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PY 1322010

Assistant Librarian
Bina Chowdhury Central Library
(GIMT & GIPS)
Guwahati - 781017

Roll No. of candidate

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2019

B.Pharm. 2nd Semester End-Term Examination

MATHEMATICS AND STATISTICS

(Old Regulation)

Full Marks – 100

Time – Three hours

The figures in the margin indicate full marks for the questions.

Answer Question No. 1 and any *four* from the rest.

1. Choose the correct answer : (10 × 2 = 20)

(a) The degree and order of the differential

equation $\frac{d^2y}{dx^2} + \left(\frac{dy}{dx}\right)^3 + \cos x = 0$ is

(i) 3, 2

(ii) 1, 0

(iii) 2, 3

(iv) None of these

[Turn over

- (b) Consider the following linear differential equation :

$$\frac{dy}{dx} + py + Q = 0$$

The integrating factor is given by

- (i) P
(ii) $\int Q dx$
(iii) $e^{\int p dx}$
(iv) $e^{\int Q dx}$
- (c) The Laplace transform of $3e^{4t}$ i-e $L\{3e^{4t}\}$ is

(i) $\frac{3}{s-3}$

(ii) $\frac{1}{3(s+3)}$

(iii) $\frac{3}{s-4}$

(iv) None of these

- (d) The inverse Laplace transfer, $L^{-1}\left\{\frac{1}{s^4}\right\}$ is

(i) t^3

(ii) $3!t^3$

(iii) $\frac{t^3}{3!}$

(iv) None of these

- (e) The value of the variable corresponding to highest frequency is termed as
- Mean
 - Median
 - Mode
 - Standard deviation
- (f) For a symmetrical distribution
- Mean = Median = Mode
 - Mean > Median > Mode
 - Median = Mode
 - None of these
- (g) If A and B are two independent events, then
- $P(A \cup B) = P(A) + P(B)$
 - $P(A \cap B) = P(A) \cdot P(B)$
 - $P(A \cap B) = 0$
 - None of these
- (h) The normal distribution is a
- Discrete distribution
 - Continuous distribution
 - None of these
- (i) If ' r ' is the coefficient of correlation, then
- $-1 \leq r \leq 1$
 - $0 \leq r < 1$
 - $-1 < r < 0$
 - None of these

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(j) A differential equation of the form $Mdx + Ndy = 0$ where M and N are some functions of x and y is exact if and only if

(i) $\frac{\partial M}{\partial x} = \frac{\partial N}{\partial y}$

(ii) $\frac{\partial M}{\partial y} = \frac{\partial N}{\partial x}$

(iii) $M = N$

(iv) None of these

2. Answer the following :

(4 × 5 = 20)

(a) Solve : $x^2 \frac{dy}{dx} = 1 + y$

(b) Solve : $x^2 y dx - (x^3 + y^3) dy = 0$

(c) Check whether the following differential equation is exact or not and also solve the equation

$$y \sin 2x dx - (y^2 + \cos^2 x) dy = 0$$

(d) Find the integrating factor for the following linear differential equation :

$$ye^y = (y^3 + 2xe^y) \frac{dy}{dx}$$

3. Answer the following :

(4 × 5 = 20)

(a) Evaluate : $L\{\sin 4t \cos 5t\}$.

(b) Evaluate : $L\{te^{at} \sin bt\}$.

(c) Evaluate : $L^{-1} \left\{ \frac{1}{s(s^2 + 4)} \right\}$.

(d) Evaluate : $L \left\{ \frac{1 - \cos t}{t} \right\}$.

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4. Answer the following :

(a) What is the probability that a leap year will have 53 Sundays? (4)

(b) Two urns contain 4 white, 6 blue and 4 white, 5 blue balls respectively. One of the urns is selected at random and a ball is drawn from it. What is the probability that the ball drawn is white? (5)

(c) State and prove Baye's theorem. (6)

(d) If A and B be events with $P(A) = \frac{1}{3}$, $P(B) = \frac{1}{4}$ and $P(A \cap B) = \frac{1}{2}$, find $P(A/B)$ and $P(B/A)$. (5)

5. Answer the following :

(a) Solve : $\frac{d^3 y}{dx^3} - \frac{d^2 y}{dx^2} - 5 \frac{dy}{dx} - 3y = 0$. (5)

(b) Solve : $\frac{d^2 y}{dx^2} - 2 \frac{dy}{dx} + 5y = e^{-x}$. (7)

(c) Apply convolution theorem to find

$$L^{-1} \left[\frac{s}{(s^2 + a^2)^2} \right]. \quad (8)$$

6. Answer the following :

(a) Find the mode for the following frequency distribution. (5)

Class : 0-4 4-8 8-12 12-16

Frequency : 4 8 5 6

(b) The ages of husbands and their wives are given in the following table.

x (age of husband) : 23 27 28 29 30

y (age of husband) : 18 22 23 24 25

Calculate the coefficient of correlation between x and y . (7)

(c) Draw a frequency bar diagram from the following data. (8)

Year : 2000 2002 2004 2006 2008

Sells of Cars in

India (in lakhs) : 12 20 25 23 26