



**UNIVERSITY OF PETROLEUM AND ENERGY STUDIES**

**End Semester Examination, April 2018**

**Programme: B.Tech. PSE**

**Course Name: HSE in Power Industry**

**Course Code: PSEG 481**

**No. of page/s: 3**

**Semester : VIII**

**Max. Marks : 100**

**Duration: 3 Hrs**

**Section A : (5 x 4 = 20 Marks)**

**Note : Attempt all questions from section "A". Each question carry equal marks.**

**Q.1 . Choose the correct answers:**

**( 1 x 4 = 4Marks)**

- i) ----- injury result from worker performing the same task time after time.  
a) Cumulative trauma injury    b) Dizziness    c) Lung Cancer    d) None of these
- ii) Suspended solids and floating materials are removed in which stage of waste water treatment?  
a) Primary                      b) Secondary                      c) Tertiary                      d) Biological treatment
- iii ) In ----- method experts (scientist, engineers and manager) review and identify the different project events and assess their possible effects on existing environmental condition.  
a) Martix method    b) Network method    c) Checklist Method    d) Adhoc Method
- iv) Corona is a mechanism of  
a) Creating a charge on the particles                      b) Migrating of particles to the electrode  
c) Formation of ions in the gas                                      d) Developing force of attraction

**Q.2. Fill in the Blanks :**

**(1 x 4 = 4**

**Marks)**

- i) -----procedures are designed to protect workers in confined spaces from outside hazards, such as gases or liquids being pumped accidentally into a confined space that could result in fatal injuries
- ii) The EIA process in India was made mandatory and was also given a legislative status through a notification issued in January -----.
- iii) ----- is the process in which the amount of toxic substance goes on increasing along with food chain.
- iv) ----- remove oil and grease from waste water in effluent treatment plant.

**Q.3. State True and False.**

**(4 Marks)**

- i) Fall protection must be provided to any employee working at a height of 6 feet or more above a lower level.

- ii) Activities are undertaken as per schedule before breakdown of system or machine takes place & to ensure smooth and efficient working of a system equipment known as break down maintenance.
- iii) Bag filter can remove gaseous pollutants as well as particulate matter emission.
- iv) Class A confined space is dangerous but not immediately life threatening, rescue procedure require entry of no more than one individual fully equipped with life support equipment - visual or auditory communication with worker.

**Q.4. Write the full form of the following abbreviations: ( 4 Marks)**

- a) RSI and ALARP -----
- b) EIS and IDLH -----
- c) TLV and LFL-----
- d) TDS and TSS-----

**Q.5. Define the following terms : ( 4 Marks)**

- a) Scaffold ( 2 Marks)
- b) Chronic effect (2 Marks)

**Section “B” ( 12 x 5 = 60 Marks)**

**B1 ( Attempt all questions from section B1)**

Q.6. What are the different types of fire? Explain various types of extinguishing media which are used to control and prevent fire in power industry? ( 4 + 8 = 12 Marks)

Q.7. What do mean by an Ergonomics? Explain various programme which are designed to eliminate Ergonomic hazard at work place . (2 + 10 = 12 Marks)

Q.8. Explain various component of safety management which are required to implement during operation and maintenance of electrical plants and equipment. (12 Marks)

Q.9. Explain all the steps of physical and chemical treatment of effluent treatment plant which are used to treatment effluent generated from power industry. (8 + 4 = 12 Marks)

**B2**

**(Note : Attempt any one question from this section B2 i.e either Q.10 or Q.11.)**

Q.10. To meet the increasing demand of power with minimum environmental impact for sustainable development, adoption of clean technologies with enhanced power plant efficiency is

necessary. Clean coal technologies offer the potential for major improvement in efficiency and significant reduction in environmental emissions when used for power generation. Explain briefly the pre-combustion, combustion and post-combustion technologies for controlling gaseous and particulate matter in thermal power plant with schematic diagram. (12 Marks)

Or

Q.11. Explain the principles and functions of any six air pollution control equipment which are used to control gaseous emission and particulate matter generated from thermal power plant with schematic diagram. (12 Marks)

**Section “C” Long Answers Questions 20 x 1= 20 Marks**

**(Note : Attempt any one questions)**

Q.12. a) What is confined space as per OSHA Standards? Describe the various hazards which are present in Confined Space. (3+ 7 = 10 Marks)

a) Describe various steps which need to be followed during permit required confined space entry procedure. (10 Marks)

**Or**

Q.13. a) What is EIA? What are the various objectives of EIA ? Explain various component of EIA. (2 + 3 + 5 = 10 Marks)

b) Describe environmental clearance process for Category A & Category B Thermal Power Plant Project with suitable flow diagram. (10 Marks)

Roll No: -----



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**Section A : (5 x 4 = 20 Marks)**

**Note : Attempt all questions from section "A". Each question carry equal marks.**

**Q.1 . Choose the correct answers:**

**( 1 x 4 = 4Marks)**

- i) Chernobyl disaster took place in the year  
a) 1983                      b) 1980                      c) 1886                      d) 1986
- ii) PAN is the example of ---  
a) Primary pollutant                      b) Secondary pollutant  
c) Indoor pollutant                      d) None of these
- iii) Which equipment is not used to control particulate matter  
a) Settling Chamber                      b) Cyclones  
c) Wet Scrubber                      d) Condensation
- iv) Activated carbon is used in the process of  
a) Absorption                      b) Adsorption  
c) Combustion                      d) Condensation

**Q.2. Fill in the blank .**

**( 4 Marks)**

- i) ..... hazard are forms of energy that can harm the body when exposure takes.
- ii) ..... is the loss of a person's ability to hear higher frequency sounds.
- iii) Initial entry into confined spaces should be done by qualified personnel intending to finish atmosphere testing and hazard evaluation is known as -----.
- iv) Class ----- confined space is dangerous but not immediately life threatening, rescue procedure require entry of no more than one individual fully equipped with life support equipment - visual or auditory communication with worker.

**Q.3. State T or F**

**( 4 Marks)**

- i) Isolation procedures are designed to protect workers in confined spaces from outside hazards, such as gases or liquids being pumped accidentally into a confined space that could result in fatal injuries.
- ii) Mercury is highly toxic; causes 'itai-itai' disease-painful rheumatic condition; cardio vascular system affected; gastro intestinal upsets and hyper tension
- iii) Breakdown maintenance Activities are undertaken after failure of an equipment, such maintenance results in outage of circuit & supply.
- iv) The objective of the Environmental Impact Assessment is to help in achieving sustainable development with minimum environmental degradation along with prevention of long term environmental effects by incorporating suitable mitigate measures.

**Q.4. Q.4. Write the full form of the following abbreviations:**

**( 4 Marks)**

- a) RSI and ALARP -----
- d) EIS and IDLH -----
- a) TLV and LFL-----
- b) TDS and TSS-----

**Q.5. Q.5. Define the following terms :**

**( 4 Marks)**

- a) First Entry ( 2 Marks)
- b) PFAS (2 Marks)

**Section "B" ( 12 x 5 = 60 Marks)**

**B1 ( Attempt all questions from section B1)**

Q.6. a) Explain the various standards set forth by the Boiler Act 1923 to prevent hazards in operation of boilers. (6 Marks)

b) What is biological hazards? What are the route of entry and transmission of biological hazards on human body? ( 2 + 4 = 6 Marks)

Q.7. What are ergonomic hazards? Explain the various risk factors which causes ergonomic hazards at work place. (4 +8 = 12 Marks)

Q.8. What is fire triangle? Explain the different classes of fire. Explain the different the different fire extinguishing techniques which are used in power industry. (12 Marks)

Q.9. What are the characteristics of Permit required confined space as per OSHA standards. What are the various steps of Permit-Required Confined Space Entry Procedures which are required to protect the workers from different hazards in confined space. (4 + 8 = 12 Marks)

### **B2**

**(Note : Attempt any one question from this section B2 i.e either Q.10 or Q.11.)**

Q.10. To meet the increasing demand of power with minimum environmental impact for sustainable development, adoption of clean technologies with enhanced power plant efficiency is necessary. Clean coal technologies offer the potential for major improvement in efficiency and significant reduction in environmental emissions when used for power generation. Explain briefly the pre-combustion, combustion and post-combustion technologies for controlling gaseous and particulate matter in thermal power plant with schematic diagram. (12 Marks)

**Or**

Q.11. Explain various component of safety management which are required to implement during operation and maintenance of electrical plants and equipment. (12 Marks)

### **Section “C” Long Answers Questions 20 x 1= 20 Marks**

**(Note : Attempt any one questions from this section either Q.12 or Q.13)**

Q.12. When effluents or waste water is discharged into a water bodies i.e. river, lake and sea, number physical, chemical and biological characteristics of water change which causes loss of organism and deterioration of water quality. Describe Primary, Secondary and tertiary treatment of Effluent Treatment Plant of thermal power plant with the help of well labelled diagram.

(20 Marks)

**Or**

Q.13. a) Define EIA? EIA. What are the objectives and types of EIA ? (2+ 4+ 4 = 10 Marks)

b) Describe in a systematic way how a new thermal power project is given environmental clearance from Ministry of Environment and Forest with flow chart. (10 Marks)