March 2023

BUILDING ELECTRIFICATION

Time Allowed: 2.5 Hours *Full Marks: 60*

Answer to Question No. 1 of Group A is compulsory and to be answered first. This answer is to be made in separate loose script(s) provided for the purpose. Maximum time allowed is 30 minutes, after which the loose answer scripts will be collected and fresh answer scripts for answering theremaining part of the question will be provided. On early submission of answer scripts of Question No. 1, a student will get the remaining script earlier.

Answer any Five (05) Questions from Group B.

Group A

1. Choose the correct answer from the given alternatives (any twenty): 1x20

i) No conductor for low or medium voltage overhead lines, Including service lines, erected across a street shall at any part thereof be at height less than:
(a) 17 ft. (b) 18 ft. (c) 19ft. (d) 20 ft.

ii) The colour of light depends on
(a) Wavelength (b) Frequency (c) Speed of light (d) Both (1) and (2).

iii) A 250 V lamp has a total flux of 3000 lumens and takes a current of 0.8 ampere from 250 V mains. its luminous efficiency is
(a) 12 lumens per watt (b) 15 lumens per watt (c) 18 lumens per watt (d) 21 lumens per watt.

iv) The light bulb operating at 100 J/S, is drawing power of_____
(a) 50 Watts (b) 100 Watts (c) 200 Watts (d) 400 Watts.

v) The underground cable has a_____ current carrying capacity as compared to an overhead line.
(a) higher (b) medium (c) lesser (d) zero.

vi) Galvanizing of poles is the process of applying a layer of (a) Zinc (b) coal tar (c) paint (d) varnish.

vii) The board at which Energy meter,cut-out&neutral link are installed is called _____
(a) Service Board (b) Switch Board (c) Main switch board (d) Distribution Board.

viii) ACSR conductor having 7steel strands surrounded by 25 aluminium conductors will be specified as
(a) 7/25 (b) 7/30 (c) 25/7 (d) 25/32.

ix) The electrostatic stress in underground cable is
(a) Same at the conductor surface and at the sheath.
(b) minimum at the conductor surface and maximum at the sheath.
(c) maximum at the conductor surface and minimum at the sheath.
(d) zero at the conductor surface and at the sheath .

x) Which among the following cable are generally suited for the voltage up to 11 KV?
(a) Belted cables (b) Screened cables (c) Pressure cables (d) None of these.

xi) Empire tape is usually made of
(a) Vulcanized rubber (b) impregnated paper (c) Varnished Cambric (d) calico cloth.

xii) The material used for construction of filament of bulb is _____
(a) carbon (b) aluminium (c) tungsten (d) nickel.

xiii) When Energy Conservation Building Code was issued?
(a) April 2008 (b) March 2008 (c) March 2007 (d) May 2007

xiv) Which of the following disadvantages is true for the oil filled cables?
a) The long lengths are not possible b) The thickness of insulation required is more
c) Perfect impregnation is not possible. d) The allowing temperature range is less than solid type cables.

xv) Arrange the type of Lamps in ascending order according to their average lumens/watt.
a) Halogen lamps, Incandescent lamps, Fluorescent lamps, Low pressure sodium lamps
b) Low pressure sodium lamps, Incandescent lamps, Halogen lamps, Fluorescent lamps
c) Fluorescent lamps, Low pressure sodium lamps, Incandescent lamps, Halogen lamps
d) Incandescent lamps, Halogen lamps, Fluorescent lamps, Low pressure sodium lamps

xvi) What should be the insulation resistance of the HV side of the 1600 KVA, 20 KV/ 400 V three phase transformer. Let the value of constant (C) be 1.5 for the oil filled T/C with the oil tank at 20°C?
a) 150 MΩ b) 750 MΩ c) 1925 MΩ d) 1485 MΩ

xvii)According to IS Code, the colour of Earth wire is usually
a) Green b)Red c)Black d) Blue

xviii) Maximum permissible resistance of large power station is_____.
a) 0.5 Ω b) 1 Ω c) 2 Ω d) 8 Ω

xix) ELCB works on the principle of
a) over load current b) short circuit current c) residual current d) neutral current

xx) Which fuses are larger in size?
a) DC Fuses b) AC Fuses c) Striker type Fuses d) Cartridge type Fuses

xxi) Which type of lamp holder from the following is fitted directly on the wooden board?
a) pendant holder b) angle holder c) bracket holder d) batten holder.

xxii) The minimum depth of Junction box used in roof slabsshall be____
a) 65mm b) 75mm c) 85mm d) 90mm

xxiii) The loop Earth wire used shall not be of a size less than
a) 8 SWG b)10 SWG c)20 SWG d)14 SWG or half of the size of the sub circuit wire.

xxiv) In an electrical control panel, the switching logic is obtained by using
a) contactors b) fuses c) wires d) connectors

Group B

2. a) Explain any two IE Rule (i) IE Rule 28 (ii)IE Rule 47 (ii)IE Rule 56
   b) Draw the symbolic diagram of intermediate switch and PT. (3+3) +2

3. a) Two light sources each having a uniform intensity of 600 cd are mounted 8 m heigh and 30 m apart. Determine the illumination directly underneath one lamp and at a distance midway between the lamps.
   b) State and explain the laws of illumination. (4+4)

4. Explain how the ratings of DP, MCB and Distribution Boardare decided for building electrification. Why stranded conductors are preferred over solid conductor? (3+3) +2

5. a) Name the different type of Electrical Wiring System
   b) Explain any two types of Electrical Wiring System with its advantage and disadvantage. (3+5)

6. a) Define the term – Service Connection.
   b) Prepare a list of material for providing service connection to a single storey building at 240 volt single phase 50 Hz having a load of three light/fan sub circuit and two 16 amp Socket points. The supply is to be given from an overhead line 20 m away from the building. (2+6)

7. a) What are the advantages of FRLS Cable?
   b) Classify the cable according to their Operating Voltage.
   c) Write down the different type of Insulation class of cable with its maximum Permissible temperature.
(2+3+3)

8. a) Draw the wiring diagram for Bedroom lighting circuit and Series parallel circuit.
   b) A single phase 240 V AC supply is used in a house consisting of 4 fans of 80 watts each and 20 lamp points of 100 watts each. What will be maximum permissible leakage current for the House?
(3+3)+2

9. a) Why the earth resistance is kept low and why two earth wires are connected to the metallic frames of the machines?
   b) Describe working principle of MCB with connection diagram and state its application. (2+2) +4

10. What are the differences between HRC and LRC cartridge fuses? What are the considerations in selecting a fuse for motor protection and lighting loads? Explain in brief modern methods of earthing. (2+3+3)
