Hall Ticket Number :										

R-13

Code: 1GC41

II B.Tech. II Semester Supplementary Examinations March 2021

Mathematics – III

(Common to EEE & ECE)

Max. Marks: 70 Time: 3 Hours

Answer *any* **five** questions

All Questions carry equal Marks (**14 Marks** each)

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1. a) Evaluate $\int_0^{\pi/2} \sqrt{\tan\theta}\, d\theta$. 7M

   b) Prove that $\Gamma(m,1/2) = 2^{2m-1}\ \beta(m,m)$. 7M

2. If $w = \phi + i\psi$ represents the complex potential function for an electric field and $\psi = x^2 - y^2 + \frac{x}{x^2+y^2}$ determine the function ϕ 14M

3. a) If cosh(u+iv)=x+iy then prove that $\frac{x^2}{\cosh^2 u} + \frac{y^2}{\sinh^2 u} = 1$ *and* $\frac{x^2}{\cos^2 v} - \frac{y^2}{\sin^2 v} = 1$. 7M

   b) Find all the roots of the equation tanhz+2=0. 7M

4. *Integrate* $f(z) = x^2 + ixy$ from A(1,1) to B(2,8) along the curve C given by $x = t,\ y = t^3$ 14M

5. a) Find the Taylor's expansion of $f(z) = \frac{1}{(z+1)^2}$ about the point z=-i. 7M

   b) Expand $f(z) = \frac{1}{(z-1)(z-2)}$ in the regions (i)$|z| < 1$,(ii) $1 < |z| < 2$. 7M

6. Using Residue Theorem, Evaluate $\int_{-\infty}^{\infty} \frac{x^2}{(x^2+1)(x^2+4)}\, dx$ 14M

7. a) State and prove Rouche's theorem. 7M

   b) Prove that the polynomial $z^5 + z^3 + 2z + 3$ has just one zero in the first quadrant of the complex plane. 7M

8. Find a bilinear transformation which maps the point's $z = 1, i, -1$ onto the points $w = 0, 1, \infty$. 14M

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Hall Ticket Number :										

R-13

Code: 1G343

II B.Tech. II Semester Supplementary Examinations March 2021

Pulse and Digital Circuits

(Electrical and Electronics Engineering)

Max. Marks: 70 Time: 3 Hours

Answer any **five** questions

All Questions carry equal marks (**14 Marks** each)

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1. a) Determine the upper 3-dB frequency for low pass RC circuit, if a pulse of 0.5μsec is required to pass without distortion. Find the value of resistance if the capacitor is 0.001μF.
   b) List out the applications of attenuator. What is the role of attenuator in CRO probes?

2. a) Write about a positive clamper.
   b) With neat diagram and derivation explain the working of a clipping circuit at two independent levels.

3. Obtain the relation between junction temperature and reverse saturation current and give details.

4. Design a Schmitt trigger circuit to have UTP = 6 V, LTP = 3 V using silicon transistors whose hFE(min) = 30, and IC(on) = 4mA. Assume necessary data.

5. The specifications of UJT are given as η =0.6, Vv = 2 V, RBB = 5 kΩ, Iv = 1.5 mA, IP=8 μA and VBB = 18 V. Calculate the component values of the UJT sweep circuit to generate an output sweep frequency of 10 kHz with sweep amplitude of 12 V.

6. With the help of the diagram, explain the working principle of a bidirectional diode sampling gate?

7. Draw and explain the block diagram of frequency divider without phase jitter.

8. a) List out the few comparisons of TTL, RTL and CML logic families
   b) Explain the concept of Fan-in and Fan-out.

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