

4046

BOARD DIPLOMA EXAMINATION, (C-14)

MARCH /APRIL-2019

DEEE - FIRST YEAR EXAMINATION

BASIC ELECTRICAL ENGINEERING

Time: 3 Hours

Max.Marks:80

PART-A

10x3=30M

Instructions : 1) Answer **all** questions.
2) Each question carries Three marks.
3) Answer should be brief and straight to the point and shall not exceed five simple sentences

- 1) Define electric potential.
- 2) What are the factors on which resistance of a material depends?
- 3) Define electric power.
- 4) Draw the figure of an incandescent bulb & mention its parts.
- 5) State right hand thumb rule.
- 6) Define leakage factor.
- 7) Classify induced emf.
- 8) Calculate coefficient of coupling for two coils having self inductances of 60 mH and 80 mH. The mutual inductance between them is 50 mH.
- 9) Define unit charge.
- 10) Define relative permeability.

PART-B

5x10=50M

- Instructions:**
- 1) Answer any **five** questions.
 - 2) Each question carries **ten** marks.
 - 3) The answer should be comprehensive and the criteria for valuation is content but not the length of the answer.

- 11) a) Derive $\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \dots + \frac{1}{R_n}$ 6M
b) A copper wire has a resistance of 30Ω at 40°C . Calculate the resistance at 140°C , given that temperature coefficient of resistance at 40°C is $0.00365/^\circ\text{C}$. 4M
- 12) Derive $\alpha_t = \alpha_0 / (1 + \alpha_0 t)$.
- 13) Calculate the monthly electricity bill of domestic service with the following loads for a month of 30 days.
- i) 4 lamps of 100W each used for 6 hours a day.
 - ii) 2000W immersion heater used for 1 hour a day.
 - iii) 3 fans of 60W each used for 10 hours a day.
 - iv) 1000W electrical iron used for 1 hour a day.
- The cost per unit of consumption is 250 paise.
- 14) An electric kettle is rated 1.5 kW, 230 V takes 5 minutes to bring 1 kg of water to boiling point from 15°C . Find the efficiency of the kettle.
- 15) A straight conductor of length 0.5 m, carries a current of 100 A is placed in a uniform magnetic field of flux density 1.5 Tesla. Calculate the force developed on the conductor, when it is placed
- (i) at right angle
 - (ii) in parallel
 - (iii) at 30° to the magnetic field.

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16) An iron ring has cross sectional area of 400 mm^2 and a mean diameter of 250 mm . An air gap of 1 mm has been made by a saw-cut across the section of the ring. If a magnetic flux of 0.3 mwb is required in the air gap, find the current necessary to produce this flux when a coil of 400 turns is wound on the ring. The iron has a relative permeability of 500 . Neglect the effect of magnetic leakage and fringing.

17) State and explain Faraday's laws of electromagnetic induction?

18) a) Derive $C = \epsilon_0 \epsilon_r A / d$ 5M

b) Two capacitors of capacitance $4 \mu\text{F}$ and $6 \mu\text{F}$ respectively are connected in series across a potential difference of 250 V . The capacitors are disconnected from the supply and are re-connected in parallel with each other. Calculate the new potential difference and charge on each capacitor. 5M

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