[Total No. of Questions - 9] [Total No. of Printed Pages - 4]
(2123)

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B. Tech 1st Semester Examination

Basic Electrical & Electronics Engineering (N.S.)

BE-101

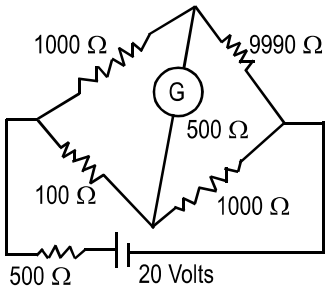
Time : 3 Hours **Max. Marks : 100**

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt five questions in all, selecting one question each from section A, B, C & D. Section E is compulsory.

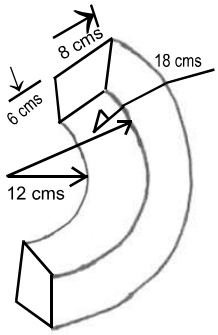
SECTION - A

1. (a) Find the current in the galvanometer arm of the Wheat stone Bridge shown in the adjacent circuit.



(10)

(b) A semi-circular ring of copper has an inner radius of 12 cms, radial thickness 6 cms and axial thickness 8 cms. Find the resistance of the ring at 60°C between its two faces. Specific resistance of copper at 20°C=1.724×10^{-8} ohm-meter



Temp. Coeff. of resist. of copper at 0°C=0.00430/°C. **(10)**

2. (a) A sinusoidal alternating voltage of 50Hz has an r.m.s. value of 200V. Write down the equation for the instantaneous value and find this value, 0.0125 secs. after passing through a positive maximum value. At what time measured from the positive maximum value, will the instantaneous voltage be 141.4 volts? **(10)**

   (b) A current of 5A flows through a non-inductive resistance in series with a coil, when supplied at 250V, 50Hz, single phase a.c. If the voltage across the resistance is 125V and across the coil 200V, calculate:

   (i) Impedance, Reactance and resistance of the coil.

   (ii) Power absorbed by the coil and total power.

   (iii) Draw the vector diagram. **(10)**

SECTION - B

3. (a) A series circuit with R=10Ω, L=0.1H and C=50μF has an applied voltage of V=50$\angle 0^{o}$ volts, with a variable frequency. Find the (i) resonant frequency (ii) the value of the frequency at which maximum voltage occurs across the inductor (iii) the value of the frequency at which maximum voltage occurs across the capacitor. **(12)**

   (b) A 3-phase, delta connected load of (4+j8)Ω is connected across a 400V, 3-phase balanced supply. Determine the phase currents and line currents. Assume a phase sequence of RYB. **(8)**

4. (a) Parallel resonance is also called anti-resonance. Explain. **(4)**

   (b) The input power to a three phase load is 10kW at 0.8 p.f. Two Wattmeters are connected to measure the power. Find the individual readings of the Wattmeters. **(8)**

   (c) List out the characteristics of an ideal transformer. **(8)**

SECTION - C

5. (a) In a common-base configuration, the emitter current is 0.9 mA. If the emitter circuit is open the collector current is 45 microamperes. Find the total collector current. Given that the current amplification factor, α=0.9. **(8)**

   (b) "A 'transistor' is a semiconductor device having both rectifying and amplifying properties". Justify the above statement. **(8)**

   (c) Differentiate between the intrinsic and extrinsic semiconductor material. **(4)**

6. (a) Write briefly about:

   (i) Tunnel diodes

   (ii) Light Emitting Diodes (LED's)

   (iii) Varactor Diodes

   (iv) Zener Diode. **(3+3+3+3=12)**

   (b) How a full wave bridge rectifier circuit better than full wave and half wave rectifier circuits? Explain with diagrams. **(8)**

SECTION - D

7. (a) What are the similarities and dissimilarities between MOSFETS and JFETS. Use diagrams for justification of your point. **(12)**

   (b) What is an ideal OP-AMP? List out the various applications where OP-AMP is used. (minimum five applications) **(8)**

8. (a) Draw a schematic block diagram of a cathode ray oscilloscope and explain the functional details of each component. **(10)**

[P.T.O.]

(b) Write a short note on monilithic ICs. Give their applications. **(10)**

SECTION - E

9. (i) What is a bilateral circuit? Give example.

(ii) What is synchronous speed? How you define slip of an Induction motor?

(iii) What are the various types of losses in a D.C. machine?

(iv) What would be the r.m.s. value of current in a wire which carries a d.c. current of 10A and sinusoidal alternating current of peak value 20A?

(v) What is the peculiar feature of I-V curve for tunnel diodes?

(vi) What is the voltage gain of a non-inverting OP-AMP if R_F=20kΩ and R_i=2kΩ?

(vii) Explain 'Gate Bias' for JFET's.

(viii) Describe the 'voltage divider' principle.

(ix) Define the Bandwidth of the BJT amplifiers.

(x) What is leakage flux as applied to iron core transformer? **(2×10=20)**