 are any two complex numbers such that $z = z_1 z_2$ then $|z| =$ -----

i) $|z_1||z_2|$ ii) $\frac{|z_1|}{|z_2|}$ iii) $|z_1| = |z_2|$ iv) $|z_1| + |z_2|$

c) Integrating factor of differential equation $\frac{dx}{dy} + \frac{3x}{y} = \frac{1}{y^2}$ is -------

i) e^{y^3} ii) y^3 iii) x^3 iv) None

d) The condition of exact differential equation is ---------

i) $\frac{dM}{dy} = \frac{dN}{dx}$ ii) $\frac{\partial M}{\partial y} = \frac{\partial N}{\partial x}$ iii) $\frac{\partial M}{\partial x} = \frac{\partial N}{\partial y}$ iv) $\frac{dM}{dx} = \frac{dN}{dy}$

e) The solution of differential $(D^2 - 8D + 16)y = 0$ is ----------

i) $c_1 e^{4x} + c_2 e^{4x}$ ii) $c_1 e^{-4x} + c_2 e^{4x}$ iii) $(c_1 + c_2 x)e^{4x}$ iv) $c_1 \cos 4x + c_2 \sin 4x$

f) The particular integral of linear differential equation $(D-1)^3 y = 2^x$ is -------

i) $(\log 2 - 1)^3$ ii) $(-1)^3 2^x$ iii) 2^x iv) $\frac{2^x}{(\log 2 - 1)^3}$

Q. No. 2 Attempt any one of the following: **(06)**

a) Using De-Moiver's theorem Prove that,

$$\frac{\sin 6\theta}{\sin 2\theta} = 16\cos^4\theta - 16\cos^2\theta + 3$$

b) A coil having resistance of R, inductance L, and battery E are connected in series , Prove that $i = \frac{E}{R}(1 - e^{\frac{-R}{L}t})$ and if $R = 20\Omega, L = 10H$ and $E = 100V$ then find current after two seconds.

Q. No 3. Attempt any two of the following **(08)**

a) Solve: $\frac{d^2y}{dx^2} + 5\frac{dy}{dx} + 6y = e^{-2x}\sin 2x$.

b) Solve: $(2x+1)^2\frac{d^2y}{dx^2} - 6(2x+1)\frac{dy}{dx} + 16y = 8(2x+1)^2$.

c) If $\sin(\theta + i\phi) = \cos\alpha + i\sin\alpha$ then prove that $\cos^2\theta = \pm\sin\alpha$.

d) Solve: $\frac{dy}{dx} + y\tan x = y^3\sec x$.