AVANTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

Tamaram, Makavarapalem, Visakhapatnam-531113

CIRCULAR

Ref:AIET/Internal Exams/Revaluation/January 2021 **Date: 05-02-2021**

Attn: II BTECH-ISEMESTER STUDENTS

ANNOUNCEMENT OF MID-1 MARKS

All the students of II B.Tech I Semester are hereby informed that mid-I scripts valuation is completed and internal marks are tabulated. The same are displayed in the department notice board. Go through your marks and if any discrepancy is observed, approach your Head of the Department with a written request by 07-02-2021.

No request for verification of marks is allowed after cut off date.

Principal

Visakhapatnam,

Dt: 06/02/2021

To,

The Head Of The Department,

Avanthi Institute Of Engg and Technology,

Makavarapalem.

Respected Sir,

sub: Request for reevaluation

I am D. Gopal Raju of ECE department studying in II BTech I semester bearing roll number 19811A0415

Sir, I am not satisfied with the internal marks I have attained for the subject RVSP. So, I request you to kindly reevaluate my internal marks

Thanking You Sir

Yours Obediently
D. Gopal Raju
19811A0415

forward to T.P Naidu
ECE depart
verify & check the internal
marks of RVSP

HOD ECE

Visakhapatnam,

Dt: 07/02/2021

To

The Head of the Department,

Avanthi Institute of Engg and technology,

Makavarapalem.

Respected Sir,

Sub: Request for revaluation.

I am A. Padmini Prasanthi of ECE Department studying in II B.Tech I Semester bearing roll number 20815A0403

Sir, I am not satisfied with the internal marks I have attained for the subject RVSP.

So, I request you to kindly revalute my internal marks.

Thanking you Sir,

Yours obediently,

A. Padmini prasanthi.

forward to T.P Naidu check & verify

HOD, ECE

Addl. Code No.	E

AVANTHI INSTITUTE OF ENGINEERING & TECHNOLOGY

Tamaram, Makavarapalem, Narsipatnam Revenue Division, Visakhapatnam Dist-531113.

Total Marks $\frac{14+1=15}{20}$

MAIN ANSWER SHEET

MID EXAMINATION - I / II / III / IV   Semester: I / II / III / IV / V

COURSES : B.Tech / MBA / M.Tech.

	Section A			Section B	
Q.No.	1	2	3	4	5
Marks					

Name: D. GOPAL RAJU Subject: R.V.S.P Date: 30/01/21

Year & Branch: 2nd, E.C.E No. of Additionals: 02 Roll No. 1 9 8 1 1 A 0 4 1 5

Signature of the Invigilator: [signature] 30/1/21

01.a) cumulative distribution function:- the cumulative distribution function is have a Random variable x, when it is defined the probability. then the random variable 'x' is have " less than or equal to 1".

$$f_x(x) = f(x \leq x)$$

*properities:-

1) If the cumulative distribution function (CDF) is defined as $f_x(x) = f(x \leq x)$, the random variable x lies between 0 and 1

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2) $f(-\infty) = 0$ and $f(\infty) = 1$.

3) $f(x_1) \leq f(x_2)$, This condition the CDF is non-decreasing function.

4) $f(x_1) \leq x \leq f(x_2)$; $f(x_1) = f(x_2)$. so, we can find x is a Random variable.

5) If the function $f_x(x)$ is a random variable 'x' value is $f_x(x) = x_1 < x_2 \cdots x_{i-1} < x_i$ - is written by

$$f(x \leq x) * P(x > x) = s$$

hence, $P(X \le x) \cup P(X > x) = P(S) = 1$

6) $f(x_1) \le X \le f(x_2)$; $f(x_1) \le f(x_2)$, the random variable x is equal.

7.) the random variable is discreate function then we can written

$f_X(x) = P(X \le x) < P(X < x)$ written in mathematical form

$$f_X(x) = \sum_{i=0}^{0} P(x_i - 1) + P(x_i)$$

$$f_X(x) = \begin{cases} 1 , & x_1 \le X \le x_2 \\ 0 & \text{else.} \end{cases}$$ unit step distribution function.

1b) Given $f_X(x) = \int_{-\infty}^{\infty} \frac{(\cancel{\quad})^2}{\sqrt{2\pi}\sigma x} e^{\left(\int^{\infty} \frac{m_x}{\sqrt{2\pi}\sigma x}\right)^{-\frac{2}{2}}} dx$

$m_x = 2$ and $\sigma_x = 2$

i) Find $P\{X > 1.0\} = P(f_x(x)) \overset{= 1 - P(f(x)) =}{=} P\left(\frac{1-2}{2}\right) = P(-1.5) = Q(1.5)$

Here $Q(x) = \left[\frac{1}{0.699(x) + 0.388(x+5.81)}\right] e^{-\frac{x^{1/2}}{2\pi}}$

$Q(1.5) = \left[\frac{1}{0.699(1.5) + 0.388(1.5+5.51)}\right] e^{-\frac{\frac{(1.5)}{2}}{2\pi}}$

$Q(1.5) = 0.0688$

$\therefore P\{X > 1.0\} = 0.0688.$

ii) $P\{X \le -1.0\} = P(f(x)\} = 1 - P(f(x))$

$= 1 - P(-1.0)$

$P = \phi(0.5)$

$\therefore Q = \phi(0.5)$

Here $Q(x) = \left[\frac{1}{0.699(x) + 0.388(x+5.51)}\right] e^{\frac{-x^2}{2}} / 2\pi$

$Q(-0.5) = \left[\frac{1}{0.699(-0.5) + 0.388((-0.5)+5.51)}\right] e^{\frac{-(0.5)^2}{2}} / 2\pi$

$= -0.03881 = 1 - P(x) = 1 - P(0.03881)$

$= -0.6915$

$\therefore P\{X \le -1.0\} = -0.6915$

Q2)
b) Given

$f_x(x)$	0	1	2	3	4	5
x	1/32	5/32	10/32	10/32	5/32	1/32

The ~~distribution~~ mean of probabilities is

$f_x(x) = \sum_{i=0}^{5} P(x_{i-1}) - P(x_i)$

$= 0 * \frac{1}{32} + 1 * 5/32 + 2 - \frac{10}{32} + 3 - \frac{10}{32} + 4 - 5/32 + 5 - 1/32$

$= 2.5$

The variance of the probabilities.

$f_x(x) = P(x_i - \bar{x}) \cdot P(x_i)$

$= 0 \times \frac{1}{32} + 1 \times \frac{5}{32} + 2 \times \frac{10}{32} + 3 \times \frac{10}{32} + 4 \times \frac{5}{32} + 5 \times \frac{1}{32}$

$= (0-2.5) \times \frac{1}{32} + (1-2.5)\frac{5}{32} + (2-2.5)\frac{10}{32} + (3-2.5)\frac{10}{32} + (4-2.5)\frac{5}{32}$
$+ (5-2.5)\frac{1}{32}$

$= \frac{1}{32}\left[6.25 + 11.2 + 10 + 10 + 11.2 + 6.25\right]$

$= \frac{85}{32}$

03a) i) Given $f_{xy}(x,y) = \begin{cases} b(x+y)^2 & -2<x<2 \text{ and} \\ 0 & \text{else were.} \end{cases}$

the function is

$$f_{xy}(x,y) = \int_{-\infty}^{\infty}\int_{-\infty}^{\infty} b(x+y)^2\,dx\,dy$$

$$= \int_{-2}^{2}\int_{-3}^{3} b(x+y)^2\,dx\,dy$$

$$= \int_{-2}^{2}\int_{-3}^{3} b(x^2+y^2+2xy)\,dx\,dy$$

$$= b\int_{-2}^{2}\int_{-3}^{3} b(x^2+y^2+2xy)\,dx\,dy$$

Integration is respetively

$$= b\int_{-2}^{2} x^2 + \frac{x^3}{3} + x^2y + \frac{y^3}{3}\Big]_{-3}^{3}\,dx\,dy$$

$$= b\int_{-2}^{2} 3x^2 + 9x + 9 + b\int_{-3}^{3} 3x^2 - 9x - 9\,]\,dx\,dy$$

$$= b\int_{-2}^{2}(6x - 18x^2)\,dx\,dy$$

$$= 6b\int(x - 3x^2)\,dx\,dy$$

$$= 6b\int(\cancel{x - 3x^2})\,dx\,dy$$

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ADDITIONAL ANSWER SHEET

Subject : RVSP **Signature with Date :** 30/11

$$= 12b\int \frac{1}{(12)(26)}\,dx\,dy$$

$$\therefore b = \frac{1}{104}$$

ii) The marginal density function of $f_X(x)$

$$f_X(x) = \int_{-\infty}^{\infty} b(x^2+y)^2\,]\,dx\,dy$$

$$= \int_{-3}^{3} \frac{1}{104}\,[(x+y)^2]\,dx$$

$$= \frac{1}{312}\int (3x+1) + (3x-1))\,dx$$

$$\therefore f_X(x) = \frac{1}{312}[(3x+1)+(3x-1)]\,dx$$

The marginal density function of $f_Y(y)$

$$f_Y(y) = \int_{-\infty}^{\infty} b(x+y)^2\,dy$$

$$= \int_{-2}^{2} \frac{1}{104}\,[(x+y)^2]\,dy$$

$$= \frac{1}{312}\,[2y+1) + (2y-1)\,dy$$

$$\therefore f_Y(y) = \frac{1}{312}[(2y+1) + (2y-1)]\,dy$$

03b) i) Given random variable $f(x) = ae^{-b|x|}$

The a and b are real constants

$$f_X(x) = \int_{-a}^{0} e^{tx}\,dx + \int_{a}^{-a} e^{tx}\,dx$$

$$= \int_{-a}^{0} a e^{tx} f(x)dx + \int_{a}^{-a} a e^{-tx} f(x) dx$$

$$= a \int_{-a}^{0} e^{tx} (b+a) dx + \int_{a}^{-a} a e^{-tx} (b-a) dx$$

$$= a \int_{-a}^{0} e^{tx} (b+t) dx + \int_{a}^{-a} e^{-tx} (b-t) dx$$

$$= a \left[\int_{-a}^{0} \frac{1+e^{(b+t)} dx}{b+x} + \int_{a}^{-a} \frac{1+e^{(b-t)} dx}{1} \right]$$

$$= a \left[\frac{1}{(b+t)} + \frac{1}{(b-t)} \right] dx$$

$$= a \left[\frac{b+\cancel{t}+b-\cancel{t}}{(b+t)(b-t)} \right] dx$$

$$= \frac{2ab}{b^2}$$

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$$\therefore m_x = \frac{2ab^2}{b^3}$$

ii) Mean

$$\Rightarrow f(x) = 2ab \int (b-t) \left.\frac{dx}{dt}\right|_{at\ t=0} = 2ab \int (b-t) \left.dx\right|_{at\ t=0}$$

$$= 2ab \int (b-t) + 2ab - 2x) \, dx \Big|_{at\ t=0}$$

$$= 2ab \int 0 \, dx$$

$$m_x = 0$$

ADDL CODE NO : E

ADDITIONAL ANSWER SHEET

Subject : RVSP

Signature with Date : 30/1/21

Moment generating function

$$f(x) = 2ab \int (b-t).f(t)\, dx \;|at\; t=a$$

$$= 2ab \int (b-t)\, f(t)\, dx \;|at\; t=1$$

$$= 2ab \int (b-t)(a) - (2x)\, dx \;|at\; t=1$$

$$= \frac{4a}{b^3}$$

$$\sqrt{x} = 2ab \int (b-t)$$

$$= \frac{4a}{b^3}$$

$$\therefore \sqrt{x} = \frac{4a}{b^3}$$

2) the properties of variance :-

a)

i) If the variance is constant x, then the constant variable k, it is zero value. $(a=0)$

proof $Var(x) = \int (E - m_x)\, dx$

$$= [E - m(x)]\, dx$$

$$= [E - m(0)]\, dx.$$

$$= 0$$

$$\therefore Var(x) = 0$$

ii) If the variance is constant k, then we can de find the ~~real~~ constant variable proof:- $Var(\cancel{kx}) = Var[E - k(x)] \, dx$

$= [E^2 - k(x)^2] \, dx$

$= (E^2 - k^2 (x)^2] \, dx$

$= [E^2 - (kx)^2] \, dx$

$\therefore Var(kx) = [E^2 - (kx)^2] \, dx.$

iii) the random variable x is constant, the we can find the real constant variable.

proof: $Var[E(kx)]^2 = Var[E(ax+b)^2 + E(ax-b)^2] \, dx$

$= [E - (ax+b)^2 + E(ax-b)^2] \, dx$

$= [E(a^2+b^2+2ab]x + E[a^2+b^2-2ab]x] \, dx$

$= [E - [a^2+b^2 + \cancel{2abx}] + [a^2+b^2 + \cancel{2abx}] \, dx$

$= [E - (a^2+b^2) + (a^2-b^2)] \, dx$

$= [E - (a+b)^2 + (a-b)^2] \, dx$

$\therefore Var(Ekx) = [E - (a+b)^2 + (a-b)^2] \, dx.$

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AVANTHI INSTITUTE OF ENGINEERING & TECHNOLOGY

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Addl. Code No.	

Total Marks: 11 / 20

MAIN ANSWER SHEET

MID EXAMINATION - I / II / III / IV   Semester: I / II / III / IV / V

COURSES : B.Tech / MBA / M.Tech.

	Section A			Section B	
Q.No.	1	2	3	4	5
Marks	(x)	0			

Name: A. Padmini prasanthi Subject: RV&P Date: 30-01-21

Year & Branch: 2nd ECE No. of Additionals: - Roll No. 2 0 8 1 5 A 0 4 0 3

Signature of the Invigilator :

1) a) properties of cummalative disterbution function:

1. $f_x(x)$ is a non decreasing function then

$f_x(x) = f_x x(x_1) - f_x(x_2)$.

2) ~~$f_x(x)$~~ $f(x) - \infty = 0$

All the real numbers will be from $-\infty$ to ∞. there are no real numbers less than $-\infty$. As we know that definition of commulation $f(x) = P(x \leq -\infty)$

3) $f(x) + \infty = 1$.

As per the definition $f(x) = P(x \leq -\infty)$ $p(s) = 1$

So, All the real values and probabilities of the function are given in a sample space is always equals to one.

4) $0 < f(x) \leq 1$. here $F(x)$ is a also a probablity distribution function.

5) If ~~B~~ we are taking the x_1, x_2, x_3 where $x_1 < x_2 < x_1 - x < x_3$. then

$F_x(x) = P(x - x) - (x_1 - x)$.

b) (i) $P\{x > 1.0\} = 1 - f_X(x)$.

$= f_X(x) - 1$.

$= \left(\frac{1-2}{2}\right) = 0.5 \quad 1 - f(x) = \cancel{f(x)}\ 1 - 0.5$.

$= Q(0.5)$.

$$= Q(x) = \frac{1}{0.333(x) + 0.399\sqrt{x^2 + 5.51}} = \frac{x^{-x^2/2}}{\sqrt{2\pi}}$$

$$= Q(0.5) = \frac{1}{0.33(0.5) + 0.399\sqrt{(0.5)^2 + 5.551}} \cdot \frac{x^{-0.5^2/2}}{\sqrt{2\pi}}$$

$= 0.308$.

$P\{x > 1.0\} = 1 - f_X(x)$.

$= 1 - Q(x)$

$= 1 - 0.308$

$= 0.6915$.

(ii) $P\{x \le -1.0\} = 1 - f_X(x)$

$= 1 - (-1.5)$.

$= \cancel{f(x)}\ F_X x(1.5)$

$= Q(1.5)$.

$$Q(x) = \frac{1}{0.333(x) + 0.399\sqrt{x^2 + 5.51}} = \frac{x^{-x^2/2}}{\sqrt{2\pi}}$$

$$= Q(1.5) = \frac{1}{0.333(1.5) + 0.399\sqrt{1.5^2 + 5.51}} = \frac{x^{-1.5^2/2}}{\sqrt{2\pi}}$$

$= 0.0668$.

$P\{x \le 1.0\} = 1 - F_X(x)$

$= F_X = Q(x)$

$= Q(x)$

$= Q(1.5) = 0.0668.$

2)
a) **Properties of variance:-**

1) the constant 'k' of x is 0 i.e. If k is a constant then $k(x) = 0$.

$\therefore \boxed{k(x) = 0}$

2) If variance of x is a function of $E[f(x)]$ then constant k. i.e.

$\text{Var} f(x) = k^2 + bx.$

3) If k is constant and a and b are two real numbers then

$\text{Var}[ax+b] = a^2 + bx.$

4) If a and b are two identical real number then

$\text{Var}[a(x)+b(x)] = \text{Var}[a(x)] + \text{Var}[b(x)]$

$\text{Var}[a(x)-b(x)] = \text{Var}[a(x)] + \text{Var}[b(x)].$

b)

x	0	1	2	3	4	5
p(x)	1/32	5/32	10/32	10/32	5/32	1/32.

As we know that

$$\text{mean} = E(x) = \Sigma x_1 (P x_1).$$

$$= 0\left(\frac{1}{32}\right) + 1\left(\frac{5}{32}\right) + 2\left(\frac{10}{32}\right) + 3\left(\frac{10}{32}\right) + 4\left(\frac{5}{32}\right)$$

$$+ 5\left(\frac{1}{32}\right)$$

$$= 2.5.$$

variance of this probability distrubution function =

$$= \sum_{i=1}^{n} E(x - x^2)\, p(x_1 - x^2).$$

$$= (0-2.5)^2\left(\frac{1}{32}\right) + (1-2.5)^2\left(\frac{5}{32}\right) + (2-2.5)^2\left(\frac{10}{32}\right) +$$

$$(3-2.5)^2\left(\frac{10}{32}\right) + (4-2.5)^2\left(\frac{5}{32}\right) + (5-2.5)^2\left(\frac{1}{32}\right)$$

$$= 1.25.$$

mean of the probability distribution = $\boxed{2.5}$

variance of the probability distribution

Function = $\boxed{1.25.}$