M – 2019

Subject Code : **40 (NS)** **2101690**

ELECTRONICS

Time : 3 Hours 15 Minutes] [Total No. of questions : 37] [Max. Marks : 70

Instructions : *i) Question paper has four Parts A, B, C and D.*

ii) Part - A has no choice.

iii) Part - D has two Parts.

Part- I is from problems

Part - II is of essay type questions.

iv) Circuit diagram/timing diagram/truth tables are drawn wherever necessary.

v) Problems without necessary formula carry no mark.

PART – A

Answer **all** questions : **(10 × 1 = 10)**

1) Name the charge carriers in N-channel JFET.

2) Write the value of bandwidth of an ideal OPAMP.

3) Draw the waveform of damped oscillations.

4) What is the function of transmitter in a radio communication system?

P.T.O.

5) Draw the waveform of AM wave when modulation index $m_a = 1$.

6) Define fidelity in a radio receiver.

7) Mention one application of TRIAC.

8) Write the decimal equivalent of BCD code $(00110101)_2$.

9) Name any one arithmetic operator in C-language.

10) Expand RADAR.

PART – B

Answer **any five** questions : **(5 × 2 = 10)**

11) Mention the steps to obtain DC-equivalent circuit of a CE amplifier.

12) Calculate the gain of a negative feedback amplifier with an internal gain, $A = 100$ and feedback factor $\beta = 1/10$

13) Write any two applications of crystal oscillator.

14) Realise XOR gate using basic logic gates.

15) Write the difference between combinational and sequential logic circuits.

16) Write any two instruction set of 8051 microcontroller.

17) Mention any two features of C-language.

18) Briefly explain the internet.

PART – C

Answer **any five** questions : **(5 × 3 = 15)**

19) Compare the FET and BJT.

20) What is a transistor biasing? Briefly explain the need for biasing a transistor.

21) With a block diagram derive an expression for output impedence of a amplifier with negative feedback.

22) Explain the importance of ionosphere in the radio communication.

23) Derive an expression for the total power of AM wave.

24) In a SCR full wave rectifier the firing angle is 90°, rms voltage of an input to the rectifier is 230 V and the load resistance is 25Ω. Calculate V_{dc} and I_{dc}.

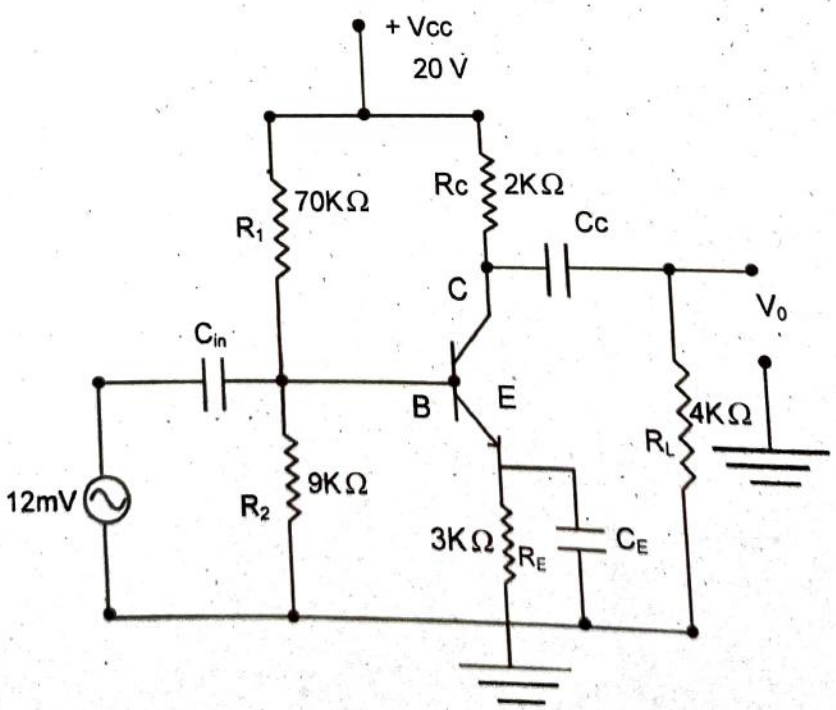
25) With a neat circuit diagram explain the working of power diode under forward bias condition.

26) With a neat block diagram explain the satellite Transponder.

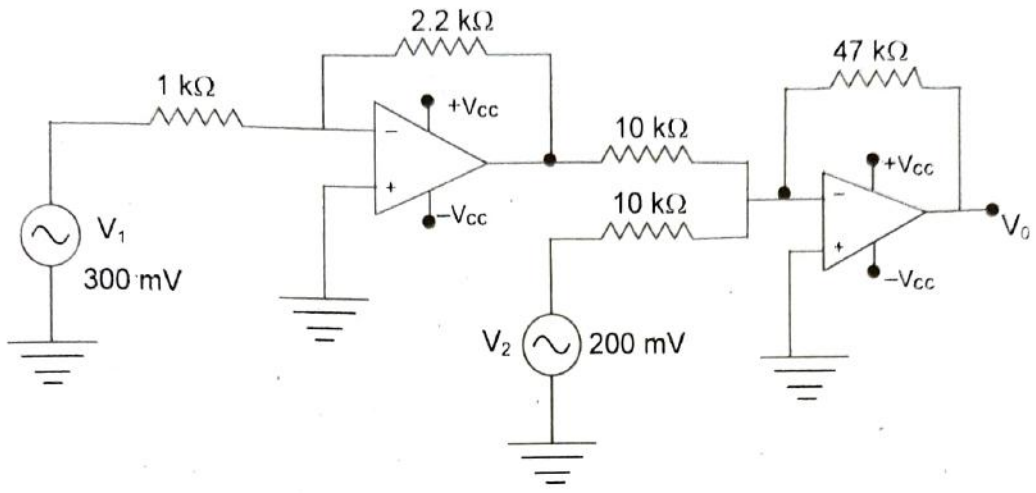
PART – D

I. Answer **any three** questions : **(3 × 5 = 15)**

27) Calculate voltage gain (A_V) and input impedence (Z_{in}) of a given CE amplifier with values $r_e' = \frac{26\ mV}{I_E}, V_{BE} = 0.7\ V, \beta = 100$



28) Calculate the output voltage (V_0) for a given circuit below.



29) A transistor Colpitts oscillator has $L = 4\ mH, C_1 = 10\ nF$ and $C_2 = 10\ nF$. Calculate the frequency of oscillations.

30) The current of a AM transmitter is 8A when the carrier is sent, it increases to 8.65 A when the carrier is modulated. Find the percentage of modulation. Also calculate the antenna current when the depth of modulation is 0.75.

31) Simplify the Boolean expression using K-map.

$$Y(ABCD) = \Sigma m(0, 2, 4, 5, 8, 10, 12, 14) + \Sigma d(6, 13)$$

Write the logic circuit for the simplified expression.

(4 × 5 = 20)

II. Answer **any four** questions:

32) Compare CE, CB and CC amplifiers.

33) a) What are active filters? (1 + 4)

b) With a neat circuit diagram explain the working of first order low pass active filter and draw its frequency response curve.

34) Draw a block diagram and explain the different stages of FM transmitter.

35) a) What is flip-flop?

b) With a logic diagram and truth table, explain the working of SR flip-flop. (1 + 4)

36) Write a flow chart and explain the steps used in creating assembly language program in 8051 microcontroller.

37) Write a C-program to find largest among three numbers.
