



10. Volume of the conductor material required in three wire DC system is .... of that is required in two wire DC system with one conductor earthed.
  - a.  $5/6^{\text{th}}$
  - b.  $5/16^{\text{th}}$
  - c.  $3/26^{\text{th}}$
  - d.  $1/6^{\text{th}}$
11. RCC poles are used upto.....in overhead transmission lines.
  - a. 11 kV
  - b. 33 kV
  - c. 66 kV
  - d. 132 kV
12. Beyond ..... pin type insulator becomes too bulky and uneconomical.
  - a. 11 kV
  - b. 33 kV
  - c. 66 kV
  - d. 132 kV
13. Tappings are allowed in a feeder conductor.
  - a. True
  - b. False
14. Standard extra high voltage (EHV) equipment are designed to clear faults within ..... of ac input voltage.
  - a. 3 cycles
  - b. 2 cycles
  - c. 5 to 20 cycles
  - d. 10 cycles
15. Computers and allied equipment frequently require ac sources that have no more than ..... total harmonic distortion (THD), with the largest single harmonic being no more than..... of the fundamental voltage.
  - a. 5%, 3%
  - b. 3%, 5%
  - c. 5%, 1%
  - d. 3%, 1%
16. Current transformer (CT) is ..... transformer and potential transformer (PT) is .... transformer.
  - a. Step up, step down
  - b. Step down, step up
  - c. Step up, step up
  - d. Step down, step down
17. Which of the following is not the characteristic of fuse element?
  - a. Low melting point
  - b. Low conductivity
  - c. Low cost
  - d. High resistance
18. Buchholz relay is used for the protection of
  - a. Transformer
  - b. Generator
  - c. Transmission line
  - d. Bus bar
19. Bare overhead conductors are used for service lines when the consumer premises are more than..... away from the supplier distribution pole.
  - a. 35 m
  - b. 45 m
  - c. 25 m
  - d. 54 m
20. Which of the following is **NOT** the characteristics of ideal UPS?
  - a. Low THD
  - b. High reliability
  - c. High EMI
  - d. Zero transition time from normal to back up mode and vice versa.

KATHMANDU UNIVERISTY  
End Semester Examination  
May/June, 2022

Level : B.E.  
Year : III  
Time : 2 hrs. 30 mins.

Course : EPEG 301  
Semester : II  
F.M. : 40

SECTION "B"

[5Q. × 8 = 40 marks]

Attempt *ANY FIVE* questions. Assume suitable data if necessary.

1. a. Describe the basic structure of power system. [4]  
b. Draw a neat schematic diagram of a hydro-electric power plant and explain the functions of various components. [4]

2. a. What are the three key factors which affect the amount of energy that a wind turbine can harness from the wind? Derive the equation for the power produced by the wind turbine relating those three factors. [4]  
b. Describe the economics of power transmission with the aid of Kelvin's law. [4]

3. a. Explain the operation of power line carrier communication (PLCC) with neat schematic diagram. [4]  
b. A generating station has the following daily load cycle: [4]

Time (Hours)	0-6	6-10	10-12	12-16	16-20	20-24
Load (MW)	50	60	70	50	70	30

Draw the load curve and find

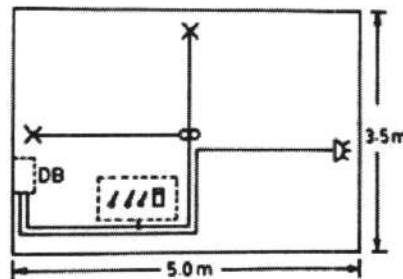
- i. maximum demand  
ii. units generated per day  
iii. average load and  
iv. load factor
4. a. Explain the principle of power system protection with the help of neat schematic diagram. [4]  
b. Explain the volt-var and load-frequency control used in electrical power system. [4]
5. a. Describe your understanding on smart grid. What is supervisory control and data acquisition system? [4]  
b. An industrial consumer having a maximum demand of 120 kW, maintain a load factor of 65%. The tariff rate are Rs. 950/kVA of maximum demand per annum plus Rs. 2/kWh of energy consumed. If the average power factor is 0.707 lagging, determine the following: [4]  
i. The total energy consumed per annum  
ii. The annual electricity bill  
iii. The overall cost per kWh consumed.

6.

a. Draw the schematic of online and offline Uninterruptible Power Supply (UPS) and explain their working principle. [4]

b. Floor plan of a single room inside a residential building is given as follows with following data: [4]

Item	Power rating (Watt)
Fan	60
Light	100
Power socket	1000



Carry out the following tasks:

- Calculate total load
- Decide number of sub-circuits required for wiring
- Decide the current to be handled by each sub circuits
- Select the appropriate size of conductor for circuits and sub-circuits.

Nominal area (mm <sup>2</sup> )	Number and diameter of wire(mm)	Current rating (Amps)	Approximate run for 1 volt drop (m)
1.5	1/1.4	10	2.3
2.5	1/1.8	15	2.5
4	1/2.24	20	2.9
6	1/2.28	27	3.4

Table 1 Current rating of aluminum conductors, single core cables (VIR, PVC or lead sheathed)