6 Attempt any **TWO** parts : **(2×5=10)**

a) Implement the given boolean function using 8:1 multiplexer

$F(A,B,C,D) = \sum m(0,2,3,6,9,12,13,15)$

b) Explain working of 4 bit Johnson counter.

c) Convert a J-K flip-flop into T flip-flop.

7 Attempt any **ONE** part : **(1×10=10)**

a) Explain the internal block diagram of 555 IC.

b) Write short notes on:

(i) Op-amp based series regulator.

(ii) Monostable multivibrator using Op-amp.

Printed Pages : 4

EE-303

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 121303

Roll No.

B.Tech.

(SEM. III) (ODD SEM.) THEORY EXAMINATION, 2014-15

ANALOG & DIGITAL ELECTRONICS

Time : **3** Hours] [Total Marks : **100**

Note : Attempt ALL sections.

SECTION - A

1 Attempt **ALL** parts : **(10×2=20)**

a) What do you mean by tunneling ?

b) Write the applications of Schottky diode.

c) What are the factors affecting the bandwidth of RC coupled amplifier ?

d) What is Barkhausen criterion for oscillation?

e) Differentiate the combinational circuit and sequential circuit.

f) Write the characteristics of Ideal op-amp.

g) Find the canonical form of the given boolean function:

$F(x,y,z) = xy + \bar{x}z$

h) Draw the logic diagram of S-R flip-flop.

i) Write the advantages of negative feedback.

j) What do you mean by the varactor diode ?

SECTION – B

2 Attempt any **THREE** parts : **(3×10=30)**

a) (i) Explain the working of Tunnel diode. Give its two applications.

(ii) Explain how transistor is used as a switch.

b) (i) Determine the f_β of the short circuit current gain of BJT if the transistor parameters are as follows :

$r_\pi = 2K\Omega$, $c_\pi = 1.8\mu F$ and $c_\mu = 0.12\mu F$.

(ii) An amplifier has a voltage gain of 10,000. Its input impedance is 1 K and output impedance is 40 K. Determine the voltage gain, input and output impedance of circuit, if 5% output of the amplifier is fed in the form of series negative voltage feedback.

c) (i) Explain the working of crystal oscillator. Give the expression for frequency of oscillation.

(ii) Find the frequency of oscillation of a Hartley oscillator with component values L_1 = 1 mH, L_2 = 100 μ H, M = 50 μ H and C = 100 pF.

d) (i) Simplify and implement the given boolean function :

$F(A,B,C,D) = \sum m(0,1,2,4,8,10,12,15)$

(ii) Prove NAND is a universal gate.

e) (i) Explain with suitable circuit diagram and waveform the working of Schmitt trigger.

(ii) Explain with circuit diagram the 555 uses as astable multivibrator.

SECTION – C

Attempt **all** questions.

3 Attempt any **TWO** parts : **(2×5=10)**

a) Explain the working of Photo diode. Give its two applications.

b) An LED has minimum drop of 1.5 V and maximum drop of 2.3 V. If supply voltage is 10 V and series resistance 470 Ω. Calculate the minimum and maximum values of LED currents.

c) Explain the working operation of Schottky diode, also list its advantages.

4 Attempt any **TWO** parts : **(2×5=10)**

a) Draw the high frequency equivalent circuit for common emitter amplifier.

b) Explain the effect of negative feedback on various characteristics of amplifier.

c) The gain of an amplifier is 100 with its bandwidth of 10 K Hz. If 10% of negative feedback is applied, determine the feedback gain and new bandwidth of the amplifier.

5 Attempt any **ONE** part: **(1×10=10)**

a) Explain the working of Wein bridge oscillator. Derive the formula for the frequency of oscillation.

b) A Colpitt's oscillator is designed with C_1 = 500 pF, C_2 = 1000 pF and a variable inductance varying from 100 μ H to 1 mH. Determine the range for frequency of oscillation.