University Of Sargodha

BS 1st Semester Examination 2018

Subject: I.T Course: Basic Electronics (Phy: 2210)

Time allowed: 2.30 hours Maximum Marks: 80

Objective Part (Compulsory)

Q.1 Attempt all questions. Each question has equal marks (2x16=32)

(i) Why cells are connected in series and parallel combination?
(ii) Define silicon controlled rectifier?
(iii) Define transistor. How it is biased for normal operation?
(iv) Define proportional current formula for a parallel circuit?
(v) What is behaviour of semiconductor at 0K?
(vi) What is net charge on P-type and N-type material?
(vii) What is difficulty in testing weather tungsten filament lamp obeys ohm law or not?
(viii) In a semiconductor material why electrons are more mobile than holes?
(ix) What is the resistance of a resistor having yellow, violet, orange and silver bands respectively?
(x) Differentiate between step up and step down transformer.
(xi) What is the effect of temperature on resistance of a resistor?
(xii) Draw symbols for a PNP and NPN transistor.
(xiii) What is a rheostat? Give its common use.
(xiv) Differentiate between regulated and unregulated power supply?
(xv) Define permeability of a magnetic material?
(xvi) How optical fiber communication is different from electronic communication?

Subjective Part: (12x4=48)

Attempt any four questions. All questions carry equal marks.

Q.2 (a) Define capacitor and its capacitance. Discuss the factors controlling the capacitance of a Capacitor. (6)

(b) Discuss behaviour of capacitor when connected in parallel. (6)

Q.3 (a) What is a transformer? Give its principle and types on the basis of construction. (6)

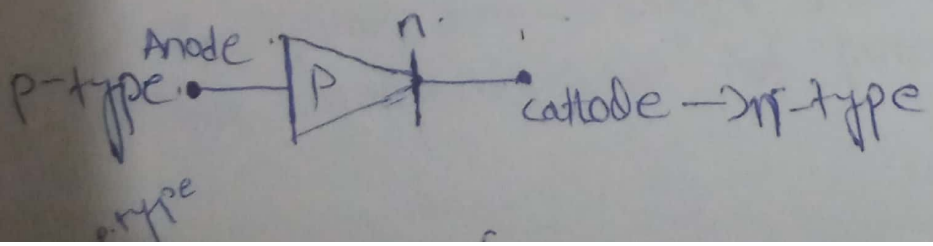
(b) A power transformer has 100 primary turns and 600 secondary turns. If primary voltage is 120volt and full load primary current is 12 Amp, find

i) secondary voltage V2
ii) Secondary Current I2 (2+2)

(c) Write down ideal transformer equation. (2)

Q.4 (a) What is Breakdown voltage? Explain Zener breakdown and avalanche breakdown mechanism. (6)

(b) Discuss P-N junction diode in forward and reverse biasing. (6)



Q.5 (a) Distinguish between conductors, insulators, and semiconductors on the basis of band theory of solids. (6)

(b) Define series circuit. Explain few characteristics of series circuit of resistance. (6)

Q.6 (a) What is a solar cell? Give construction and working of solar cell. (6)

(b) Explain theory involved in construction and working of LED? (6)

Q.7 (a) Explain input and output characteristics of a NPN transistor in common base Configuration. (8)

(b) Prove that $\alpha = \beta/1+\beta$ (4)

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Objective Part (Compulsory)

Q.1 Attempt all questions. Each question has equal marks (2x16=32)

(i) Define a linear resistor? Draw its V-I curve?
(ii) Why electrons have greater mobility than holes in a semiconductor material?
(iii) What is the effect of doping on width of depletion layer?
(iv) Draw schematic energy band diagram of a P-type extrinsic semiconductor?
(v) What is Zener breakdown in reverse biased P-N junction?
(vi) Do pure semiconductors obey ohms law?
(vii) Draw symbols of an air-core and an iron-core inductor.
(viii) Why optical fibres are better than metallic wires?
(ix) What are thermally generated charge carriers?
(x) In a transistor why emitter is heavily doped? and collector is lightly doped.
(xi) Describe a circuit which provides continuously varying potentials?
(xii) Differentiate between primary and secondary cells.
(xiii) Define capacitance of a capacitor and its unit.
(xiv) What should be the features of outside protection provided to an optical fiber?
(xv) Ten resistors each having resistance 1/R are connected in parallel. What is their equivalent resistance?
(xvi) What is LED?

Subjective Part: (12x4=48)

Attempt any four questions. All questions carry equal marks

Q.2 (a) How P-N junction diode is forward and reverse biased? Draw VI characteristic curve for PN junction diode. (8)
(b) What are intrinsic semiconductors? What is their behaviour at 0K and at room temperature (i.e 300K) What is their response to electric field (4)

Q.3 (a) What is photomultiplier tube? Write theory involved in photomultiplier tube. (6)
(b) A 12 volt battery of negligible internal resistance is connected across a parallel combination of 4K, 6K and 12K resistors. Compute
i) combined circuit resistance (2)
ii) Current supplied by the battery (2)
iii) Power supplied by the battery (2)

Q.4 (a) What is rectification? Which characteristic of a diode is used in rectification? Explain its types. (8)
(b) How pulsating dc can be converted in to pure dc by using an inductor filter? (4)

(f) The pure semi-conductor does not obey Ohm's law because such materials have not purely resistive response curve.

Q.5 (a) Explain input and output characteristics of a NPN transistor in common emitter configuration. (8)

(b) Prove that $\alpha = \beta/1+\beta$ (4)

Q.6 (a) What is a transformer? Hbw it works (core type transformer)? what is voltage transformation ratio? What is condition for ideal transformer? (8)

(b) A power transformer has 100 primary turns and 600 secondary turns. If primary voltage is 120 volt and full load primary current is 12 Amp, find secondary voltage V2 and Secondary current I2 (2+2)

Q.7 (a) Define modulation, Demodulation and carrier wave? There are how many methods of Modulation? Why frequency modulation is advantageous as compared to amplitude modulation? (8)

(b) Explain structure of an optical fibre with the help of a diagram. (4)