Hall Ticket Number :										

R-17

Code: 7GC43

II B.Tech. II Semester Supplementary Examinations November 2023

Complex Variables & Special Functions

(Common to EEE &ECE)

Max. Marks: 70 Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)

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UNIT–I

1. a) Symmetry of Beta function B(m, n)=B(n, m) 7M

   b) Evaluate $\int_0^1 \frac{x^2}{\sqrt{1-x^5}}dx$ in terms of B function 7M

OR

2. Prove that $\int_0^{\frac{\pi}{2}} \sin^{2\theta}\cos^{4\theta}\,d\theta = \frac{\pi}{32}$ 14M

UNIT–II

3. Determine P such that the function $f(z)=\frac{1}{2}\log(x^2+y^2)+i\,Tan^{-1}\left(\frac{px}{y}\right)$ be an analytic function 14M

OR

4. Prove that z^n (n is a positive integer) is analytic and hence find its derivative. 14M

UNIT–III

5. Expand $Log\,z$ by Taylor's series about z=1. 14M

OR

6. Evaluate $\int_{(0,0)}^{(1,1)} (3x+4xy+ix^2)dz$ along $y=x^2$ 14M

UNIT–IV

7. Find the poles of the function $\frac{z+1}{z^2(z-2)}$ and Residues at the poles 14M

OR

8. Evaluate $\oint_c \frac{4-3z}{z(z-1)(z-2)}dz$ where c is the circle $|z|=\frac{3}{2}$ using Residue theorem. 14M

UNIT–V

9. Under the Transformation $w=\frac{1}{z}$ find the image of the circle $|z-2i|=2$ 14M

OR

10. Show that the function $w=\frac{4}{z}$ transforms the straight line x=c in the z-plane into a circle in the w-plane. 14M

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Hall Ticket Number :										

R-17

Code: 7G244

II B.Tech. II Semester Supplementary Examinations November 2023

Electrical Circuits – II

(Electrical and Electronics Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)

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UNIT–I

1. a) Prove $I_L=\sqrt{3}\, I_{ph}$ for 3-Φ, balanced, Δ- connected system. 7M

   b) Illustrate the readings of two wattmeter's on a 3-wire, 240V system with balanced star connected load of $10\angle 30^0\ \Omega$. 7M

OR

2. a) A three phase balanced system supplies 230V to a delta connected load whose phase impedances are equal to (3.54+j3.54) Ω. Determine the line current and draw the phasor diagram 7M

   b) An induction motor draws a three phase power. Two wattmeter measurement is applied to find total power. If W_1= 10KW and W_2= 5KW determine the total active power, reactive power and power factor. 7M

UNIT–II

3. a) State and Prove Initial value theorem and Final value theorem. 7M

   b) Determine the Laplace transform of the following functions
   i) f (t) = $(4t^3+t^2-6t+7)$ ii) $e^{-4t}\sin 5t$ 7M

OR

4. Formulate the step response of series RLC Circuit using Laplace Transform. 14M

UNIT–III

5. Derive the expression for current response of RL series circuit with a DC excitation. 14M

OR

6. Derive the expression for current response of RC series circuit with a sinusoidal excitation. 14M

UNIT–IV

7. a) Discuss properties of Fourier transforms. 7M

   b) Explain the evaluation of trigonometric Fourier coefficients 7M

OR

8. a) Determine Fourier transform of Gaussian function. 7M

   b) Determine the exponential Fourier series for the half wave rectifier sine wave 7M

UNIT–V

9. a) Test the function $H(s) = 4s^6 + 2s^5 + 17s^4 + 8s^3 + 16s^2 + 6s + 3$ is Hurwitz or not 7M

   b) Explain the necessary conditions for a transfer function 7M

OR

10. Test the positive realness of the following function

$$F(S) = \frac{(S^2 + 2S + 36)}{(S^2 + 3S + 49)}$$

14M

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Hall Ticket Number :										

R-17

Code: 7G345

II B.Tech. II Semester Supplementary Examinations November 2023

Analog Electronics–II

(Electrical and Electronics Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)

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UNIT–I

1. a) With a neat circuit diagram explain basic operational amplifier circuit 6M
   b) Describe the internal block diagram of an Op-amp and explain each block in detail 8M

OR

2. a) Derive the gain of non inverting amplifier 7M
   b) Design an non inverting Op Amp with gain 120. 7M

UNIT–II

3. a) Illustrate the operation of inverting summer circuit using IC 741. 7M
   b) Illustrate the operation of Subtractor circuit using IC 741. 7M

OR

4. a) Discuss the operation of Adder-Subtractor using Op-Amp. 7M
   b) Consider the lossy integrator with components R_1=10 KΩ, R_F=100 KΩ, C_F=10nF. Determine the lower frequency limit of integrator. 7M

UNIT–III

5. a) Explain the operation of Precision Half-wave Rectifier. 7M
   b) Discuss the operation of Log Amplifier. 7M

OR

6. a) Design a triangular wave generator using comparator and integrator to oscillate at 4KHz and peak to peak voltage of 7V. Use the Op-Amp with $\pm$15V power supply and make necessary assumptions. 6M
   b) Explain how astable multivibrator can be used as Square wave generator. 8M

UNIT–IV

7. a) Draw the pin diagram of IC 555 and list out its applications 6M
   b) Explain the basic principle of operation using block schematic of a PLL. 8M

OR

8. a) Discuss how PLL can be used as frequency translator. 7M
   b) How a monostable multivibrator can be used as missing pulse detector? Explain. 7M

UNIT–V

9. a) With help of neat diagram explain the operation of counter type ADC. 7M
   b) Illustrate the operation of weighted resistor DAC. 7M

OR

10. a) What are the advantages of SAR ADC? Explain its operation 7M
    b) Construct the Inverted R-2R DAC and explain in detail 7M

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