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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FIRST SEMESTER B.TECH DEGREE SPECIAL EXAMINATION, SEPTEMBER 2016

Course Code: BE101-04

Course Name: INTRODUCTION TO ELECTRONICS ENGINEERING

Max. Marks: 100

PART A

Answer ALL questions. Each question carries 2 marks

- Why is it necessary to connect an electrolytic capacitor in a circuit with correct polarity?
- Write the color code for 100Ω Resistor with tolerance ±5%.
- What are the specifications of transformer?
- Why does an intrinsic semiconductor behave like an insulator at absolute zero temperature?
- Explain why LEDs emit different colours.
- Identify the diodes i)AA113 ii)BB105
- “For better operation of transistor amplifiers operating point is fixed at the middle of active region”. Justify it.
- For CB input characteristic I_E vs. V_{EB} curves move inwards for higher values of V_{CB} . Justify.
- Suppose you have a single stage amplifier. Assume you removed the bypass capacitor at the emitter terminal. How does it affect the frequency response characteristics?

- What is meant by the threshold voltage of a MOSFET?
- What is intrinsic standoff ratio of UJT?
- How UJT can be used to trigger an SCR?
- What is SMPS and where it is used?
- For the given clipper circuit input is 10V peak to peak sine wave. Plot the output waveform. $V_B = 3V$ (Fig 1)

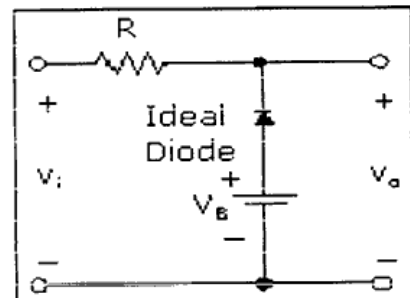


Fig 1

- For the given circuit, find out V_a . (Assume the diode to be a practical one) (Fig 2)

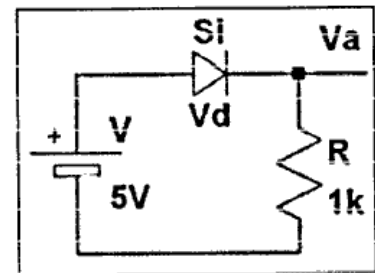


Fig 2

- Calculate the ripple factor of a capacitor filter for a peak rectified voltage of 30V, capacitor $C=100\mu F$, and load current of 50mA.
- Digital multimeters are superior to analog multimeters. Give reason.

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- 18. List the different types of errors in measurements.
- 19. Write the steps for testing a transistor.
- 20. Determine the phase shift between two sine waves, which is indicated by the pattern as in fig 3.

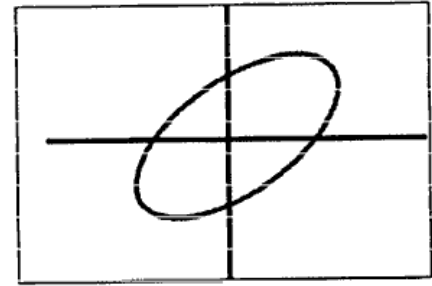


Fig 3

PART B

Answer any 4 complete questions each having 10 marks

- 21. Explain the structure of any three types of fixed resistors. Mention its advantages and disadvantages.
- 22. A) Draw the V-I characteristics of a p-n junction diode. If the reverse saturation current of a Germanium pn junction diode at room temperature is $6\mu\text{A}$. Determine the current flowing through the diode when 0.2 V forward bias is applied. Given thermal voltage $V_T = KT/q = 26\text{ mV}$. <http://www.ktuonline.com>
B) A doorbell requires 0.4A at 6 V. It is connected to a transformer whose primary contains 2000 turns and is connected to a 110 V household outlet.

- 1. How many turns should be there in the secondary?
- 2. Find the current in the primary?
- 3. How many watts does the bell require from the transformer?

- 23. Sketch and explain the typical input- output characteristics of a BJT when connected in
(i) Common Emitter configuration and
(ii) Common Base configuration

- 24. a) Find out the Q point for the transistor circuit shown in fig 4. (5 marks)
b) With the help of schematic block diagram, explain the principle operation of a photo transistor. (5 marks)
- 25. a) Draw and explain the working of enhancement mode MOSFET. (5 marks)
b) With a neat diagram explain the principle of operation of SCR. (5 marks)

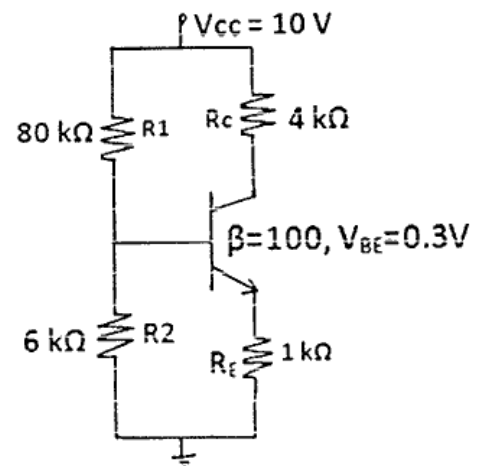


Fig 4

Answer any 2 complete questions each having 10 marks

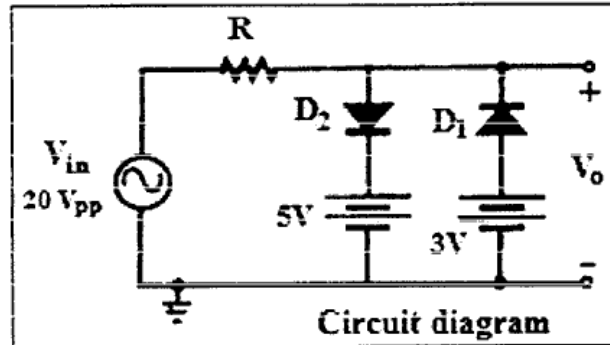
- 26. a) Discuss a full wave voltage doubler with circuit diagram. (4 marks)

b) The load resistance of a centre tapped FWR is 500Ω and the necessary voltage (end to end) is $60 \sin(100\pi t)$. Calculate (i) peak, average and rms values of current, (ii) ripple factor and (iii) efficiency of the rectifier. Each diode has an idealised I-V characteristics having slope corresponding to a resistance of 50Ω . (6 marks)

27. a) Draw the output waveform and transfer characteristics of the given clipper circuit: (5 marks)

b) With neat block diagram, explain the working of DSO. (5 marks)

28. a) With the aid of a block diagram, explain the working of a CRO. Also give the constructional details of cathode ray tube. (7 marks)



b) A sinusoidal waveform is displayed on CRO screen with one full cycle in two divisions. If the time-base knob is in 0.5 ms position, what is the frequency of the waveform?

(3 Marks)

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