B. N. BANDODKAR COLLEGE OF SCIENCE, THANE - 400 601.

FIRST TERM EXAMINATION OCT. - 2010

S. Y. B. Sc.

TIME : 2 Hrs.

SUBJECT : PHYSICS - II **MARKS :** 60

N. B. : 1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Use of non programmable calculators is allowed.

Q.1 a) Attempt ANY THREE : [12]

i) Explain 'Isotopes' with suitable example.

ii) Explain the term 'Lorentz Force'.

iii) State why silicon devices are preferred over germanium devices.

iv) Write short note on 'Frequency response' of an amplifier.

v) Write short note on 'One's complement Representation' of binary numbers.

b) Write the truthtable of JK Flipflop. [3]

Q.2 a) Attempt ANY ONE of the following : [8]

i) A charged particle enters a uniform constant magnetic field. Show that it traces a helical path, in general.

ii) Set up the equation of motion of a charged particle in a uniform constant electric field and solve it.

b) What is a Velocity Selector and discuss its working. [4]

c) In a Velocity Selector, the crossed electric and magnetic fields applied are 60 kV/m and 0.3 wb/m^2. A beam of ions enters the crossed fields. What should be the speed of ions so that they pass undeflected through the region. [3]

Q.3 a) Attempt ANY ONE : [8]

i) What is faithful amplification. State and explain the conditions to be fulfilled to achieve faithful amplification in a transistorized amplifier.

ii) Derive the relation between the gain without feedback and gain with feedback when negative feedback is introduced.

P.T.O.

b) For a Voltage divider bias circuit given R = 6kΩ R_2 = 4kΩ, $R_C = R_E$ = 5kΩ, β = 100, V_{CC} = 30V. Determine I_C & I_B if V_{BE}= 0.6V. [4]

c) An amplifier has an input signal voltage 0.1 V and draws 0.1mA from the source. The amplifier delivers 5V to a load at 10 mA. Determine the voltage, current and power gains. [3]

Q.4 a) Attempt ANY ONE of the following : [8]

i) Explain R. S. flipflop using NOR gates by drawing its logic CKT and write down its state transition table.

ii) For a given logical equation
Y = (A + BC) (B + $\bar{C}$A) design the circuit with I) NAND II) NOR gates

b) Convert decimal no. $(286.75)_{10}$ to hexadecimal number. [4]

c) What is a counter? Compare a ripple and synchronous counter. [3]

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