



(Following Paper ID and Roll No. to be filled in your Answer Book)

**PAPER ID : 140856**

Roll No.

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## B.Tech.

### (SEM. VIII) THEORY EXAMINATION, 2014-15 CONCEPTS OF MODERN PHYSICS

Time : 3 Hours]

[Total Marks : 100

1 Attempt any one part. Each part carries equal marks.

[10×1=10]

- Write a short note wave particle duality.
- Derive the Schrodinger's time independent wave equation and give the physical significance of wave function.

2 Attempt any one part. Each part carries equal marks.

[10×1=10]

- Explain the working and construction of ruby laser.
- What is the de-Broglie matter wave? Calculate de-Broglie wavelength associated with a proton moving with a velocity equal to  $\frac{1}{20}$  th of the velocity of light.

3 Attempt any one part. Each part carries equal marks.  
[10×1=10]

- (a) Explain in brief about the elementary particles and give its characteristics.
- (b) What is the law of conservation? Explain quarks model.

4 Attempt any one part. Each part carries equal marks.  
[10×1=10]

- (a) Explain Feynman diagrams with their rules.
- (b) Write a short note on simple particle dynamics.

5 Attempt any one part. Each part carries equal marks.  
[10×1=10]

- (a) Describe the working and construction of Michelson-Morley experiment.
- (b) Explain how relativity works as a bridge of electricity and magnetism.

6 Attempt any one part. Each part carries equal marks.  
[10×1=10]

- (a) What the general – relativity concept is of curved space-time?
- (b) Explain in brief Minikowaskian space-time.

- 7 Attempt any one part. Each part carries equal marks.  
[10×1=10]
- (a) Give a brief review of universe big-bang to black-hole including nucleo-synthesis.
  - (b) What is Hubble's Law? Explain the critical density.
- 8 Attempt any one part. Each part carries equal marks.  
[10×1=10]
- (a) What is solar system and explain about the galaxy.
  - (b) Explain about dark – matter and dark energy in brief.
- 9 Attempt any one part. Each part carries equal marks.  
[10×1=10]
- (a) What is the Maxwell unification of electric and magnetic field as electromagnetic?
  - (b) Write the short note on:
    - (i) Standard model
    - (ii) Strong and weak nuclear force
- 10 Attempt any one part. Each part carries equal marks.  
[10×1=10]
- (a) With the introduction of Feynman diagram explain the GSW electro-weak unification.
  - (b) What do you understand by the M-theory? Explain it.