

**Model Question Paper**  
**Probability Distributions - Part II**

12th Standard

**Business Maths**

Reg.No. : 

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- I. Answer all the questions.  
 II. Use blue pen only.  
 III. Question number 15 is compulsory.

Time : 01:00:00 Hrs

Total Marks : 85

5 x 1 = 5

**Part-A**

- 1) The normal distribution curve is  
 (a) Bimodal (b) Unimodal (c) Skewed (d) none of these
- 2) If X is a poisson variate with  $P(X = 1) = P(X = 2)$ , the mean of the Poisson variate is equal to  
 (a) 1 (b) 2 (c) -2 (d) 3
- 3) The standard deviation of a Poisson variate is 2, the mean of the poisson variate is  
 (a) 2 (b) 4 (c)  $\sqrt{2}$  (d)  $\frac{1}{\sqrt{2}}$
- 4) The random variables X and Y are independent if  
 (a)  $E(XY) = 1$  (b)  $E(XY) = 0$  (c)  $E(XY) = E(X)E(Y)$  (d)  $E(X+Y) = E(X) + E(Y)$
- 5) The mean and variance of a binomial distribution are 8 and 4 respectively. Then  $P(X = 1)$  is equal to  
 (a)  $\frac{1}{2^{12}}$  (b)  $\frac{1}{2^4}$  (c)  $\frac{1}{2^8}$  (d)  $\frac{1}{2^{10}}$

**Part-B**

5 x 6 = 30

- 6) In a binomial distribution consisting of 5 independent trials, probabilities of 1 and 2 successes are 0.4096 and 0.2048 respectively. Find the parameter 'p' of the distribution.
- 7) The average percentage of failure in a certain examination is 40. What is the probability that out of a group of 6 candidates atleast 4 passed in the examination?
- 8) An unbiased coin is tossed six times. What is the probability of obtaining four or more heads?
- 9) If the function f(x) is defined by  $f(x) = ce^{-x}$ ,  $0 \leq x < \infty$ . Find the value of c.
- 10) A random variable x has the probability function as follows :

Values of X:	-1	0	1
Probability	0.2	0.3	0.5
:			

Evaluate (i)  $E(3x + 1)$  (ii)  $E(X^2)$  (iii)  $\text{Var}(X)$

**Part-C**

5 x 10 = 50

- 11) The mean yield for one-acre plot is 663 kgs with a S.D 32kgs. Assuming normal distribution, how many one-acre plot in a batch of 1000 plots would you expect to have yield (i) over 700 kgs (ii) below 650 kgs.
- 12) A large number of measurements is normally distributed with a mean of 65.5" and S.D of 6.2". Find the percentage of measurements that fall between 54.8" and 68.8".
- 13) The diameter of shafts produced in a factory conforms to normal distribution. 31% of the shafts have a diameter less than 45mm. and 8% have more than 64mm. Find the mean and standard deviation of the diameter of shafts.
- 14) The results of a particular examination are given below in a summary form.

Result	Percentage of candidates		
1. passed with distinction 2. passed 3. failed	10	60	30

It is known that a candidate gets plucked if he obtained less than 40 marks out of 100 while he must obtain atleast 75 marks in order to pass with distinction. Determine the mean and the standard deviation of the distribution assuming this to be normal.

- 15) a) It is stated that 2% of razor blades supplied by a manufacturer are defective. A random sample of 200 blades is drawn from a lot. Find the probability that 3 or more blades are defective. ( $e^{-4} = .01832$ )

**(OR)**

- b) Find the probability that at most 5 defective bolts will be found in a box of 200 bolts, if it is known that 2% of such bolts are expected to be defective ( $e^{-4} = 0.01832$ )

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