13
Optional Paper
Electrical Engg.
Paper – I

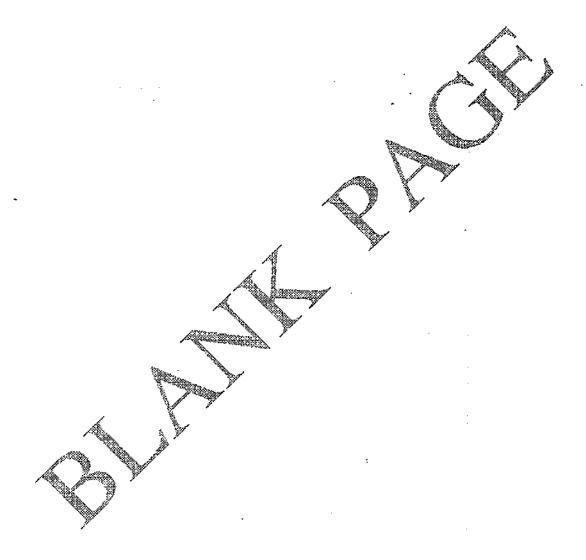| Time : 3 Hours	Maximum Marks : 200

IMPORTANT NOTES / महत्वपूर्ण निर्देश

(A) Please fill up the OMR Sheet of this Question Answer Booklet properly before answering. Please also see the directions printed on the obverse before filling it.

प्रश्नोत्तर पुस्तिका में प्रश्न हल करने से पूर्व उसके संलग्न ओ.एम.आर. पत्रक को भली प्रकार भर लें । उसे भरने हेतु उसके पृष्ठ भाग पर मुद्रित निर्देशों का अध्ययन कर लें ।

(B) The question paper has been divided into three Parts - A, B and C. The number of questions to be attempted and their marks are indicated in each part.

प्रश्न–पत्र अ, ब और स तीनों भागों में विभाजित है । प्रत्येक भाग में से किये जाने वाले प्रश्नों की संख्या और उनके अंक उस भाग में अंकित किये गये हैं ।

(C) Attempt answers in English.

उत्तर अंग्रेजी भाषा में दीजिये ।

(D) Answers to all the questions of each part should be written continuously in the script and should not be mixed with those of other parts. In the event of candidate writing answers to a question in a part different to the one to which the question belongs, the question will not be assessed by the examiner.

उत्तर पुस्तिका में प्रत्येक भाग के समस्त प्रश्नों के उत्तर क्रमवार देने चाहिये तथा एक भाग में दूसरे भाग के उत्तर नहीं मिलाने चाहिये । एक भाग में दूसरे भाग के प्रश्न के उत्तर लिखे जाने पर ऐसे प्रश्न को जाँचा नहीं जा सकता है ।

(E) The candidates should not write the answers beyond the limit of words prescribed in parts A, B and C failing this the marks can be deducted.

अभ्यर्थियों को भाग अ, ब और स में अपने उत्तर निर्धारित शब्दों की सीमा से अधिक नहीं लिखने चाहिये । इसका उल्लंघन करने पर अंक काटे जा सकते हैं ।

(F) **In case the candidate makes any identification mark i.e. Roll No./Name/Telephone No./Mobile No. or any other marking either outside or inside the answer book, it would be treated as resorting to using unfair means. In such a case his candidature shall be rejected for the entire examination by the Commission.**

अभ्यर्थी द्वारा उत्तर पुस्तिका के अंदर अथवा बाहर पहचान चिन्ह यथा – रोल नम्बर / नाम / मोबाईल नम्बर / टेलीफोन नम्बर लिखे जाने या अन्य कोई निशान इत्यादि अंकित किये जाने को अनुचित साधन मान जायेगा। आयोग द्वारा ऐसा पाये जाने पर अभ्यर्थी की सम्पूर्ण परीक्षा में अभ्यर्थिता रद्द कर दी जायेगी ।

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Note :   Attempt all the **twenty** questions. Each question carries 2 marks. Answer should not exceed 15 words.

1   Inductance per unit length of a single-phase line with conductor radius R and Spacing D (in meter) is given by the expression.

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2   Define bundled conductors.

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3   What one the parameters which indicate the performance of transmission lines?

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4   What is surge Impedance of a Transmission line?

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5   What is the use of Power Circle diagrams?

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6   What are the types of cores used in transformers?

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7   What is a Bucholtz Relay?

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8   Give two applications of single phase induction motors.

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9   Why blocked roter test is conducted on Induction Motors?

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10   Define all day efficiency of a transformer.

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11   What are V-curves of a synchronous machine?

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12   What is a salient pole synchronous machine?

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13   Give two 'Base load' generating plants.

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14   The electrostatic precipitator is an indispensable item in a thermal power plant. Why?

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15   What are pumped storage generating plants?

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16   What is Diversity Factor as applied to an Electric Supply system?

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17   Give three advantages of MOCB (Minimum Oil Circuit Breaker)

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18   What is a mho relay?

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19 Draw the wave shape used in an impulse current testing.

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20 Give two methods to improve the transient stability limit of a Power System.

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Note :   Attempt all the **twelve** questions. Each question carries 5 marks. Answer should not exceed **50** words.

21   What is ACSR conductor? Why is it used in transmission lines?

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22   Write the expressions for the ABCD parameters of a long transmission lines explaining the relevant symbols used. Prove that AD-BC = 1.

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23 Explain Grading of cables, highlighting the advantages.

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24 The magnetic core of a transformer in laminated, give justification, specifying the material used for the core of high voltage transformers.

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25 Draw the torque-slip characteristics of an induction motor explaining the different modes of operation.

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26 Discuss the conditions for parallel operation of two synchronous generators for active power sharing.

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27 Explain the principle of operation of an MHD generator (Magneto-Hydro-dynamic)

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28 Define the pickup level, reset level and operating time of a protective relay.

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29   Discuss the advantages of an SF_6 circuit breaker.

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30   Draw a typical current differential relay protection scheme and explain the working.

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31 Discuss the advantages of static relays.

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32 Describe the open circuit test conducted on a transferencer. Why is this conducted?

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Note :   Attempt any 5 questions. Each question carries 20 marks. Answer should not exceed 200 words.

33   Explain two methods of equalising the potential across a string of overhead line insulators. (Grading and static shielding).

34 What is equal area criterion as applied do power system stability ? Explain a condition where the criteria is used to deteive the stability for a sudden change in load.

35 With suitable diagram explain the functioning of a Nuclear reactor.

36   Discuss the arc interruption methods used in CBS. Elaborate the energy balance theory and the voltage race theory of arc interruption.

37 Discuss the Cockcroft-Walton voltage multiplies circuit used for the generation of high Direct Current Voltage (High dc voltage)

38   Discuss the 3 zone distance protection as applied to a transmission line.

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39 The voltages across a 3-phase unbalanced load are $V_a = 300V$, $V_b = 300 < -90°V$ and $V_c = = 800 < 143.1°$ V respectively. Determine the sequence components of voltages. Phase sequence is abc.

SPACE FOR ROUGH WORK/रफ कार्य के लिए जगह