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I Term Examination, Even - Semester, 2018-19

Program:- B. Tech **Year:- I Sem:- II**

Subject:-Engineering Mathematics-II **Code:- BMAS-0102**

Time: - 60 Min. **Max. Marks: 15**

Section- A

Note: Attempt ALL Questions. **(2x3=6 Marks)**

Q.1. Using Beta and Gamma functions, evaluate

(a) $\int_0^\infty x^{\frac{1}{4}} e^{-\sqrt{x}} dx$

(b) $\int_0^1 \left(\frac{x^3}{1-x^3}\right)^{\frac{1}{2}} dx$

Q.2. Test the convergence of the series:

$$1+\frac{1}{2^2}+\frac{2^2}{3^3}+\frac{3^3}{4^4}+\ldots$$

Q.3. Test the series whether it is convergent or divergent.

$$\sum_{n=1}^{\infty}\left(\frac{1+nx}{n}\right)^n$$

Section- B

Note: Attempt ALL Questions. **(3x3=9 Marks)**

Q.1. Test the series for convergence and divergence:

$$\frac{1^2}{4^2}+\frac{1^2.5^2}{4^2.8^2}+\frac{1^2.5^2.9^2}{4^2.8^2.12^2}+\frac{1^2.5^2.9^2.13^2}{4^2.8^2.12^2.16^2}+\ldots$$

Q.2. Test the series for convergence and divergence:

$$1+\frac{x}{2}+\frac{2!}{3^2}x^2+\frac{3!}{4^3}x^3+\ldots$$

Q.3. (a) Using Gamma function, prove that:

$$\int_0^{\frac{\pi}{2}}\sqrt{\tan\theta}\,d\theta=\frac{\pi}{\sqrt{2}}$$ (2 Marks)

(b) State De Morgan and Bertrand's test. (1 Mark)