Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY
(Manipal University) Manipal – 576 104

IV SEMESTER B.Tech (BME) DEGREE MAKEUP EXAMINATIONS JUNE/JULY 2016

SUBJECT: ANALOG ELECTRONIC CIRCUITS (BME 202)
(REVISED CREDIT SYSTEM)
Thursday, 30th June 2016 : 2.00 p.m.- 5.00 p.m.

TIME: 3 HOURS MAX. MARKS: 100

Instructions to Candidates:
1. Answer any FIVE full questions.
2. Draw labeled diagram wherever necessary

1. (A) Draw a typical Zener diode regulator circuit. Determine the range of R_L and I_L that will result in V_{R_L} being maintained at 10 V. Also find the maximum wattage rating of the diode. The following parameters are provided: $V_i = 50V, V_z = 10V, I_{z\max} = 32mA, R_s = 1K\Omega$ 6

(B) Explain the working of a full wave bridge rectifier circuit and draw the output voltage and current waveforms. 6

(C) Derive the expression for the peak current in the diode of a half wave rectifier circuit with capacitor filter. Also, elaborate on the design of a regulated power supply. 8

2. (A) Draw the voltage shunt feedback amplifier circuit. The values of h-parameters are: $h_{fe} = 100, h_{ie} = 1.1K$, h_{re} & h_{oe} are negligible. The values of the circuit parameters are: $R_c = 12K, R_f = 200K, R_s = 10K$. Determine R_{Mf}, A_{vf}, R_{if} 6

(B) Discuss the characteristics of negative feedback in detail. 6

(C) In the process of analysis of voltage series feedback amplifier with BJT as the active device, evaluate the gain, feedback factor, input impedance and output impedance. 8

3. (A) Consider a colpitts oscillator, taking into account the resistance r_3 in series with L_3, show that $\omega^2 = \frac{1}{L_3}\left[\frac{1}{C_1} + \frac{1}{C_2}\left(1 + \frac{r_3}{R_o}\right)\right]$. Draw the circuit. 6

(B) Derive an expression for the frequency of oscillation of a Wein bridge oscillator circuit. 6

(C) For a typical BJT RC phase shift oscillator, derive an expression for each of the following: frequency of oscillations, phase of the loop gain and minimum value of h_{fe}. 8

4. (A) Determine the necessary transformer turn ratio for transferring maximum power to a 16Ω load from a source that has an output impedance of 10 KΩ. Also calculate the voltage across the external load if the terminal voltage of the source is 10V rms. 6

(B) What do you understand by multistage transistor amplifier? Mention its need. Draw a typical transformer coupled multistage amplifier. 6

(C) How does the RC coupled transistor amplifier operate? Draw its circuit diagram and the low frequency model. 8

5. (A) Determine the input power, output power, and efficiency resulting in a class B amplifier providing a signal of 20 volt peak to a 10 Ohm load, using a single supply of $V_{CC} = 30v$. 6

(B) Derive an expression for the conversion efficiency of a class A power amplifier circuit. Explain the operation of series fed Class A power amplifier circuit. 6

(C) With a circuit diagram of class A push pull power amplifier circuit, explain its working. Mention the advantages of a push pull system. 8

6. (A) Show that the input impedance of the RC network of a RC phase shift oscillator at the frequency of oscillation is (0.83-j2.7)R. 6

(B) Derive an expression for the frequency of oscillation of the Colpitts oscillator circuit. 6

(C) For a parallel resonant circuit, prove mathematically how the circuit tends to become more selective and illustrate the resonance curve. 8