

2016 (A)
(NEW SYLLABUS)

Roll No. : ನೋಂದಣಿ ಸಂಖ್ಯೆ :	Subject Code : ವಿಷಯ ಸಂಖ್ಯೆ :	40 (N/S)
Duration : 3 Hrs. 15 Minutes ಸಮಯ : 3 ಗಂಟೆ 15 ನಿಮಿಷಗಳು	Q.P. Serial No. : ಪ್ರ.ಪ. ಯ ಕ್ರಮ ಸಂಖ್ಯೆ :	10859
No. of Pages : 7 ಪುಟಗಳ ಸಂಖ್ಯೆ : 7	Full Marks : 70 ಒಟ್ಟು ಅಂಕಗಳು : 70	

ELECTRONICS

ಎಲೆಕ್ಟ್ರಾನಿಕ್ಸ್

Instructions : This question paper has been sealed by reverse jacket. You have to cut to open the paper at the time of commencement of the examinations. Check whether all the pages of the question paper are intact.

ಸೂಚನೆಗಳು : ಈ ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆಯನ್ನು ರಿವರ್ಸ್ ಜಾಕೆಟ್ ಮೂಲಕ ಸೀಲ್ ಮಾಡಲಾಗಿದೆ. ಪರೀಕ್ಷೆ ಪ್ರಾರಂಭವಾಗುವ ಸಮಯಕ್ಕೆ ನಿಮ್ಮ ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆಯ ಬಲಬದಿ ಪಾರ್ಶ್ವವನ್ನು ಕತ್ತರಿಸಿ, ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆಯಲ್ಲಿ ಎಲ್ಲಾ ಪುಟಗಳು ಇವೆಯೇ ಎಂದು ಪರೀಕ್ಷಿಸಿಕೊಳ್ಳಿ.

General Instructions to the Candidate :

ಪರೀಕ್ಷಾರ್ಥಿಗಾಗಿ ಸಾಮಾನ್ಯ ಸೂಚನೆಗಳು :

1. Candidates are required to give their answers in their own words as far as practicable.

ಪರೀಕ್ಷಾರ್ಥಿಯು ಸಾಧ್ಯವಾದಷ್ಟು ತಮ್ಮ ಸ್ವಂತ ಪದಗಳಲ್ಲಿಯೇ ಉತ್ತರಿಸಬೇಕು.

2. Figures in the right hand margin indicate full marks.

ಬಲ ಭಾಗದಲ್ಲಿ ಕೊಟ್ಟಿರುವ ಅಂಕಗಳು ಪೂರ್ಣಾಂಕಗಳನ್ನು ತೋರಿಸುತ್ತದೆ.

3. While answering the candidate should adhere to the word limit as far as practicable.

ಪರೀಕ್ಷಾರ್ಥಿಯು ಉತ್ತರಿಸುವ ಸಮಯದಲ್ಲಿ ಸಾಧ್ಯವಾದಷ್ಟು ಮಟ್ಟಿಗೆ ಉತ್ತರವು ಶಬ್ದಗಳ ಪರಿಮಿತಿಯೊಳಗೆ ಇರುವಂತೆ ಗಮನಿಸುವುದು.

4. 15 minutes of extra time have been allotted for the candidates to read the questions.

ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆಯನ್ನು ಓದಿ ಅರ್ಥೈಸಿಕೊಳ್ಳಲು 15 ನಿಮಿಷಗಳ ಹೆಚ್ಚಿನ ಕಾಲಾವಕಾಶ ನೀಡಲಾಗಿದೆ.

Instructions :

- i) The question has five parts A, B, C, D and E.
- ii) Part-A is compulsory.
- iii) Part-D contains only problems.
- iv) Read the instruction given for each part.

PART - A

Answer all questions.

 $10 \times 1 = 10$

1. Mention the size of memory allocated for a character (char) type data in C-programming.
2. How many 8-bit ports are present in 8051 microcontroller ?
3. Write the Boolean expression for the carry of the half-adder.
4. Which code is used in shaft position encoders ?
5. Determine modulation index m_a of AM. Given $V_{\max} = 8\text{ V}$ and $V_{\min} = 4\text{ V}$.
6. What is the wavelength of modulating signal of frequency 20 kHz ?

7. Define critical frequency.
8. What is the bandwidth of an ideal Op-Amp ?
9. In which region of characteristics does a transistor behave as closed switch ?
10. Write the relation between JFET parameters.

PART - B

Answer any *five* questions.

$$5 \times 2 = 10$$

11. Draw the structure of power diode showing impurity atom densities.
12. The input and output voltages of an amplifier are 5 mV and 2V respectively.
If the gain with negative feedback is 50, find the feedback fraction.
13. Mention Barkhausen criteria.
14. Write the syntax for 'if-else' statement.
15. Mention any two types of transistor biasing.
16. What is cross-over distortion ? Sketch the graph showing cross-over distortion.
17. Expand ISP and URL with reference to internet.
18. Distinguish between SJMP and LJMP instructions in 8051 microcontroller.

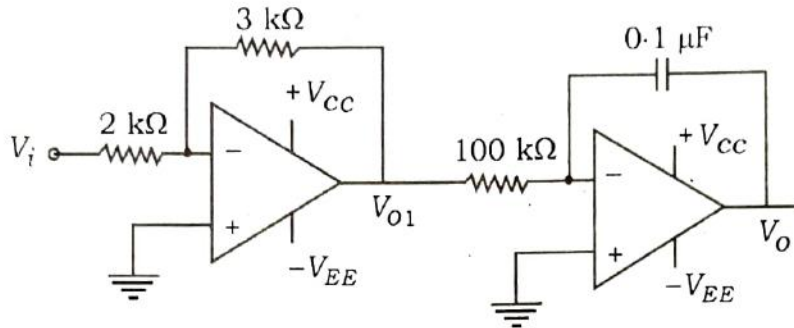
PART - CAnswer any *five* questions.

5 × 3 = 15

19. What is RADAR ? Mention any two applications of RADAR.
20. Draw the logic diagram of *T* flip-flop. Draw its truth table and timing diagram.
21. An ac voltage $V = 230 \sin 314t$ is applied to SCR half-wave rectifier. If it has a firing angle of 30° , determine V_{dc} and I_{dc} when load resistance of 25Ω is connected.
22. Determine anode current I_A of SCR when $I_G = 0$. Given $(\alpha_1 + \alpha_2) = 0.98$ and $(I_{CO1} + I_{CO2}) = 1 \text{ mA}$.
23. Explain the need for modulation in terms of length of transmitting antenna.
24. Define critical frequency, critical angle and skip distance.
25. Derive an expression for voltage gain of voltage series negative feedback amplifier.
26. Derive the relation $\mu = g_m \times r_d$ for JFET.

PART - D

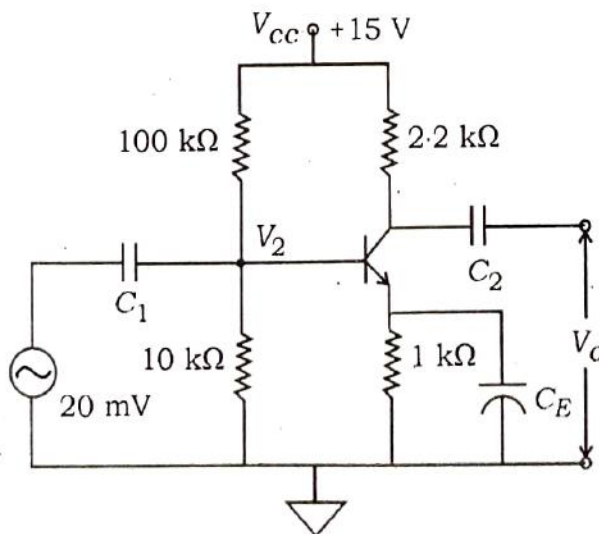
Answer any three questions.

 $3 \times 5 = 15$ 27. Find the output voltage of the following circuit, where $V_i = 5 \sin 100\pi t$.

28. A phase shift oscillator uses $R_1 = R_2 = R_3 = R = 220 \Omega$. What should be the capacitors values $C_1 = C_2 = C_3 = C$ to get frequencies of (a) 5 kHz and (b) 1 kHz?

29. For the given CE amplifier circuit using silicon transistor find (a) V_2 (Bias voltage) (b) I_E , (c) r'_e , (d) Z_{in} (base), Z_o . Given : $V_{BE} = 0.7 \text{ V}$, $\beta = 200$ and

$$r'_e = \frac{26 \text{ mV}}{I_E}$$



30. Simplify the Boolean function using K-map.

$$F(A, B, C, D) = \sum m(0, 2, 4, 6, 7, 8, 10, 12, 13, 14) + \sum d(5, 15).$$

Draw logic circuit

using NAND gates to realise the simplified expression.

31. A 25 MHz carrier is modulated by 500 Hz modulating signal. If the carrier voltage is 6 V and maximum deviation is 10 kHz, write the equation for the FM.

PART - E

Answer any four questions.

4 × 5 = 20

32. Write a C-program to print the sum of first n integers.
33. Write an assembly language program to multiply 04 H and 0AH. What are the contents of registers A and B after execution of the program ?

34. What is a counter ? Draw the logic diagram of a 4-bit synchronous up counter.
Write its counting sequence table.

35. Derive an expression for instantaneous voltage of amplitude modulated (AM) wave.

36. Derive an expression for output voltage of Op-Amp non-inverting amplifier.
37. Explain direct coupled transistor CE amplifier with a circuit. Draw the frequency response curve. Mention any one advantage of it.

36. Derive an expression for output voltage of Op-Amp non-inverting amplifier
37. Explain direct coupled transistor CE amplifier with a circuit. Draw the frequency response curve. Mention any one advantage of it.
