

Roll No: -----

**UNIVERSITY OF PETROLEUM
AND ENERGY STUDIES**



End Semester Examination, April, 2017

Program/course:	MSENT	Semester – VIII
Subject:	Advanced Applications of Nano Tech.	Max. Marks : 100
Code :	MTEG 421	Duration : 3 Hrs
No. of page/s:	3	

SECTION: A [Total-20 marks]

Q.1. Fill in the blanks / Objectives / True [T]-False [F]: 1 Mark each [Total -10 Marks]

1. Water can be used as base fluid for development of nano-fluids [T/F].
2. Write the names of two nano-drugs.
3. If FC is for fuel cell write the expansion of PEMFC & DMFC.
4. Give example of quantum dot.
5. Density of CNT is.....g/cm³.
6. Viscosity of a lubricant increases with increase in temperature [T/F].
7. Graphene based scaffold is useful to enhance the activity of metal catalysts [T/F].
8. Trichloroethylene (TCE) can be removed from water by
[A] Nano-platinum [B] Nano-Iron [C] Nano-sodium [D] Nano-potassium.
9. Capsules based concept is useful for multiple self-healing [T/F].
10. Techniques for dispersing nano fillers and measuring degree of dispersion pose the biggest challenge for nano-industry [T/ F].

Q.2. Discuss the followings sentences: 5 Marks each [Total-10 Marks].

- (i) The relation of viscosity and temperature for a high performance lubricant, please give a numerical explanation also.
- (ii) Advantages of click chemistry based self-healing technique including the percentage detection of click based self-healing.

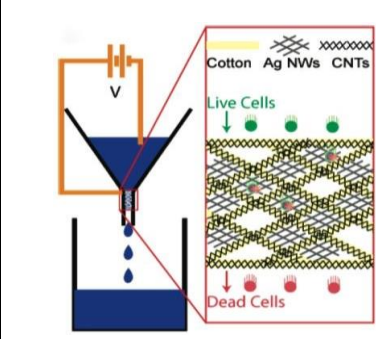
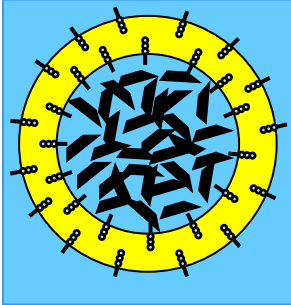
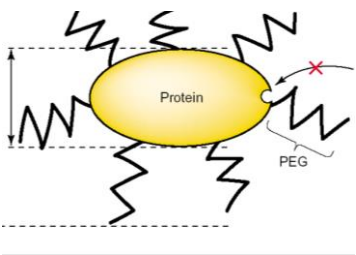
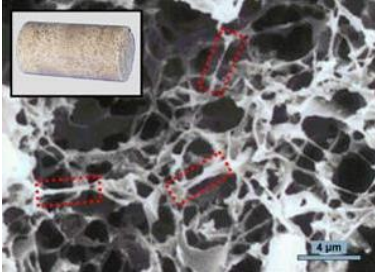
SECTION: B [Total-40 marks]

- Q.3.** Define G_0 , G_1 , G_2 , and G_3 dendrimers. Explain the factors affecting the properties of dendrimers and their applications. **[Mark 10].**
- Q.4.** Explain the role of CNT in (i) drug delivery (ii) water purification. **[Mark 10].**
- Q.5.** Describe the types of Fuel Cells based on used electrolytes, operating temperature and sensitivity to hydrogen purity. **[Mark 10].**
- Q.6.** Describe the synthesis and application of Zero-valent iron (nZVI) **[Mark 10].**

SECTION: C [Total-40 marks]

Attempt any two questions: 20 marks each

- Q.7.** Explain the following Figures with one application: 5 Marks each **[Total-20 Marks].**

 <p>[1] Purification</p>	 <p>[3] ZVI</p>
 <p>[2] Nano-Drug</p>	 <p>[4] Nanorobots</p>

Q.8. Explain the role of nanotechnology for the followings: 4 Marks each **[Total-20 Marks]**.

1. 'Drug Vehicle'
2. 'Nano-reporters'
3. 'Nano-sensors' in kitchen
4. TiO_2 for window cleaning
5. Nanofluids

Q.9. Give a comprehensive mechanism of Bio-desulfurization (BDS) of dibenzothiophene (DBT) including the detail of used nanoparticles and bacteria. **[Total-20 marks]**