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**END SEMESTER EXAMINATION, NOVEMBER 2018**

Semester – 5th

Subject Code : CAI-502

**GENERATION, TRANSMISSION AND  
DISTRIBUTION OF POWER**

Full Marks – 70

Time – Three hours

The figures in the margin indicate full marks  
for the questions.

**Instructions :**

1. *All* questions of PART – A are compulsory.
2. Answer any *five* questions from PART – B.

**PART – A**

Marks – 25

1. Fill in the blanks :

1×10=10

- (a) The most common system for secondary distribution is 3-phase, \_\_\_\_\_ wire system.

- (b) The demand factor is the ratio of \_\_\_\_\_ to \_\_\_\_\_.

[Turn over

- (c) The main consideration in the design of a feeder is the \_\_\_\_\_. (current carrying capacity / voltage drop)
- (d) In short transmission lines, the effects of \_\_\_\_\_ are neglected.
- (e) If the power factor of the load decreases, the line losses \_\_\_\_\_.
- (f) Due to skin effect in the AC system, the effective resistance of the line \_\_\_\_\_ . (increases / decreases)
- (g) The commercial unit of electrical energy is \_\_\_\_\_.
- (h) The unit of reactive power is \_\_\_\_\_.
- (i) Primary transmission is done by \_\_\_\_\_ system. (3-phase, 3-wire / 3-phase, 4-wire)
- (j) The major reason for low lagging power factor of supply system is due to the use of \_\_\_\_\_ motors. (Induction / DC series)

2. Write true or false :

1×10=10

- (a) In chemical reactions, the nuclei don't change and only the valence electrons are shared or exchanged.
- (b) High head hydro power plants work under a head of 40m or above.
- (c) The overall efficiency of a thermal power plant in India is 28-32%.
- (d) In surface condensers, the exhaust steam and cooling water come in direct contact.
- (e) In a balance star connected system, line and phase voltages are equal to each other for a selected phase.
- (f) The underground system has less initial cost than the overhead system.
- (g) The unit of energy is joule.
- (h) A transformer works only on AC voltage.
- (i) The chances of faults in underground system are more as compared to overhead system.
- (j) Maximum demand is the highest demand of load on the power station during a given period.

3. Choose the correct answer :  $1 \times 5 = 5$

(a) Solar and wind power plants are called

(i) Conventional power generating plants

(ii) High efficient power generating plants

(iii) Low efficient power generating plants

(iv) Renewable energy power plants

(b) The major heat loss in a steam power station occurs in

(i) Turbine

(ii) Economizers

(iii) Condenser

(iv) None of the above

(c) The active power loss in an overhead transmission line is mainly due to

(i) Line inductance

(ii) Line capacitance

(iii) Line resistance

(iv) Ground conductor

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(d) An electric transformer is a machine

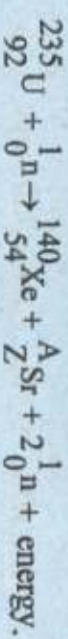
(i) which changes the voltage and frequency

(ii) which changes voltage, power and current levels

(iii) which changes voltage level only keeping power and frequency unchanged

(iv) which changes current level only keeping voltage, power and frequency unchanged

(e) Consider the nuclear equation :



The value of Z and A are

(i) Z=39, A=92

(ii) Z=37, A=93

(iii) Z=38, A=95

(iv) Z=38, A=94

61/CAI-502/GT&DOP (5)

[Turn over

PART - B

Marks - 45

4. (a) Draw a neat diagram of secondary distribution system clearly showing the distribution of power to retail consumers and factories.

4

- (b) 'Proper voltage, availability of power on demand and reliability are the three essential requirements of a good distribution system'. Briefly explain in your own words.

5

5. (a) What is the source of heat in a nuclear reactor ?

1

- (b) What are nuclear fission and nuclear fusion reactions ? Explain with examples.

2.5+2.5=5

- (c) What are moderators and why they are used in nuclear reactors ? Write two names of good moderators.

1+2=3

6. (a) Draw a top view of hydroelectric power plant showing the necessary parts.

3

- (b) 'Hydro power stations are the cleanest energy generating stations with low running cost'. Explain.

3

- (c) Mention three advantages of hydroelectric power plant.

3

7. (a) What are the uses of cooling towers in thermal power stations ?

2

- (b) Why water treatment is required in thermal power plants ? Briefly explain.

3

- (c) A 100MW steam power station uses coal of calorific value 6400 kcal/Kg. Thermal efficiency of the station is 30% and electrical efficiency is 92%. Calculate the coal consumption per hour when the station is delivering its full rated output.

4

8. (a) Write the name of the prime mover used in a diesel power station.

1

- (b) Mention three advantages and three disadvantages of diesel power station.

3+3=6

- (c) What is the purpose of starting motor in gas turbine plant ?

2

9. (a) In power stations, voltage is generated at 11kV and stepped up to 132kV for transmission. Why the generated voltage is stepped up to such a higher magnitude ? 3
- (b) What are short transmission lines ? Derive an expression for sending end voltage and transmission efficiency for short transmission lines.  $2+4=6$