Pre Board MT -05

INFINITY THINK BEYOND.....
AN EDUCATIONAL INSTITUTE

12 th

Syllabus: Mock Test 05: Ch – Vectors , Three Dimensional Geometry, Probability, LPP

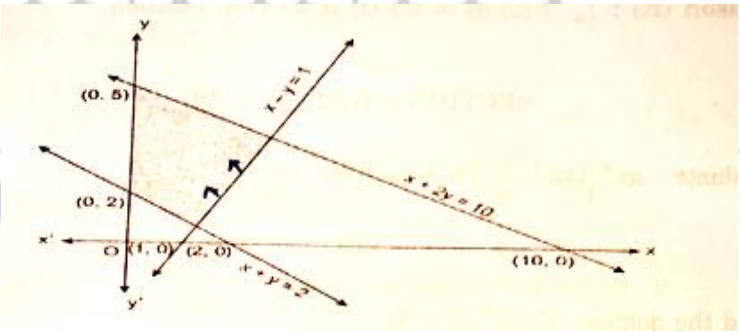
Time: 90 min **Maximum marks :40**

INSTRUCTIONS TO THE STUDENTS

1 . Read each question carefully .
2. Mark of each question is mention in front of question .
3. Attempt one question in internal choice based question .
4. Use of calculators is not allowed.
5. No negative marking .

SECTION A

(Questions 1 – 10 carry 1 marks)

1	If P (A ∪ B)=0.9 and P(A ∩ B) =0.4 , then P($\bar{A}$)+P($\bar{B}$) is (a)0.3 (b)1 (c)1.3 (d)0.7	**1**
2	If $\|\vec{a}\|$ = 3 , $\|\vec{b}\|$ = 4 and $\|\vec{a}+\vec{b}\|$=5 , then $\|\vec{a}+\vec{b}\|$= (a)3 (b)4 (c)5 (d)8	**1**
3	The vector of the direction of the vactor $\hat{\imath}-2\hat{\jmath}+2\hat{k}$ that has magnitude 9 is (a) $\hat{\imath}-2\hat{\jmath}+2\hat{k}$ (b)$\frac{\hat{\imath}-2\hat{\jmath}+2\hat{k}}{3}$ (c)3$(\hat{\imath}-2\hat{\jmath}+2\hat{k})$ (d)9 $(\hat{\imath}-2\hat{\jmath}+2\hat{k})$	**1**
4	The bounded feasible region of an LLP is always a (a)Convex polygon (b)Concave polygon (c)Either (a) or (b) (d)Neither (a) nor (a) nor (b)	**1**
5	The feasible region corresponding to the linear constraints of a linear programming problem is given below.  Which of the following is not a constraint to the given linear programming problem? (a)x + y≥ 2 (b)x + 2y≤ 10 (c)x - y≥1 (d)x-y ≤ 1	**1**
6	If $\vec{a}$ and $\vec{b}$ are two vectors such that $\vec{a}.\vec{b}$ >0 and $\|\vec{a}.\vec{b}\| = \|\vec{a}\times\vec{b}\|$; then angle between $\vec{a}$ and $\vec{b}$ is (a) $\frac{\pi}{4}$ (b) $\frac{\pi}{3}$ (c) $\frac{2\pi}{3}$ (d) $\frac{3\pi}{4}$	**1**
7	If a line makes an angle of $\frac{\pi}{4}$ with the positive directions of both X –axis and Z – axis , then the angles which it makes with the positive direction of Y-axis is (a)0 (b) $\frac{\pi}{4}$ (c) $\frac{\pi}{2}$ (d) π	**1**
8	Given P(A)= 0.4 , P(B) = 0.7 and P$(B\|A)$ = 0.6 , then P(A∪B)= (a)1.1 (b)0.86 (c)0.46 (d)0.16	**1**
9	If $\vec{a}$ is any non zero vector , the value of $(\vec{a}.\hat{\imath})\hat{\imath}+(\vec{a}.\hat{\jmath})\hat{\jmath}+(\vec{a}.\hat{k})\hat{k}$ is equal to (a) $\vec{a}$ (b) 2 $\vec{a}$ (c)3$\vec{a}$ (d)4 $\vec{a}$	**1**

10	Two statements are given, one labelled Assertion (A) and the other labelled Reason(R) Select the correct answer from the options (A), (B), (C) and (D) as given below . (a)Both A and R are true and R is the correct explanation for A. (b) Both A and R are true and R is not the correct explanation for A. (c) A is true but R is false. (d) A is false but R is true **Assertion (A):** A linear programming problem is to optimise objective functions. **Reason(R):** Maximum or minimum of objective function lies at the corner points of bounded feasible region.	**1**
	SECTION B **(Questions 11 – 13 carry 2 marks)**	
11	An ant is moving along the vector $\vec{a} = \hat{\imath} - 2\hat{\jmath} + 3\hat{k}$. Few sugar crystals are kept along the vector $\vec{b} = 3\hat{\imath} - 2\hat{\jmath} + \hat{k}$ which is inclined at an angle 0 with the vector $\vec{a}$. Then find the angle θ . Also find the scalar projection of $\vec{a}$ on $\vec{b}$	**2**
12	A and B throw a die alternately till one of them gets a '6' and wins the game .Find their respective probabilities of winning, if A starts the game first.	**2**
13	(a)A and B take turns in throwing two dice; first to throw 9 is awarded a prize. If A throws first, what is the chance that B gets the prize? **OR** (b)Two dice are thrown. Find the probability that the numbers that appeared have sum of 8 if it is known that the second die always exhibits 4.	**2**
	SECTION C **(Questions 14 – 15 carry 3 marks)**	
14	Solve the following linear programming problem graphically : Minimise : Z = x+2y , subject to constraints : x+2y $\geq$ 100 , 2x- y $\leq$ 0 , 2x +y $\leq$ 200 , x , y $\geq$ 0.	**3**
15	Bag I contains 4 white and 2 black balls . Bag II contains 3 white and 5 black balls. One ball is transferred from Bag I to Bag II and then a ball is drawn from bag II. The ball so drawn is found to be black in colour. Find the probability that the transferred ball is black.	**3**
	SECTION D **(Questions 16 – 17 carry 5 marks)**	
16	(a)Find the vector and Cartesian equation of line which is perpendicular to the lines with equations $\frac{x+2}{1} = \frac{y-3}{2} = \frac{z+1}{4}$ and $\frac{x-1}{2} = \frac{y-2}{3} = \frac{3-z}{-4}$ and passes through the points (1,1,1). Also find the angle between the given lines.0 **OR** (b)Find the foot of the perpendicular and image of the point P(1,6,3) with respect to the line $\frac{x}{1} = \frac{y-1}{2} = \frac{z-2}{3}$. Also find the equation of the perpendicular to the line from P.	**5**
17	Find the image of the point (1,2,1) with respect to the line $\frac{x-3}{1} = \frac{y+1}{2} = \frac{z-1}{3}$. Also find the equation of the line joining the given point and its image.	**5**
	SECTION E **(Questions 18 – 19 carry 4 marks)**	
18	Rohit , Jaspreet and Alia appeared for an interview for three vacancies the same post . The probability of Rohit's selection is $\frac{1}{5}$, Jaspreet's selection is $\frac{1}{3}$ and Alia's selection is $\frac{1}{4}$. The event of selection is independent of each other.	**4**

	 Based on the above information , answer the following questions: (i)What is the probability that at least one of them is selected? (ii)Find P($\frac{G}{\overline{H}}$) where G is the event of Jaspreet's selection and $\overline{H}$ denotes the event that Rohit is not selected. (iii)(a)Find the probability that exactly one of them is selected **OR** (b)Find the probability that exactly two of them are selected.	
19	In an office three employees James, Sophia and Oliver process incoming copies of a certain form. James process 50% of forms, Sophia process 20% and Oliver the remaining 30% of forms. James has an error rate of 0.06, where as the error rate of Sophia and Oliver is 0.04, 0.03 respectively Based on the above information , answer the following questions (i)Find the probability that Sophia processed and committed error (ii)Find the probability of committing error in processing the form (iii)(a)The manager of the company selects a forms has an error , find the probability that the form is not processed by James. **OR** (b)Let E be the event of committing an error in processing the form and let E_1, E_2 and E_3 be the events that James, Sophia and Oliver processed the form . Find the volume $\sum_{i=1}^{3} P(Ei/E)$.	**4**