Std. 12 Time : 1½ hr.

9-12-2016 Final Term Unit Test in MATHEMATICS M. Marks: 50

GENERAL INSTRUCTIONS:

i) Question nos. 1 and 2 are of 1 mark each.
ii) Question nos. 3 – 5 are of 2 marks each.
iii) Question nos. 6 – 11 are of 4 marks each.
iv) Question nos. 12 – 14 are of 6 marks each.

SECTION – A

1. What is the cosine of angle, which the vector $\sqrt{2}\,\hat{i} + \hat{j} + \hat{k}$ makes with y-axis?

2. Two independent events A and B are given such that P(A) = 0.3, P(B) = 0.6, find P(A and not B).

SECTION – B

3. The probability distribution of X is

X	:	0	1	2	3
P(x)	:	0.2	k	k	2k

Find $P(X \geq 2)$.

4. If $\vec{a} + \vec{b} + \vec{c} = \vec{0}$ and $|\vec{a}| = 3, |\vec{b}| = 5, |\vec{c}| = 7$, then find the angle between $\vec{a}$ and $\vec{b}$.

5. Cartesian equation of line AB is $\frac{2x-1}{2} = \frac{4-y}{7} = \frac{z+1}{2}$. Write the equation of line through origin and parallel to AB.

SECTION – C

6. Solve : $(1 + e^{x/y})dx + e^{x/y}(1 - x/y)dy = 0$.

7. Solve : $(x^2 - yx^2)dy + (y^2 + x^2y^2)dx = 0$; given that y=1, when x=1.

8. If $\vec{a} = \hat{i} + \hat{j} + \hat{k}$ and $\vec{b} = \hat{j} - \hat{k}$, then find a vector $\vec{c}$ such th at $\vec{a} \times \vec{c} = \vec{b}$ and $\vec{a}.\vec{c} = 3$.

9. Find the image of the point having position vector $\hat{i} + 3\hat{j} + 4\hat{k}$ in the plane $\vec{r}.(2\hat{i} - \hat{j} + \hat{k}) + 3 = 0$.

10. P speaks truth in 70% of the cases and Q in 80% of the cases. In what percent of cases are they likely to agree in stating the same fact? Do you think when they agree, means both are speaking truth?

11. There are two bags I and II. Bag I contains 4 white and 3 red balls while another bag II contains 3 white and 7 red balls. One ball is drawn at random from one of the bags and it is found to be white. Find the probability that it was drawn from bag I.

SECTION – C

12. A man rides his motorcycle at the speed of 50km/hr. He has to spend Rs. 2/- per km on petrol. If he rides it at a faster speed of 80km/hr, the petrol cost increases to Rs. 3/- per km. He has at the most Rs. 120/- to spend on petrol and one hour time. He wishes to find the maximum distance that he can travel. Express this problem as a linear programming problem and solve.

13. Using integration, find the area of the following region

$$\{(x, y) : |x + 2| \leq y \leq \sqrt{20 - x^2}\} .$$

14. Find the distance of the point (-2,3,-4) from the line $\frac{x + 2}{3} = \frac{2y + 3}{4} = \frac{3z + 4}{5}$ measured parallel to the plane $4x + 12y - 3z + 1 = 0$.

-x-x-x-x-x-x-