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GIET MAIN CAMPUS AUTONOMOUS GUNUPUR – 765022

B. Tech Degree Examinations, December – 2020

(Seventh Semester)

**BEEPE 7041 / BELPE 7041 - POWER STATION ENGINEERING AND ECONOMY**

(EE &amp; EEE)

Time: 2 hrs

Maximum: 50 Marks

**The figures in the right hand margin indicate marks.****PART – A: (Multiple Choice Questions)****(1 x 10 = 10 Marks)****Q.1. Answer ALL questions**

[CO#] [PO#]

- |   |   |     |
|---|---|-----|
| a. In an interconnected grid system, the diversity factor of the whole system               | 1   | 1   |
| .....   |   |     |
| (i)increase   | (ii)decrease                                |     |
| (iii)constant   | (iv)varies                                  |     |
| b. Natural uranium is made up of  | 2   | 1   |
| (i) 99.282% U238, 0.712% U235, 0.006% U234  | (ii) 99.282% U235, 0.712% U238, 0.06% U234  |     |
| (iii) 99.282% U234, 0.712% U238, 0.006% U235  | (iv) 99.282% U235, 0.712% U234, 0.006% U238 |     |
| c. Which of the following can be used as a coolant in nuclear plant                         | 2   | 1   |
| (i)light or heavy water   | (ii) molten lead                            |     |
| (iii) carbon dioxide  | (iv) freon                                  |     |
| d. Reflector in nuclear plants is used to   | 2   | 1   |
| (i) return the neutrons back into the core  | (ii) shield the radioactivity completely    |     |
| (iii) conserve energy   | (iv) check pollution                        |     |
| e. Annual load factor is determined from ..... load curve                                   | 1   | 1   |
| (i)daily  | (ii)monthly                                 |     |
| (iii)annually   | (iv)weekly                                  |     |
| f. Location of the surge tank in a hydro-electric station is near to the.....               | 3   | 1   |
| (i) Tailrace  | (ii) Turbine                                |     |
| (iii) Reservoir   | (iv)None of the Above                       |     |
| g. Francis, Kaplan and propeller turbines fall under the category of.....                   |   |     |
| (i) Impulse turbine   | (ii) Reaction turbine                       | 3 1 |
| (iii) Impulse reaction combined   | (iv) Axial flow                             |     |
| h. The expression for power plant output in kilo-watt of a hydro-electric plant is given by | 3   | 1   |
| (i) $0.736 Q.W.h/75 X \eta_0$   | (ii) $0.736 Q.Wh.\eta_0/75$                 |     |
| (iii) $75 Q.Wh.\eta_0/0.736$  | (iv) None of these                          |     |
| i. Economisers improve boiler efficiency by   | 4   | 1   |
| (i) 1 to 5 %  | (ii) 4 to 10 %                              |     |
| (iii) 10 to 12 %  | (iv) None of these                          |     |
| j. The working fluid in liquid phase of a steam power plant is:                             | 4   | 1   |
| (i) Water   | (ii) Graphite                               |     |
| (iii) Steam   | (iv) Flue Gas                               |     |

**PART – B: (Short Answer Questions)****(2 x 5 = 10 Marks)**Q.2. Answer ALL questions

	[CO#]	[PO#]
a. Discuss the different classifications of costs of electrical energy	1	1
b. What is Moderator in nuclear power plant?	2	1
c. Write the Essential components of a nuclear reactor?	2	1
d. What are the functions of draft tubes?	3	1
e. What is Forced Draught?	4	1

**PART – C: (Long Answer Questions)****(6 x 5 = 30 Marks)**Answer ANY FIVE questions

	Marks	[CO#]	[PO#]
3. The annual working cost of a power station is represented by the formula Rs (a + b kW + c kWh) where the various terms have their usual meaning. Determine the values of a, b and c for a 60 MW station operating at annual load factor of 50% from the following data: (i) capital cost of building and equipment is Rs 5 × 106 (ii) the annual cost of fuel, oil, taxation, and wages of operating staff is Rs 9,00,000 (iii) the interest and depreciation on building and equipment are 10% per annum	(6)	1	2
4. Explain the working Pressurised Water Reactor (PWR) with schematic diagram	(6)	2	1
5. What are the factors are considered to selecting the site for Nuclear power plant?	(6)	1	1
6. A generating station has the following daily load cycle: Time (hours) 0—6 6—10 10—12 12—16 16—20 20—24 Load (MW) 20 25 30 25 35 20 Draw the load curve and find (i) maximum demand, (ii) units generated per day, (iii) average load, (iv) load factor,	(6)	1	2
7. State the functions of a dam. How are dams classified? Briefly describe a few important types of dams. How would you select the site and the type of the dam?	(6)	3	1
8. The run off data of a river at a particular site is tabulated in Table	(6)	3	3

Month	Mean discharge (millions of cu.m.)	Month	Mean discharge (millions of cu.m.)
January	30	July	80
February	25	August	100
March	20	September	110
April	0	October	65
May	10	November	45
June	50	December	30

- (a) Draw the hydrograph and find the mean flow. (b) Draw the flow duration curve.  
(c) Find the power developed if the head available is 90 m and the overall efficiency
9. A forced circulation boiler delivering 36 kg/s at 130 bar is operated with a circulation ratio of 5 : 1. The circulation pumps impart a head rise of 2.8 bar, with suction conditions of 350 °C and 140 bar. What would the ideal pump work amount to per kg of steam delivered? (6) 4 2
10. What is Merits and demerit of a Thermal Power Plant (6) 4 1

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