

Ref No.:- Ex/PG/NuE/T/127A/2019

Master of Nuclear Engineering 2nd Semester Examination, 2019

Subject: Reactor Physics and Engineering II

Time: Three hours

Full marks: 100

Answer any Five Questions

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| 1. a. What are the safety barriers in a nuclear power plant? | 2 |
| b. Write the major engineered safety features. | 3 |
| c. What are the different levels of defense in depth system? | 5 |
| d. What are the reasons for which reactor trip signal is activated? | 6 |
| e. What are the criteria for determination of design basis LOCA in PWR or BWR? | 4 |
| 2. a. Write the goals of reactor safety | 4 |
| b. Consider a typical 1000-MW(e) PWR which discharges fuel assemblies with an average discharge burnup of 33000 MW.d/t. If the thermodynamic efficiency is 32 percent, and each assembly contains 450 kg of total uranium, how many assemblies would be discharged annually? A plant factor of 0.7 may be assumed. | 4 |
| c. Define passive system and classify it. | 5 |
| d. Define capacity factor and plant factor. | 2 |
| e. Write a short note on spent-fuel management | 5 |
| 3. a. Define Radioactivity. | 2 |
| b. Write a short note on Photo Electric Absorption. | 3 |
| c. Write a short note on Pair Production. | 5 |
| d. Write a short note on Spontaneous Fission. | 5 |
| e. Write a short note on Annihilation Radiation. | 5 |
| 4. a. Describe TMI accident. | 8 |
| b. Describe Chernobyl accident. | 8 |
| c. What are the Severe Accident Management Guidelines? | 4 |

5. a. Write the difference between Nuclear Power Plant and Thermal Power Plant. 2
 b. Write the difference between Reliability and Quality. 2
 c. Define Maintainability. 2
 d. Define Availability. 2
 e. Write the reasons for probabilistic safety analysis. 4
 f. What are the passive safety systems are used in AP600, ESBWR and AHWR. 8
6. a. Describe the functions of containment 5
 b. What are the calculated ECCS acceptance criteria? 5
 c. Draw the Event Tree and also find its consequence. 5

Large Loss of Coolant	Reactor Protection	High Pressure Injection System	Low Pressure Injection System	GDWP Recirculation Failure	Unavailability of Moderator Cooling
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d. Draw the fault tree.

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