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Question Paper Code:UC303

B.E./B.Tech. DEGREE EXAMINATION, NOV 2025

Professional Elective

21BTV303 – NANOMEDICINE FOR THERANOSTICS

Biotechnology

(Regulations 2021)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1. Comment on the mechanism of protooncogenes in cancer CO1 - App
2. How is cell death different from Apoptosis? CO1 - App
3. List out the barriers to nanovector delivery CO2 - App
4. Define Blood-Brain Barrier CO1 - U
5. “Dendrimers as drug nanocarriers”. Justify CO3 - App
6. Define Theranostics. Give an example with reference to cancer nanomedicine CO1 - U
7. How does the MRI work in the case of cancer detection? CO2- App
8. Throw light on new research areas in “Regenerative Medicine in Cancer” CO - U
9. Comment on ELSI issues related to cancer nanomedicine CO5 - App
10. Give out the key points related to Adoption and diffusion CO1 - U

PART – B (5 x 16= 80 Marks)

11. (a) Explain the methodology for the removal of cancer tissue from the cancer patient. CO1 – U (16)
- Or
- (b) Explain the chromothrypsis mechanism in cancer and mention how the proto-oncogenes and oncogenes lead to the formation of cancer. CO1 – U (16)

12. (a) Explain in detail the nano-engineered hydrogel for the cell repair mechanism. CO1 – U (16)
- Or
- (b) Explain the aspects of stem cell-based treatment in detail. CO1 – U (16)
13. (a) Write a detailed note on the MRI and CT visualization techniques. CO1 - U (16)
- Or
- (b) Write a detailed note on Nanoparticles deployed for diagnostic purposes. CO1 –U (16)
14. (a) Tissue engineering and Regenerative medicine are one of the most promising areas of medical science. Explain in significance of tissue engineering in wound healing. CO2 –App (16)
- Or
- (b) MRI safety committee approval is required if the proposed research involves the use of contrast agents in MRI. Why is it so? Explain in detail the role of MRI and various contrast agents in cancer diagnosis. CO2 –App (16)
15. (a) The development and production of nanoparticles can be expensive, which could limit their availability and affordability. Regulatory challenges: The use of nanomedicine in humans is subject to strict regulatory approval, which can slow down the development and implementation of new therapies. Suggest some measurable strategies to overcome those limitations. CO6 - E (16)
- Or
- (b) The emergence of a huge number of Nano medicines has demonstrated their potential in both disease diagnosis and treatment, and is promising to take the place of conventional diagnosis and therapeutic approaches in the future. How would you compile the facts from your learning about Nano medicine from a future perspective. CO6 - E (16)