16172

3 Hours / 100 Marks Seat No. | | | | | | | | |

Instructions : (1) All Questions are *compulsory.*

(2) Answer each next main Question on a new page.

(3) Illustrate your answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

(6) Use of Non-programmable Electronic Pocket Calculator is permissible.

(7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. (A) Attempt any THREE : **12**

(a) Draw any two safety symbols used in industry and also write what the symbols stand for.

(b) State the types of maintenance to be undertaken for electrical machines. Explain in brief the purpose of any two types of maintenance.

(c) Draw the dielectric absorption curve. How is it used for interpreting the condition of insulation ?

(d) State any one application of the following tools :

(i) Earth tester (ii) Megger (iii) Dial test indicator (iv) Spirit level.

(B) Attempt any ONE : **6**

(a) What is meant by tolerance ? Write the values of tolerance level of any five quantities of power transformers as per IS 2026.

(b) Study the following incorrect figure No : 1 of phasing out test of three phase transformer and answer the following questions.

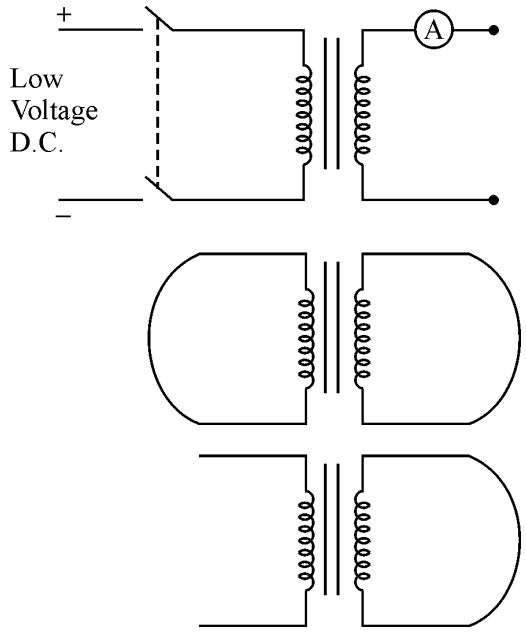

Fig. No. 1

(i) Identify the two mistakes in the above figure.

(ii) Draw the correct figure for the same.

(iii) State the significance of this test.

2. Attempt any TWO : **16**

(a) (i) List out any four precautions to be taken to avoid fire caused by electrical reasons.

(ii) State the type of fire extinguisher used on live electrical circuit.

(iii) Why is CCl_4 not recommended to be used as a fire extinguisher in less ventilated spaces ?

(iv) Describe the operation of fire extinguisher briefly.

(b) In an industrial sub-station a distribution transformer of rating 750 kVA, 33/11 kV is available. Prepare a complete maintenance schedule chart for the same as per IS 100 28 (Part-III) – 1981.

(c) State four possible causes for each of the following trouble of a 3 phase slip ring induction motor.

(i) Motor runs hot (ii) Motor runs slow (iii) Motor fails to start (iv) Excessive sparking between brushes and slip rings.

3. Attempt any FOUR : **16**

(a) What are the external causes for the abnormal operation of electrical equipments ? (any four)

(b) Describe the procedure for conducting polarity test of a single phase transformer with the necessary circuit diagram.

(c) Explain the method of babing of insulation with internal heat in detail.

(d) State the meaning of the following terms related to transformer oil : (i) Viscosity (ii) Fire point (iii) Flash point (iv) Purity

(e) Following test results were obtained in a single phase 2.75 kVA, 250/125 V transformer on a short circuit test with S_1 and S_2 shorted conducted at test temperature of 30 ºC, current = 8A; Voltage applied = 36 volts,

Power = 128 watts. Find (i) Percentage resistance (ii) Percentage impedance both at 75 ºC.

4. (A) Attempt any THREE : **12**

(a) Draw the vector diagram of three phase induction motor and justify that three phase induction motor is a generalised transformer.

(b) Explain any four factors affecting earth resistance.

(c) State any four requirements of foundation of rotating machines.

(d) State and explain any four circumstances under which the competent authority should not issue the 'permit to work' card ?

P.T.O.

(B) Attempt any ONE : **6**

(a) Explain the procedure of the test to be undertaken for measuring dielectric strength of transformer oil. Draw the necessary circuit set up for the same.

(b) Write the correct procedure of conducting (i) High voltage test (ii) Quiet running test on a single phase induction motor.

5. Attempt any TWO : **16**

(a) Draw a neat figure of vacuum impregnation plant and write the stepwise procedure of revarnishing the insulation.

(b) As per the procedure of installation of transformer (IS 10028) discuss about the following aspects : (i) Location (ii) Cabling (iii) Facilities for maintenance

(c) The following results were obtained from the tests on a 3.5 kW, 3 phase, 220 V, 50 Hz, 4 poles star connected induction motor.

No load test : 220 V, 5A, 385 W

Blocked rotor test : 110 V, 20A, 1870 W.

Assume stand still stator copper losses to be 55% of total copper losses. Draw the circle diagram and find out, full load current, efficiency, power factor.

6. Attempt any FOUR : **16**

(a) What are the points to be considered while selecting the site for the location of rotating electrical machines as per IS 900 ? (any four point)

(b) Discuss the procedure of levelling and aligning of direct coupled drives. Also draw the figure showing the position of packing materials.

(c) Describe the procedure of conducting high voltage test on a three phase induction moter as per IS 4029-2010.

(d) Discuss in detail any four factors affecting preventive maintenance schedule.

(e) Draw the general line diagram of a centrifugal purifier for purifying transformer oil.
