



Name: ..... Roll No.: .....

Branch: ..... Signature of Invigilator: .....

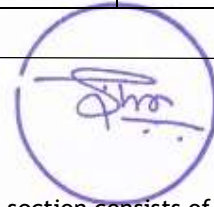
Semester: VIth

Date: 05/05/2022 (MORNING)

Subject with Code: ME391 ELEMENTS OF NUCLEAR & DIESEL POWER PLANT

Marks Obtained	Section A (30)	Section B (20)	Total Marks (50)

INSTRUCTION TO CANDIDATE



1. The booklet (question paper cum answer sheet) consists of two sections. First section consists of MCQs of 30 marks. Candidates may mark the correct answer in the space provided / may also write answers in the answer sheet provided. The Second section of question paper consists of subjective questions of 20 marks. The candidates may write the answers for these questions in the answer sheets provided with the question booklet.
2. The booklet will be distributed to the candidates before 05 minutes of the examination. Candidates should write their roll no. in each page of the booklet.
3. Place the Student ID card, Registration Slip and No Dues Clearance (if applicable) on your desk. All the entries on the cover page must be filled at the specified space.
4. Carrying or using of mobile phone / any electronic gadgets (except regular scientific calculator)/chits are strictly prohibited inside the examination hall as it comes under the category of unfair means.
5. No candidate should be allowed to enter the examination hall later than 10 minutes after the commencement of examination. Candidates are not allowed to go out of the examination hall/room during the first 30 minutes and last 10 minutes of the examination.
6. Write on both side of the leaf and use pens with same ink.
7. The medium of examination is English. Answer book written in language other than English is liable to be rejected.
8. All attached sheets such as graph papers, drawing sheets etc. should be properly folded to the size of the answer book and tagged with the answer book by the candidate at least 05 minutes before the end of examination.
9. The door of examination hall will be closed 10 minutes before the end of examination. Do not leave the examination hall until the invigilators instruct you to do so.
10. Always maintain the highest level of integrity. Remember you are a BITian.
11. Candidates need to submit the question paper cum answer sheets before leaving the examination hall.

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI  
(END TERM EXAMINATION)**

**CLASS: B. TECH  
BRANCH: All**

**SEMESTER: VI  
SESSION: SP/2022**

**SUBJECT: ME391(OE-III) Elements of Nuclear and Diesel Power Plants**

**TIME: 2 HOURS**

**FULL MARKS: 50**

**INSTRUCTIONS:**

1. The total marks of the questions are 50.
  2. For section A - Attempt all question (each of one marks)
  3. For section B- Attempt any four questions (each of five marks)
  3. Before attempting the question paper, be sure that you have got the correct question paper.
  4. The missing data, if any, may be assumed suitably.
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<b>SECTION A (Attempt all questions)</b>		[30x1]
1.	The efficiency of a nuclear power plant in comparison to a conventional thermal power plant is: (a) Same (b) More (c) Less (d) May be less or more depending on size (e) Unpredictable	
2.	Isotopes of same elements have: (a) Same atomic number and different masses (b) Same chemical properties but different atomic numbers (c) Different masses and different atomic numbers (d) Different chemical properties and same atomic numbers (e) Same chemical properties and same atomic numbers	
3.	Amongst the following, the fissionable materials are (a) U233 and Pu239 (b) U23i and Pu233 (c) U235 and Pu235 (d) U238 and Pu239 (e) U243 and Pu235	
4.	Moderator in nuclear plants is used to (a) Reduce temperature (b) Extract heat from nuclear reaction (c) Control the reaction (d) Cause collision with the fast-moving neutrons to reduce their speed (e) Moderate the radioactive pollution	
5.	The most commonly used moderator in nuclear plants is (a) Heavy water (b) Concrete and bricks (c) Graphite and concrete (d) Deuterium (e) Graphite	

6.	The nuclear energy is measured as (a) MeV (b) Curie (c) Farads (d) MW (e) KWhr	
7.	Boiling water reactor employs (a) Boiler (b) Direct cycle of coolant system (c) Double circuit system of coolant cycle (d) Multi pass system (e) Single circuit system	
8.	Fast breeder reactor uses (a) Boiler (b) Direct cycle of coolant system (c) Double circuit system of coolant cycle (d) Multi pass system (e) Single circuit system	
9.	Which of the following nuclear reactor does not need a heat exchanger for generation of steam? (a) Gas cooled (b) Liquid metal cooled (c) Pressurized water (d) Boiling water (e) None of the above	
10.	Gas cooled reactor uses following materials as moderator, and coolant (a) Graphite, CO <sub>2</sub> (b) Graphite, air (c) Heavy water, CO <sub>2</sub> (d) Lead, H <sub>2</sub> (e) Concrete, N <sub>2</sub>	
11.	Which of the following type of pump is used in liquid metal cooled reactor for circulation of liquid metal: (a) Centrifugal (b) Axial (c) Reciprocation (d) Electromagnetic	
12.	One gram of uranium will produce energy equivalent to approximately (a) 1 tonne of high-grade coal (b) 4.5 tonnes of high-grade coal (c) 45 tonnes of high-grade coal (d) 85 tonnes of high-grade coal (e) 100 tonnes of high-grade coal	
13.	Which of the following can be used as a coolant in nuclear plant: (a) Light or heavy water (b) Molten lead (c) Carbon dioxide (d) Freon (e) Carbon tetrachloride	

14	<p>The function of control rods in nuclear plants is to</p> <ul style="list-style-type: none"> <li>(a) Control temperature</li> <li>(b) Control radioactive pollution</li> <li>(c) Control absorption of neutron</li> <li>(d) Control fuel consumption</li> <li>(e) None of the above</li> </ul>	
15	<p>A fast breeder reactor uses following as fuel</p> <ul style="list-style-type: none"> <li>(a) Enriched uranium</li> <li>(b) Plutonium</li> <li>(c) Thorium</li> <li>(d) U235</li> <li>(e) Natural uranium</li> </ul>	
16	<p>Pressurized water reactor is designed</p> <ul style="list-style-type: none"> <li>(a) For boiling water in the core</li> <li>(b) To use liquid sodium metal as coolant</li> <li>(c) To use intermediate coolant</li> <li>(d) To prevent the water coolant from boiling in the core</li> </ul>	
17.	<p>The average thermal efficiency of modern nuclear power plant is about</p> <ul style="list-style-type: none"> <li>(a) 30%</li> <li>(b) 60%</li> <li>(c) 40%</li> <li>(d) 80%</li> </ul>	
18	<p>Reflectors of a nuclear reactors are made up of:</p> <ul style="list-style-type: none"> <li>(a) Boron</li> <li>(b) Cast iron</li> <li>(c) Beryllium</li> <li>(d) Steel</li> </ul>	
19	<p>Diesel engines may be designed as:</p> <ul style="list-style-type: none"> <li>(a) Two-stroke cycles</li> <li>(b) Four-stroke cycles</li> <li>(c) Three-stroke cycles</li> <li>(d) Both A and B</li> </ul>	
20	<p>Which of the following are advantages of diesel engine?</p> <ul style="list-style-type: none"> <li>(a) Good lubrication properties</li> <li>(b) High energy density</li> <li>(c) Low risk of catching fire, as they do not form a flammable vapor</li> <li>(d) All of the above</li> </ul>	
21	<p>The operation of forcing additional air under pressure in the engine cylinder is known as</p> <ul style="list-style-type: none"> <li>(a) Scavenging</li> <li>(b) Supercharging</li> <li>(c) Turbulence</li> <li>(d) Pre-ignition</li> </ul>	
22	<p>The thermal efficiency of diesel engines is about</p> <ul style="list-style-type: none"> <li>(a) 0.3</li> <li>(b) 0.4</li> <li>(c) 0.5</li> <li>(d) 0.6</li> </ul>	

23	<p>Which among the following instruments are provided on the exhaust line to reduce the pressure?</p> <p>(a) Ducts.  (b) Muffler  (c) Strainers.  (d) Purifiers.</p>	
24	<p>Diesel engine power plants usually run on</p> <p>(a) Neptha  (b) Light diesel oil  (c) Kerosene  (d) High speed diesel oil.</p>	
25	<p>A diesel power plant is best suited as</p> <p>(a) Base load plant  (b) Stand-by plant  (c) Peak load plant  (d) General purpose plant.</p>	
26	<p>A nuclear power plant is invariably used as a</p> <p>(a) Peak load plant  (b) Base load plant  (c) Stand-by plant  (d) Spinning reserve plant.</p>	
27	<p>Reflector in nuclear power plants ..... neutron leakage.</p> <p>a) Decreases  b) Has no effect  c) Increases  d) All of the mentioned</p>	
28	<p>In a diesel engine, the duration between the time of injection and ignition is known as?</p> <p>a) Delay period  b) Period of ignition  c) Burning period  d) Pre-ignition period</p>	
29	<p>What is a power plant?</p> <p>a) Industrial facility that uses primary energy to generate electricity  b) Industrial facility that uses secondary energy to generate mechanical energy  c) Industrial facility that uses primary energy to generate mechanical energy  d) Industrial facility that uses secondary energy to generate electricity</p>	
30	<p>The alternator is used in power plants which converts</p> <p>(a) Electrical Energy into Mechanical Energy  (b) Electrical energy into Solar Energy  (c) Mechanical Energy into Electrical Energy  (d) Mechanical Energy into Nuclear Energy</p>	

<b>SECTION B (Attempt any four questions)</b>		[4x5]
1.	Elaborate the function of different parts of a typical nuclear power plant with neat sketch	
2.	What are the different types of reactors commonly used in nuclear power stations? Describe any one of them with a neat diagram.	
3.	How does nuclear energy impact the environment? Is using nuclear power really the answer to clean, environmentally friendly energy?	
4.	Draw a typical layout of Diesel Power Station and Explain it.	
5.	Describe the fuel system and exhaust system of a diesel power station.	
6.	Explain the necessity of the cooling system in a diesel engine. What are the methods of cooling the engine?	

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