

Code No: R09222103

R09

SET-1

B.Tech II Year - II Semester Examinations, April-May, 2012
ELECTRICAL AND ELECTRONIC ENGINEERING
(Aeronautical Engineering)

Time: 3 hours

Max. Marks: 75

Answer any five questions
All questions carry equal marks

- - -

- 1.a) Differentiate between voltage and current source.
- b) Explain nodal voltage method of circuit analysis. When should this method be preferred over loop current method? [5+10]
- 2.a) Derive the emf equation of a dc machine.
- b) A 4 pole lap wound 400V dc generator has 600 armature conductors. Its speed is 400 rpm. Find the flux per pole. [10+5]
3. Enumerate the losses in a transformer. Define efficiency. Derive the condition for maximum efficiency. [15]
- 4.a) What is a synchronous generator? Why should it operate at synchronous speed?
- b) A 3- phase, 50 Hz, 6 pole, star connected synchronous generator has 972 conductors distributed in 54 slots. The coils are short pitched by 1 slot. The flux per pole is 0.01 Wb. Calculate line voltage on no load. [5+10]
5. Explain the torques needed for proper operation of measuring instruments. [15]
6. What is a p-n junction diode? Discuss its operation. Give its symbol. [15]
7. Discuss the characteristics of SCR. List out its applications. [15]
8. State the main applications of CRO. Explain each of them briefly. [15]

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- 1.a) State and explain Kirchhoff's laws.
- b) Explain loop current method of circuit analysis using a typical example. [8+7]
- 2.a) Derive the torque equation of a dc machine.
- b) A 4 pole lap wound dc machine has 628 armature conductors. The flux per pole is 0.04 Wb. The total armature current is 110 A. Find the torque developed. [8+7]
- 3.a) Derive an equation for emf induced in the windings of a transformer.
- b) Define voltage regulation of a transformer. [11+4]
- 4.a) Explain the concept of slip.
- b) A 3-phase, 6 pole, 50 Hz cage motor is running with a slip of 4%. Find
 - i) Motor speed
 - ii) Frequency of emf induced in the rotor. [5+10]
5. Discuss the principle, construction and working of a moving coil instrument with the help of a neat diagram. [15]
- 6.a) When is a p-n junction said to be
 - i) Forward biased
 - ii) Reverse biased
- b) Mention the applications of a diode. [10+5]
7. Illustrate the different modes of a transistor by drawing the circuit diagrams for an N-P-N transistor. [15]
8. Explain how an electron beam is deflected by a voltage applied to the deflection plates. [15]

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SET-3

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Answer any five questions
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- - -

- 1.a) How can a delta circuit be converted into a star circuit?
- b) Three star connected resistances are 3.21 K Ω , 2.14 K Ω and 4.72 K Ω . Find the values of equivalent delta resistances. [8+7]
- 2.a) Explain the words back emf and counter torque.
- b) A 4 pole dc generator has 480 armature conductors. The useful flux per pole is 0.05 Wb and speed is 1000 rpm. Find induced emf if the armature is wave wound. [8+7]
- 3.a) Explain the principle of operation of a transformer.
- b) A 1-phase two winding 50 Hz transformer has 400 and 1000 turns in the primary and secondary winding. The active area of the core is $6 \times 10^{-3} \text{ m}^2$. The primary is excited at 500 V. Find secondary induced emf. [8+7]
4. Define voltage regulation of an alternator. Explain how it can be calculated by synchronous impedance method. [15]
5. What is a repulsion type moving iron instrument? Discuss its construction, advantages and disadvantages. [15]
6. Draw and explain the circuit diagram of a half wave rectifier. [15]
7. Illustrate the different modes of operation a transistor by drawing the circuit diagrams for a P-N-P transistor. [15]
8. Sketch a CRT with electric focusing and deflection system. What are its main parts? [15]

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SET-4

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Max. Marks: 75

Answer any five questions
All questions carry equal marks

- - -

- 1.a) How can a star circuit be converted into a delta circuit?
- b) Three resistances of 100 Ω , 200 Ω and 300 Ω form a star circuit. Find the values of resistances of delta circuit. [8+7]
2. Explain the types of dc motors. [15]
- 3.a) Define transformation ratio of a transformer.
- b) A 60 Hz single phase two winding transformer is rated at 220/110 V. If the maximum core flux is 4.13×10^{-3} Wb, find the number of turns in primary and secondary. [5+10]
- 4.a) Explain the operation of three phase induction motor.
- b) A 6 pole, three phase, 50 Hz induction motor has a frequency of rotor currents of 2.4 Hz. Find i) slip ii) motor speed. [7+8]
5. Explain the construction, advantages and disadvantages of moving iron instruments. [15]
6. Draw and explain the circuit diagram of a full wave rectifier. [15]
7. Discuss how a transistor can be used as a current amplifier? [15]
8. What are the main parts of CRT? Discuss the function of each part. [15]
