Reg. No. : ....

Name : ....

**II Semester B.Sc. Hon's (Mathematics) Degree (Reg./Supp./Imp.)
Examination, April 2019
(2016 Admission Onwards)
BHM 205 : GRAPH THEORY AND DISTRIBUTION FUNCTIONS**

Time : 3 Hours
Max. Marks : 60

Answer **any 4** questions out of 5 questions.
(4×1=4)

1. Define a u – v detour in a graph G.

2. Define caterpillar.

3. Find the moment generating function of a binomial distribution.

4. Define exponential distribution.

5. Find the mean deviation of normal distribution.

Answer **any 6** questions out of 9 questions.
(6×2=12)

6. Prove that no non trivial graph is irregular.

7. Prove that every graph has an even number of odd vertices.

8. Draw all of the (non-isomorphic) graphs of order 5.

9. State Menger's theorem.

10. Prove that the number of edges of a tree of order n is n – 1.

11. A die is thrown three times. Getting a 3 or a 6 is considered to be success. Find the probability of getting at least two successes.

12. There are 50 telephone lines in an exchange. The probability of them being busy is 0.1. What is the probability that all the lines are busy ?

13. 8 coins are tossed together. Find the probability of getting 1 to 5 heads in a single toss.

14. Find the points of inflection of a normal curve.

Answer **any 8** questions out of 12 questions. (8×4=32)

15. Prove that detour distance is a metric on the vertex set of a connected graph.

16. For every integer $n \geq 2$ there is exactly one connected nearly irregular graph of order n.

17. Let G be a graph of order 3 or more. Prove that G is connected if and only if G contains two distinct vertices u and v such that $G - u$ and $G - v$ are connected.

18. Prove that every two distinct vertices in a nonseparable graph G of order 3 or more lie on a common cycle of G.

19. Prove that for every graph G, $k(G) \leq \lambda(G)$.

20. Prove that for every positive integer n, $\lambda(K_n) = n - 1$.

21. If the probability of a defective bolt is $\frac{1}{10}$. Find the mean, variance, moment of coefficient skewness, kurtosis for the distribution of defective bolts in a total of 400.

22. In 256 sets of twelve tosses of a coin, in how many cases may one expect eight heads and four tails ?

23. Using the recurrence formula. Find the probabilities when x = 0, 1, 2, 3, 4 and 5, if the mean of the Poisson distribution is 3.

24. Find the area under the standard normal curve which lies

a) to the left of $Z = 1.73$

b) to the right of $Z = -0.66$

c) between $Z = 1.25$ and $Z = 1.45$.

25. Find the probability of getting 1 or 3 or 4 or 5 in throwing a die 5 to 7 times among 9 trials.

26. Define Gamma distribution of first kind. Find its mean, variance and moment generating function.

Answer **any 2** questions out of 4 questions. (2×6=12)

27. State and prove Whitney's theorem.

28. Let G and H be isomorphic graphs. Prove the following :

a) The graph G is bipartite if and only if H is bipartite.

b) The graph G is connected if and only if H is connected.

c) If G contains a path of length k then H contains a path of length k.

29. a) Prove that if G is a connected graph of order 3 or more, then every bridge of G is incident with a cut vertex of G.

b) Prove that every connected graph containing cut-vertices contains at least two end blocks.

30. In a normal distribution, 31% of the items are under 45 and 8% of the items are over 64. Find the mean and standard deviation of the distribution.