MEERUT INSTITUTE OF ENGINEERING AND TECHNOLOGY 17/1/23

(380)

NH-58, Delhi-Roorkee Highway, Baghpat Road, Meerut – 250 005 U.P.

Sessional Examination II : Odd Semester 2022-23   SET B

Course/Branch : B Tech - All (OP 4, OP 6, OP 8, OP10, OP 12, OP 13, OP 14)   **Semester: I**

Subject Name	: Engg. Physics	**Max. Marks**	**: 60**
Subject Code	: BAS101	**Time**	**: 120 min**

CO-4 :To know the functioning of optical fiber and its properties and applications. To understand the concept, properties and applications of Laser.

CO-5 : To know the properties and applications of superconducting materials and nano materials.

Section – A (CO - 4) # Attempt both the questions # 30 Marks

Q.1 : Attempt any **SIX** questions (Short Answer Type). Each question is of two marks.   **(2 x 6 = 12 Marks)**

a) With the help of well diagram, name the components of an optical fibre.

b) Explain the principle of an optical fibre.

c) Why model dispersion is negligible in single mode fibre?

d) Discuss the Difference between single mode and multimode fibre.

e) Compare Ruby laser with He-Ne laser.

f) Differentiate between spontaneous and stimulated emission of radiation. Which one is required for laser action?

g) Define metastable state.

Q.2 : Attempt any **THREE** questions (Medium Answer Type). Each question is of 6 marks. **(3 x 6 = 18 Marks)**

a) Describe acceptance angle and numerical aperture? Derive expression for Acceptance angle.

b) Establish a relation between Einstein's coefficients.

c) Describe the principle and working of Ruby laser system.

d) A communication system uses a 25 km long fiber having a loss of 2.5dB/km. The input power is $2500\mu W$, Compute the output power.

e) In a Ruby Laser, total number of Cr^{+3} ions is 2.8×10^{19}. If the laser emits radiation of wavelength 6000 Å, then calculate the energy of the laser pulse.

Section – B (CO - 5) # Attempt both the questions # 30 Marks

Q.3 : Attempt any **SIX** questions (Short Answer Type). Each question is of two marks.   **(2 x 6 = 12 Marks)**

a) Define Critical temperature.

b) Write few applications of superconductors.

c) Explain the phenomenon of superconductivity.

d) Differentiate between nanoscience and nanotechnology.

e) Explain the dimension of quantum wire and quantum dot.

f) Describe some properties of matter at bulk and nano scale.

g) What do you mean by quantum confinement?

Q.4 : Attempt any **THREE** questions (Medium Answer Type). Each question is of 6 marks. **(3 x 6 = 18 Marks)**

a) Distinguish between type I and type II superconductors.

b) Describe Meissner's effect? How it shows that superconductors are perfectly diamagnetic materials.

c) Explain CVD and Sol gel method for synthesis of nano particles.

d) Discuss applications of nanotechnology in various fields.

e) Write short notes on high temperature superconductors.

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NH-58, Delhi-Roorkee Highway, Baghpat Road, Meerut – 250005 U.P. $4/?- \text{II}$

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Make-Up Test – I : Odd Semester 2022-23

Course/Branch	: B Tech	**Semester: I**
Subject Name	: ENGG. PHYSICS	**Max. Marks: 60**
Subject Code	: BAS101	**Time : 90 min**
Section	:Y3,Y6,Y9,Y10,Y13,Y14,Y15	

CO-4 : *To know the functioning of Optical fiber and its properties and applications. To understand the concept, Properties and applications of Laser.*

CO-5 : *To know the properties and applications of Superconducting materials and Nonmaterial's.*

Section – A (CO - 4) # Attempt Both The Questions # 30 Marks

Q.1 : Attempt all **THREE** questions (Short Answer Type). Each question is of 4 marks. **(3 x 4 = 12 Marks)**

    a) Explain the principle of optical fiber.

    b) Differentiate between spontaneous and stimulated emission of Radiation.

    c) Write the component of optical fiber with proper diagram.

Q.2 : Attempt all **THREE** questions (Medium Answer Type). Each question is of 6 marks. **(3 x 6 = 18 Marks)**

    a) Explain the construction and working of He-Ne Laser.

    b) Obtain the relation between Einstein's coefficients.

    c) Derive the expression for Acceptance angle.

Section – B (CO - 5) # Attempt Both The Questions # 30 Marks

Q.3 : Attempt all **THREE** questions (Short Answer Type). Each question is of 4 marks. **(3 x 4 = 12 Marks)**

    a) At what temperature is $H_{(c)}(T) = 0.1\, H_{(C)}(0)$ for Pb having $T_c = 7.2K$ only.

    b) Define Critical temperature and critical magnetic field.

    c) Describe the properties of Nonmaterial's.

Q.4 : Attempt all **THREE** questions (Medium Answer Type). Each question is of 6 marks. **(3 x 6 = 18 Marks)**

    a) Describe Meissner's effect? Show that superconducting materials are perfectly diamagnetic in nature.

    b) Explain High temperature superconductors with example.

    c) Define Quantum well and quantum dot. Explain the formation of Nano particles by CVD Method.

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Sessional Examination / Class Test –II : Odd Semester 2022-23

Course/Branch : B Tech – OP4, OP6, OP8, OP10, OP12   Semester: First
Subject Name : Fundamental of Electrical Engineering   Max. Marks : 60
Subject Code : BEE101   Time : 120 min

CO-3 : Identify the application areas of a single phase two winding transformer as well as an auto transformer and calculate their efficiency.

CO-5 : Describe the components of low voltage electrical installations and perform elementary calculations for energy consumption.
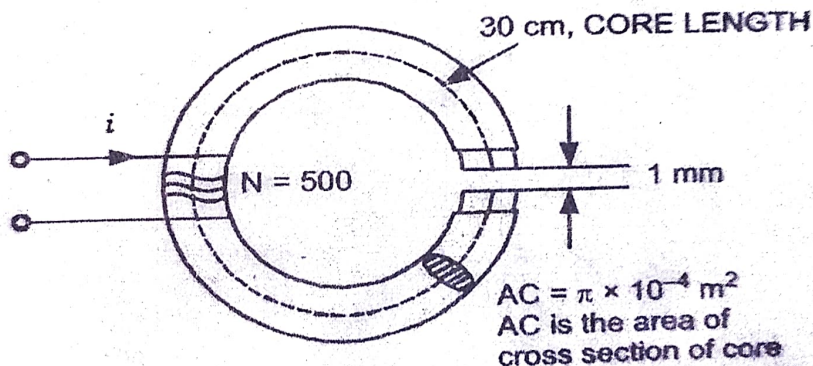
Section – A (CO - 3) # Attempt both the questions # 30 Marks

Q.1 : Attempt any **SIX** questions (Short Answer Type). Each question is of two marks.   (2 x 6 = 12 Marks)
   a) Find the relationship between MMF, flux and reluctance.
   b) What will happen if primary of transformer is connected to dc supply?
   c) Draw the phasor diagram for an ideal transformer and practical transformer on no load.
   d) Compare between electric circuits and magnetic circuits.
   e) How many types of transformers as construction wise?
   f) Define hysteresis & eddy current loss in the transformer.
   g) What type of load transformer provides negative voltage regulation?

Q.2 : Attempt any **THREE** questions (Medium Answer Type). Each question is of 6 marks. (3 x 6 = 18 Marks)
   a) A wrought iron bar 30 cm long and 2 cm in diameter is bent into a circular shape as given in figure below. It is then wound with 500 turns of wire. Calculate the current required to produce a flux of 0.5 mWb in magnetic circuit with an air gap of 1 mm. μ_R of iron = 4,000

30 cm, CORE LENGTH

i

N = 500

1 mm

$AC = \pi \times 10^{-4}\ m^2$
AC is the area of
cross section of core

   b) Discuss the principle of operation of a single phase transformer. Derive EMF equation for a single phase transformer.
   c) What is the purpose of an equivalent circuit of a transformer? Obtain the approximate equivalent circuit of a transformer as referred to the primary with all necessary parameters.
   d) A 40 KVA transformer has a core loss of 400 watts and full load cu loss of 800 watts.If the power factor of the load is 0.9 lagging, Calculate :-
      i) The full load efficiency
      ii) Percentage of the full load at which max.efficiency occurs.
      iii) Maximum efficiency at 0.9 p.f.lagging
      iv) Efficiency at half load unity power factor
   e) What is the voltage regulation of a transformer and also obtain the expression of voltage regulation at lagging power factor load.

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Make-Up Test – I : Odd Semester 2022-23

Course/Branch	: B Tech Y3, Y6, Y9, Y10, Y13, Y14, Y15 Semester	: I	
Subject Name	: FEE	Max. Marks	: 60
Subject Code	: BEE101	Time	: 90 min

CO-2 : Understand the steady state behavior of single phase and three phase A.C circuits.

CO-3 : Distinguish between single phase and three phase transformers.

Section – A (CO - 4) # Attempt Both The Questions # 30 Marks

Q.1 : Attempt all THREE questions (Short Answer Type). Each question is of 4 marks. (**3 x 4 = 12 Marks**)

   a) What are the advantages of 3-phase system over single phase system? (BKL : K1-K2 Level).

   b) What is the relation between Quality factor and bandwidth? Also define selectivity? (BKL : K1-K2 Level).

   c) Define Form factor and Peak factor in a.c. ckt. (BKL : K1-K2 Level).

Q.2 : Attempt all THREE questions (Medium Answer Type). Each question is of 6 marks. (**3 x 6 = 18 Marks**)

   a) Explain the phenomenon of resonance in series R L C ckt. Derive resonant frequency and draw resonance curve. Why series RLC circuit at resonance is called accepter ckt? (BKL >= K3 Level).

   b) Find out r.m.s and average value of (ii) Full wave rectifier output (iii) Half wave rectifier output (BKL >= K3 Level).

   c) Prove that i). In a three phase star connection $[V_L = \sqrt{3}V_{ph}]$ ii). In a three phase delta connection $[I_L = \sqrt{3}\ I_{ph}]$. (BKL >= K3 Level).

Section – B (CO - 5) # Attempt Both The Questions # 30 Marks

Q.3 : Attempt all THREE questions (Short Answer Type). Each question is of 4 marks. (**3 x 4 = 12 Marks**)

   a) What is the magnetic circuit. Define MMF, Flux and Reluctance. (BKL : K1-K2 Level).

   b) What will happen if primary of transformer is connected to dc supply? (BKL : K1-K2 Level).

   c) A 200 KVA transformer operating at 0.9 p.f 90% Maximum efficiency at full load. Iron loss will be (BKL : K1-K2 Level).

Q.4 : Attempt all THREE questions (Medium Answer Type). Each question is of 6 marks. (**3 x 6 = 18 Marks**)

   a) A 40 KVA transformer has a core loss of 0.4 KW and full load cu loss of 800W. If the power factor ofthe load is 0.9 lagging, Calculate :- i).The full load efficiency   ii).Efficiency at half load unity power factor (iii). KVA supplied atmaximum efficiency iv).Maximum efficiency at 0.9 p.f. lagging (BKL >= K3 Level).

   a) Write down the expression of efficiency for a single phase transformer. Deduce the condition for maximum efficiency of transformer and prove that (BKL >= K3 Level).

   b) Explain the working of transformer. Derive e.m.f equation of transformer. (BKL >= K3 Level).

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Make-Up Test – I : Odd Semester 2022-23

Course/Branch	: B Tech	**Semester**	: I
Subject Name	: FEE	**Max. Marks**	: 60
Subject Code	: BEE101	**Time**	: 90 min

CO-4 : Elaborate the working principle of D.C and A.C electrical machines with their application.

CO-5 : Explain the working of low voltage electrical installation equipments.

Section – A (CO - 4) # Attempt Both The Questions # 30 Marks

Q.1 : Attempt all **THREE** questions (Short Answer Type). Each question is of 4 marks. **(3 x 4 = 12 Marks)**

a)   What is back e.m.f and it's significance in dc motor? (BKL : K1-K2 Level).

b)   What are the applications of dc series and shunt motor? (BKL : K1-K2 Level).

c)   A 4-pole, 3-phase, 50 Hz star connected induction motor has full load slip of 4%. Calculate the full load speed of the motor. (BKL : K1-K2 Level).

Q.2 : Attempt all **THREE** questions (Medium Answer Type). Each question is of 6 marks. **(3 x 6 = 18 Marks)**

a)   Derive the e.m.f. equation of dc generator. A 4 pole, lap wound dc generator has a useful flux of 0.07 Wb per pole. Calculate the generated e.m.f. when it is rotated at a speed of 900 r.p.m. with the help of prime mover. Armature consists of 440 number of conductors. Also calculate the generated e.m.f if lap wound armature is replaced by wave wound armature. (BKL >= K3 Level).

b)   Draw and explain slip-torque characteristics of 3-Φ induction motor and mention all regions of operations.

   A 3-phase, 50 Hz induction motor has a full load speed of 960 rpm. Calculate:- a).slip b).frequency of rotor induced e.m.f c). no.of poles d).speed of rotor field w.r.to rotor structure e).speed of rotor field w.r.to stator structure f). speed of rotor field w.r.to stator fieldive the torque equation of D.C Motor. (BKL >= K3 Level).

c)   Derive the torque equation of D.C Motor. (BKL >= K3 Level).