Hall Ticket Number :										

R-11 / R-13

Code: 1G241

II B.Tech. II Semester Supplementary Examinations December 2017

Electrical Machines-II

(Electrical & 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) With neat vector diagram explain the operation of a single phase transformer under loaded conditions. 6M

   b) A 25 KVA, 440/110 V, 50 Hz. single phase step down transformer is designed to work with 1.5 V per turn with a flex destiny not exceeding 1.5 Tesla. Determine

   (i) The required number of turns on the primary and secondary windings respectively (ii) The cross sectional area of the core and (iii) The secondary current 8M

2. a) What is Voltage Regulation in a transformer? Derive an expression for the voltage regulation in terms of the transformer parameters under lagging load condition with the help of vector diagram. 7M

   b) A single phase; 6000/600 V transformer has primary and secondary resistances of 0.25 and 0.018 Ω respectively. If iron loss of the transformer is 200 w, calculate the secondary current at which maximum efficiency occurs. Also calculate the maximum efficiency at 0.9 p.f lagging. 7M

3. a) With a neat circuit diagram explain how Sumpner's test is conducted on a pair of identical transformers to find the performance. 6M

   b) Two 200 KVA single phase transformers are to be operated in parallel. The internal impedance of transformer 1 is (0.006+J0.08) p.u while transformer 2 has an internal impedance of (0.008+j 0.05) p.u. How will they share a load of 300 kw at 0.8 lagging power factor? 8M

4. a) With a neat diagram explain the working of SCOTT connection in transformers. 7M

   b) What is the importance of tap changing in transformers? Explain ON LOAD tap changing with relevant diagrams. 7M

5. a) Derive an expression for the torque developed in a three phase induction motor under running condition. 6M

   b) An 8-pole, 50 Hz.; 3-phase induction motor has rotor input of 100 kw on full load. The rotor e.m.f makes 120 cycles per minute. Determine (i) Rotor speed in RPM (ii) Rotor cu loss (iii) Mechanical power developed by and (iv) Rotor resistance per phase if rotor current is 80 A per phase. 8M

6. The following test results refer to a 3-phase, 20 HP, 440 V, delta connected, 50 Hz; 4-pole induction motor.

   Running light test: 440 V; 10 A (line); 1.5 Kw (input)

   Locked rotor test : 120 V; 30 A (line); 2.25 Kw (input)

   Draw the circle diagram of this induction motor and determine therefrom

   (i) Full load current and power factor

   (ii) Maximum possible power out put

   (iii) The best possible operating power factor 14M

7. a) Explain the working of a Y – Δ starter used in induction motor with neat diagram. 7M

   b) Discuss different methods of speed control of 3-phase squirrel cage induction motor. 7M

8 Write short notes on

   a) Auto Transformers 5M

   b) Cogging and Crawling in 3-phase induction motors 4M

   c) Induction Generator 5M

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Hall Ticket Number :										

R-11 / R-13

Code: 1GC41

II B.Tech. II Semester Supplementary Examinations December 2017

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) Prove that $(2n+1)P_n(x) = P'_{n+1}(x) - P'_{n-1}(x)$ 7M

   b) Show that $\int_{-1}^{1} P_m(x).P_n(x)\,dx = 0,\ if\ \ m \neq n$ 7M

2. a) Show that the function $f(z) = \sqrt{|xy|}$ is not analytic at the origin although the Cauchy Riemann equations are satisfied at the origin. 6M

   b) Find the analytic function whose imaginary part is $f(x,y) = x^3y - xy^3 + xy + x + y$ Where $z = x + iy$. 8M

3. a) Separate the real and imaginary parts of $\cosh(x+iy)$ 6M

   b) Find the general value of i^i 8M

4. a) Evaluate $\int_c (x+y)\,dx + x^2y\,dy$ from (0, 0) to (3, 9) along $x^2 = y$ 6M

   b) Use Cauchy's Integral Formula to evaluate $\int_c \frac{\sin^2 z}{\left(z - \frac{®}{6}\right)^3}\,dz$, Where C is unit circle. 8M

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

   b) State and prove Laurent's theorem. 7M

6. a) Prove by calculus of residues $\int_0^\infty \frac{\cos px}{\left(x^2+b^2\right)} = \frac{®}{2b}e^{-bp}$ 7M

   b) Evaluate by contour integration $\int_0^{2®} \frac{d¯}{5+4\cos¯}$ 7M

7. a) Use Rouche's theorem the prove that all the roots of $z^7 - 5z^3 + 12 = 0$ lie between the circles $|z| = 1\ and\ |z| = 2$ 8M

   b) State and prove the fundamental theorem of algebra. 6M

8. a) Define bilinear transformation. Find the bilinear transformation that maps the points $z = 2, i, -2$ into the points $w = 1, i, -1$ respectively 7M

   b) Find the image of $|z - 2i| = 2$ under the mapping $w = \frac{1}{z}$ 7M

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Hall Ticket Number :										

R-11 / R-13

Code: 1G343

II B.Tech. II Semester Supplementary Examinations December 2017

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) Describe the response of a Low-Pass RC circuit for Step input with necessary equations and waveforms. 7M

   b) Obtain the response of a High-Pass RC circuit for Square input and then derive the expression for % Tilt. 7M

2. a) Give the circuits of Positive and Negative types of shunt clippers and explain their operation with the help of their transfer characteristics. 7M

   b) Design the positive and negative peak clamper circuits and then explain its operation with the help of input and output waveforms. 7M

3. a) Explain how a transistor can be used as a switch. Also explain various transistor switching times. 7M

   b) Explain how diode acts as switch? Define diode forward recovery time and reverse recovery time. 7M

4. a) What is a monostable multivibrator? Explain with the help of a neat circuit diagram the principle of operation of a monostable multivibrator. Draw the waveforms at collector and Bases of both transistors. 7M

   b) Explain the operation of Schmitt trigger with the help of circuit diagram and waveforms. Also define UTP and LTP. 7M

5. a) Draw the circuit diagram of transistor Miller time base generator and explain its working. 7M

   b) Distinguish between voltage and current sweep circuits. Draw the circuit of a linear current sweep and explain its operation with the help of waveforms. 7M

6. a) What is sampling gate? Draw the circuit diagram of unidirectional diode sampling gate and explain its operation. 7M

   b) Explain the operation of a six - diode sampling gate with necessary equations. 7M

7. a) Define synchronization. What is one-to-one basis synchronization? What is phase delay and phase jitter? 7M

   b) Describe frequency division employing a transistor monostbale multivibrator with the help of circuit diagram and waveforms. 7M

8. a) Realize 2-input AND gate using CMOS logic and explain its operation with the help of functional table. 7M

   b) Design a 2-input NOR DTL gate and then verify its truth table. 7M

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