BE /BTECH DEGREE SEMESTER EXAMINATION NOV/DEC – 2011

ELECTRONICS AND COMMUNICATION ENGINEERING

THIRD SEMESTER- BIOMEDICAL ENGINEERING

BM9202- ELECTRONIC CIRCUITS

Max Time – 3 hours Max Mark = 100 Marks

Part – A 10x2 = 20 Marks

1. What is CMOS?
2. Draw a clipper circuit for which the negative half cycle of the wave form should be clipped off.
3. Draw the high frequency model of BJT for CE configuration.
4. What is coupling and Bypass capacitor?
5. A crystal has the following parameters L= 0.5 H, C_S = 0.06PF, C_P = 1PF and R=5KΩ. Find the series and parallel resonant frequencies ant the Q – factor of the crystal.
6. Differentiate positive and negative feedback.
7. A silicon power transistor is operated with heat sink θ_{SA} = 1.5°C/W. The transistor has θ_{JC} = 0.5°C/W and the mounting insulation has θ_{SC} = 0.6°C/W. What maximum power can be dissipated if the ambient temperature is 40°C and the junction temperature is 200°C?
8. What is the different between Class A series fed and Class A transformer coupled power amplifier.
9. Define line and load regulation.
10. What is fold back technique?

Part – B 5x16 = 80 Marks

11. i) A system needs to be powered with 12 V dc source of maximum load current 150mA. Design a circuit to supply power with the available domestic ac line. Assume any data required but reasonably. (6)
    ii) With a neat diagram explain the operation of dc-dc convertor. (6)
    iii) With a neat diagram explain the emitter follower type regulator. (4)

12. (a) i) Explain the working of voltage divider biasing with a neat diagram (8)

    ii) Design a voltage divider circuit with VCC= 22V, I_C = 0.85mA, β=140 and

    RE= 1.5KΩ (8)

    Or

12. (b)i) Explain the working of Full wave rectifier and calculate the ripple with capacitor filter. (8)
    ii) Explain the self biasing configuration of FET (4)
    iii) Explain the working operation of voltage doublers (4)

(b) (i) A circuit has an impulse response given by $h(t) = \begin{cases} \frac{1}{T}, 0 \le t \le T \\ 0, otherwise \end{cases}$. Evaluate $S_{YY}(\omega)$ in terms of $S_{XX}(\omega)$. (8)

(ii) Find the autocorrelation of a periodic time function $x(t) = A \sin \omega_0 t$. (8)

15) (a) (i) The power spectral density of a wide sense stationary process is given by $S(\omega) = \begin{cases} \frac{b}{a}(a - |\omega|), |\omega| \le a \\ 0, |\omega| > a \end{cases}$, find the auto correlation function of the process. (8)

(ii) If input $X(t)$ and its output $Y(t)$ are related by $Y(t) = \int_{-\infty}^{\infty} h(u)X(t-u)du$, then show that the system is a linear time-invariant system. (8)

(OR)

(b) A random process $X(t)$ having auto correlation function $R_{XX}(\tau) = Pe^{-\alpha\tau}$, where P and α are real positive constants, is applied to the input of the system with impulse response $h(t) = \begin{cases} \lambda e^{-\lambda t}, t > 0 \\ 0, \quad t < 0 \end{cases}$ where λ is a real constant. Find the auto correlation function of the network response $Y(t)$ and find the cross-correlation of $R_{XY}(\tau)$. (16)