

Question Paper

Exam Date & Time: 05-Mar-2019 (02:00 PM - 04:00 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION

FIRST SEMESTER B.Sc. MEDICAL RADIOTHERAPY TECHNOLOGY DEGREE EXAMINATION - MARCH 2019
SUBJECT: BMRT 105/BRTT 101 - BASIC PHYSICS
(2016/2016 RV SCHEME)
Tuesday, March 05, 2019 (14.00 - 16.00)

Marks: 50

Duration: 120 mins.

1. Explain:

- 1A) Collision. (2)
- 1B) Newton. (2)
- 1C) Inertia. (2)
- 1D) Static and Kinetic friction. (4)

- 2) Elucidate the laws of electromagnetic induction. (10)

3. Answer all the questions.

- 3A) Using Newton's second law of motion, explain impulse and change in momentum. (5)
- 3B) Explicate on fluorescence and phosphorescence. (5)
- 3C) State and explain Kirchhoff's second law. (5)
- 3D) A gymnast of mass 62kg bounces vertically on a trampoline so that she approaches and leaves the trampoline with a speed of 8.0ms^{-1} . Calculate: (5)
- i) Her change of momentum.
- ii) Average resultant force exerted on her whilst in contact with the trampoline (contact time = 0.8s).

4. Answer all the questions.

- 4A) Define meter and kilogram. (2)
- 4B) State and explain the inverse square law. (2)
- 4C) Give any two examples of action-reaction pairs in day-to-day life. (2)
- 4D) Differentiate between conductor, semiconductor and superconductor. (2)
- 4E) Write a short note on photocell. (2)

-----End-----

Question Paper

Exam Date & Time: 06-Mar-2019 (02:00 PM - 05:00 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION

FIRST SEMESTER B.Sc. MEDICAL RADIOTHERAPY TECHNOLOGY DEGREE EXAMINATION - MARCH 2019
SUBJECT: BRTT 103 - BASIC AND APPLIED MATHEMATICS
(2016 RV SCHEME)
Wednesday, March 06, 2019 (14.00 - 17.00)

Marks: 100

Duration: 180 mins.

Answer all the questions.

- 1A) Define: (i) Complement of set (ii) Power subset (iii) Finite Set (iv) Infinite set with examples. (7)
- 1B) Prove that: i) $\sin 2x + 2\sin 4x + \sin 6x = 4\cos^2 x \cdot \sin 4x$ (7)
ii) $\tan A + \cot A = \sec A \operatorname{cosec} A$
- 1C) In a right angle triangle, given that the perimeter and area are 60 and 150 units respectively. Find its sides. (6)
- 2A) Solve: i) $\int \left(\frac{1}{x} + e^x\right) dx$ & ii) $\int (2^x - e^x + 3x^2) dx$. (7)
- 2B) Differentiate: i) $y = x^3 - x^2$ ii) $y = \log x - e^x$ (7)
- 2C) Solve the differential equation: $\frac{dy}{dx} = \frac{y+1}{x+1}$ (6)
- 3A) Evaluate: $\lim_{x \rightarrow 2} \left[\frac{x^4 - 16}{x^3 - 8} \right]$ (5)
- 3B) Evaluate: $\int \frac{3x-1}{(x-3)(x+1)} dx$, by partial fraction method. (5)
- 4) Check whether the pair of equations $x + 3y = 6$ & $2x - 3y = 12$ is consistent. If so, solve them graphically. (10)
- 5A) Find the base radius and volume of right circular cylinder having curved surface area 94.2 cm² and height 5 cm. (5)
- 5B) If $y = \cos x$, find $\frac{dy}{dx}$ using first principles. (5)
- 5C) Define a Relation, Function, Domain and the Range of a function with examples. (5)
- 5D) Solve the differential equation $x \frac{dy}{dx} + \frac{y^2}{x} + y = 0$. (5)
- 5E) Find the area of the sector of a circle with radius 4cm and of angle 30°. Also find the area of the corresponding major sector (use $\pi = 3.14$). (5)
- 5F) (5)

If $f(x) = \frac{2x+1}{3x-2}$ prove that $(f \circ f)(x) = x$.

- 6A) Show that $\sin A (1 + \tan A) + \cos A (1 + \cot A) = \sec A + \operatorname{cosec} A$. (2)
- 6B) Let $U = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9\}$, $A = \{1, 3, 5\}$ and $B = \{0, 1, 2, 3, 8, 9\}$. Find $(A' \cap B')$. (2)
- 6C) Find the volume of right circular cone if its base area is 154 cm^2 and height is 12 cm . (2)
- 6D) Find the roots of the equation by factorization method: (2)
- $$2x^2 - x + \frac{1}{8} = 0$$
- 6E) Solve: $\int (x + 1)(2x^2 - 6) dx$. (2)

-----End-----

Question Paper

Exam Date & Time: 07-Mar-2019 (02:00 PM - 04:00 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION

FIRST SEMESTER B.Sc. MEDICAL RADIOTHERAPY TECHNOLOGY DEGREE EXAMINATION - MARCH 2019
SUBJECT: BMRT 109/BRTT 105 - FUNDAMENTALS OF COMPUTERS AND COMPUTER APPLICATIONS
(2016/2016 RV SCHEME)
Thursday, March 07, 2019 (14.00 - 16.00)

Marks: 50

Duration: 120 mins.

Answer all the questions.

- 1) Explain the working of a computer with a neat block diagram. (10)
- 2) Explain the classification of computer software with examples. (10)
- 3A) Write the HTML web page to display the table mentioned below with cell content justification, text formatting and page title as - Sales Information. (5)

SALES and PROFIT STATEMENT			
SL. No.	Region	sales	Profits
1	North	25	78
2	South	39	70
3	East	78	45
4	West	76	08

- 3B) Explain the working of the hard disk with a neat diagram. (5)
- 3C) Explain the working of the key board as an input device. (5)
- 3D) Explain the working of the Liquid Crystal Display based monitors with a diagram. (5)
- 4A) What is the difference between ROM and RAM? (2)
- 4B) What are the business applications of computers? (2)
- 4C) What happens during the Booting of a Computer? (2)
- 4D) How is data represented in bar code? (2)
- 4E) What is the need for the mail merge feature in MS-Word? (2)

-----End-----