Name: **Enrolment No:**	UPES

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2019

Course: Fundamentals of Nanotechnology | **Semester: VI**
Program: B.Tech ETLLB IPR | **Time: 03 hrs.**
Course Code: ETEG 332 | **Max. Marks: 100**

Instructions: Your answer should be concise and to the point.

SECTION A (All questions are compulsory)			
Q1	What do you understand by the term self-cleaning windows?	**[4]**	**CO3**
Q2	Explain the role of Ethics in science.	**[4]**	**CO4**
Q3	"Sputtered films have the same concentration as that of the target material". Why?	**[4]**	**CO3**
Q4	What is the role of vacuum during synthesis of nanomaterials?	**[4]**	**CO1**
Q5	Explain in brief the Photovoltaic effect.	**[4]**	**CO3**
SECTION B (Question 9 has internal choices.)			
Q6	Explain the use of Nanotechnology in power transmission lines.	**[10]**	**CO3**
Q7	With the help of a neat sketch, explain the mechanical milling process for the production of nanoparticles.	**[10]**	**CO2**
Q8	A solar cell of area 2 cm^2 receives solar radiation having an intensity of 0.9mW/cm^2. Measurements show that at 25°C the open circuit voltage, the short circuit current and maximum current are 0.24V, 9 mA and 6 mA respectively. The efficiency of the cell is 20%. Calculate the maximum voltage that the cell can give and find the fill factor.	**[10]**	**CO3**
Q9	Discuss the different ways by which white light can be generated through LED**.** **OR** Discuss one method to split water with sunlight for hydrogen production.	**[10]**	**CO3**
SECTION-C (Question 11 has internal choices.)			
Q10	(a) Give the construction and working of Transmission Electron Microscope. (b) Explain the principle and working of sputtering method for the synthesis of thin films with the help of a suitable diagram.	**[10]** **[10]**	**CO3** **CO2**
Q11 (a)	(i) List out the different ways in which we can harvest the solar energy? Explain them briefly. (ii) "Exposure to nanomaterials is dangerous to human health and ecosystem". Explain. **OR**	**[10]** **[10]** **[10]**	**CO3** **CO4** **CO3**
Q11 (b)	(i) Compare the various Physical and Chemical routes for the synthesis of nanomaterials.	**[10]**	**CO4**

	(ii) Write a note on the status of nanotechnology in National scenario.		

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	SECTION A (All questions are compulsory)		
Q1	What do you understand by the term Artificial Photosynthesis?	**[4]**	**CO3**
Q2	What is the importance of Ethics in Science?	**[4]**	**CO4**
Q3	"No more Spiderman window cleaner". Explain.	**[4]**	**CO3**
Q4	What is the role of vacuum during thin film deposition?	**[4]**	**CO3**
Q5	Explain weak confinement on the basis of Bohr's radius.	**[4]**	**CO1**
	SECTION B (Question 9 has internal choices.)		
Q6	Provide one method for the production of Hydrogen gas using solar energy.	**[10]**	**CO3**
Q7	Write a brief note on the present and future applications of Nanotechnology.	**[10]**	**CO2**
Q8	A solar cell of area 1 cm^2 receives solar radiation having an intensity of 0.9mW/cm^2. Measurements show that at 25°C the open circuit voltage, the short circuit current and maximum current are 0.24V, 9 mA and 6 mA respectively. The efficiency of the cell is 25%. Calculate the maximum voltage that the cell can give and find the fill factor.	**[10]**	**CO3**
Q9	Explain the different processes that are involved in the preparation of a solid sample to be characterized by TEM. **OR** Discuss the use of Nanotechnology in energy storage devices.	**[10]**	**CO3**
	SECTION-C (Question 11 has internal choices.)		
Q10	(a) Explain the potential impacts of Nanotechnology on pipeline transmission of Petroleum and natural gas. (b) With the help of a neat and labelled diagram explain the construction and working of Scanning Electron Microscope	**[10]** **[10]**	**CO3** **CO2**
Q11 (a)	(i) How nanotechnology is being used in Solid State Lightning. What are its advantages over the conventional lighting systems? (ii) Discuss the implications of Nanotechnology on environment.	**[10]** **[10]**	**CO3** **CO4**

	OR		
Q11 (b)	(i) Why silicon dominates the solar cell market? Give the construction and working of a silicon solar cell.	**[10]**	**CO3**
	(ii) Write in brief on the status of nanotechnology in International scenario.	**[10]**	**CO4**