

ಕರ್ನಾಟಕ ಸರ್ಕಾರ ತಾಂತ್ರಿಕ ಶಿಕ್ಷಣ ಇಲಾಖೆ

ಸಂಖ್ಯೆ: ತಾಂತಿನಿ 36 ಸಿಡಿಸಿ(1) 2017-18 36

ನಿರ್ದೇಶಕರ ಕಾರ್ಯಾಲಯ ಅರಮನೆ ರಸ್ತೆ, ಬೆಂಗಳೂರು-560 001.

ದಿನಾಂಕ: 04-04-2018.

:ಸುತ್ತೋಲೆ:

ವಿಷಯ: 2018ರ ಸಾಲಿನಿಂದ ಡಿಪ್ಲೊಮಾ ಅಭ್ಯರ್ಥಿಗಳು ಬಿ.ಇ (ಲ್ಯಾಟರಲ್ ಎಂಟ್ರಿ) ವ್ಯಾಸಂಗಕ್ಕೆ ಪ್ರವೇಶ ಪಡೆಯಲು ಕರ್ನಾಟಕ ಪರೀಕ್ಷಾ ಪ್ರಾಧಿಕಾರ ನಡೆಸುವ DCET ಪರೀಕ್ಷೆಗಳಿಗೆ ಪಠ್ಯಕ್ರಮಗಳನ್ನು ಅಳವಡಿಸಿರುವ ಬಗ್ಗೆ.

ಉಲ್ಲೇಖ: ಸರ್ಕಾರದ ಆದೇಶ ಸಂ. ಇಡಿ 23 ಟಿಪಿಇ 2018, ಬೆಂಗಳೂರು, ದಿನಾಂಕ:03ನೇ ಎಪ್ರಿಲ್ 2018.

ಜುಲೈ 2018 ರಿಂದ ನಡೆಯುವ DCET ಪರೀಕ್ಷೆಗಳಿಗೆ ಹಾಜರಾಗಿ ಬಿ.ಇ (ಲ್ಯಾಟರಲ್ ಎಂಟ್ರಿ) ಪ್ರವೇಶ ಪಡೆಯುವ ಅಭ್ಯರ್ಥಿಗಳು "ಫಲಿತಾಂಶದ ಆಧಾರಿತ ಪಠ್ಯಕ್ರಮ (Outcome Based Education)" ಪದ್ಧತಿಯನುಸಾರ, ಸರ್ಕಾರವು ಪ್ರಕಟಿಸಿರುವ ಪಠ್ಯಕ್ರಮಗಳಂತೆ DCET ಪರೀಕ್ಷೆಗಳನ್ನು ತೆಗೆದುಕೊಳ್ಳುವುದು. ಸದರಿ ಮಾಹಿತಿಯನ್ನು ಸಂಸ್ಥೆಯ ಸೂಚನಾ ಫಲಕದಲ್ಲಿ ಪ್ರಕಟಿಸುವ ಮುಖಾಂತರ ಸಂಬಂಧಪಟ್ಟ ಎಲ್ಲಾ ವಿದ್ಯಾರ್ಥಿಗಳ ಗಮನಕ್ಕೆ ತರಲು ಸೂಚಿಸಲಾಗಿದೆ.

ಗೆ:

ರಾಜ್ಯದ ಎಲ್ಲಾ ಸರ್ಕಾರಿ, ಅನುದಾನಿತ ಮತ್ತು ಖಾಸಗಿ ಪಾಲಿಟೆಕ್ನಿಕ್ ಗಳ ಪ್ರಾಂಶುಪಾಲರುಗಳಿಗೆ – ಸೂಕ್ತ ಕ್ರಮಕ್ಕಾಗಿ.

ಪ್ರತಿ:

- 1. ಕಾರ್ಯನಿರ್ವಾಹಕ ನಿರ್ದೇಶಕರು, ಕರ್ನಾಟಕ ಪರೀಕ್ಷಾ ಪ್ರಾಧಿಕಾರ, ಮಲ್ಲೇಶ್ವರಂ, ಬೆಂಗಳೂರು-ಸೂಕ್ತ ಕ್ರಮಕ್ಕಾಗಿ.
- 2. ಕಾರ್ಯದರ್ಶಿ, ತಾಂತ್ರಿಕ ಶಿಕ್ಷಣ ಪರೀಕ್ಷಾ ಮಂಡಳಿ, ಬೆಂಗಳೂರು-ಸೂಕ್ತ ಕ್ರಮಕ್ಕಾಗಿ.
- 3. ಸಹಾಯಕ ನಿರ್ದೇಶಕರು(ಎ.ಸಿಎಂ), ತಾಂ.ಶಿ.ನಿ, ಬೆಂಗಳೂರು-ಸೂಕ್ತ ಕ್ರಮಕ್ಕಾಗಿ.

🙏 ಇ-ಗೌವರ್ನೆನ್ಸ್ ವಿಭಾಗ- ವೆಬ್ ಸೈಟ್ನಲ್ಲಿ ಪ್ರಕಟಿಸಲು.

ಅಡಕಗಳು: ಕರ್ನಾಟಕ ಸರ್ಕಾರದ ನಡವಳಿಗಳು ಮತ್ತು ಅನುಮೋದಿತ DCET ಪಠ್ಯಕ್ರಮಗಳ ಪ್ರತಿ.

Q 04/4/18.

ಕರ್ನಾಟಕ ಸರ್ಕಾರದ ನಡವಳಗಳು

ವಿಷಯ:- 2018ರ ಸಾಅನಿಂದ ಡಿಮ್ಲೊಮಾ ಅಭ್ಯರ್ಥಿಗಳು ಜಿ.ಇ (ಲ್ಯಾಟರಲ್ ಎಂಟ್ರ) ವ್ಯಾಸಂಗಕ್ಕೆ ಪ್ರವೇಶ ಪಡೆಯಲು ಕರ್ನಾಟಕ ಪರೀಕ್ಷಾ ಪ್ರಾಧಿಕಾರ ನಡೆಸುವ DCET ಪರೀಕ್ಷೆಗಳಗೆ ಹೊಸ ಪಠ್ಯಕ್ರಮಗಳನ್ನು ಅಳವಡಿಸುವ ಬಗ್ಗೆ.

ಓದಲಾಗಿದೆ:--

- 1. ಸರ್ಕಾರದ ಪತ್ರ ಸಂಖ್ಯೆ: ಇಡಿ 281 ಅಪಿಇ 2013, ದಿನಾಂಕ:13-02-2015.
- 2. ಸರ್ಕಾರದ ಆದೇಶ ಸಂಖ್ಯೆ: ಇಡಿ 148 ಟಪಿಇ 2015, ದಿನಾಂಕ:23-06-2016.
- 3. ಸರ್ಕಾರದ ಆದೇಶ ಸಂಖ್ಯೆ: ಇಡಿ 76 ಏಪಿಇ 2016, ದಿನಾಂಕ:21–06–2016.
- 4. ಸರ್ಕಾರದ ಆದೇಶ ಸಂಖ್ಯೆ: ಇಡಿ 46 ಏಪಿಇ 2017, ದಿನಾಂಕ:15-05-2017.
- 5. ನಿರ್ದೇಶಕರು, ತಾಂತ್ರಿಕ ಶಿಕ್ಷಣ ಇಲಾಖೆ ಇವರ ಪತ್ರ ಸಂಖ್ಯೇ ತಾಂಶಿನಿ 36 ಸಿಡಿಸಿ (1) 2017–18/2910, ದಿನಾಂಕ:30–01–2018.

<u>ಪ್ರಸ್ತಾವನೆ:–</u>

ಮೇಲೆ ಕ್ರಮಸಂಖ್ಯೆ (1) ರಲ್ಲ ಓದಲಾದ ಸರ್ಕಾರದ ಪತ್ರದಲ್ಲ ರಾಜ್ಯದ ಪಾಅಬೆಕ್ನಿಕ್ ಗಳ ಡಿಪ್ಲೋಮೊ ಕೋರ್ಸುಗಳ ಪಠ್ಯಕ್ರಮವನ್ನು ಕೆಲವೊಂದು ಷರತ್ತಿಗೊಳಪಡಿಸಿ ಪರಿಷ್ಠರಿಸಲು ಸರ್ಕಾರದ ಅನುಮೋದನೆ ನೀಡಲಾಗಿರುತ್ತದೆ.

ಮೇಲೆ ಕ್ರಮಸಂಖ್ಯೆ (2). (3) ಮತ್ತು (4)ರಲ್ಲ ಓದಲಾದ ಸರ್ಕಾರದ ಆದೇಶಗಳಲ್ಲ ರಾಜ್ಯದಲ್ಲನ ಎಲ್ಲಾ ಪಾಲಬೆಕ್ನಿಕ್ ಗಳ ಡಿಪ್ಲೋಮೊ ಕೋರ್ಸುಗಳಲ್ಲ ಕ್ರಮವಾಗಿ 1 ಮತ್ತು 2ನೇ ಸೆಮಿಸ್ಟರ್ ಗಳಲ್ಲನ ಪಠ್ಯಕ್ರಮವನ್ನು 2015–16ನೇ ಶೈಕ್ಷಣಿಕ ಸಾಲನಿಂದ, 3 ಮತ್ತು 4ನೇ ಸೆಮಿಸ್ಟರ್ ನ ಪಠ್ಯಕ್ರಮವನ್ನು 2016–17ನೇ ಶೈಕ್ಷಣಿಕ ಸಾಲನಿಂದ ಹಾಗೂ 5 ಮತ್ತು 6 ನೇ ಸೆಮಿಸ್ಟರ್ ಗಳಲ್ಲನ ಪಠ್ಯಕ್ರಮವನ್ನು 2017–18ನೇ ಶೈಕ್ಷಣಿಕ ಸಾಲನಿಂದ ಪರಿಷ್ಕೃತ ಪಠ್ಯಕ್ರಮವನ್ನು ಅಳವಡಿಸಲು ಅನುಮೋದನೆ ನೀಡಲಾಗಿತು.

ಮೇಲೆ ಕ್ರಮಸಂಖ್ಯೆ (5)ರಲ್ಲ ಓದಲಾದ ನಿರ್ದೇಶಕರು, ತಾಂತ್ರಿಕ ಶಿಕ್ಷಣ ಇಲಾಖೆ ರವರ ಪತ್ರದಲ್ಲ ರಾಜ್ಯದ ಪಾಲವೆಕ್ನಿಕ್ ಡಿಪ್ಲೋಮೊ ಸೆಮಿಸ್ಟರ್ಗಳ ಪಠ್ಯಕ್ರಮಗಳಲ್ಲ " ಫಲತಾಂಶದ ಆಧಾರಿತ ಪಠ್ಯಕ್ರಮ (Outcome Based Education)" ಪದ್ಧತಿಯನುಸಾರ ಹೊಸ ಪಠ್ಯಕ್ರಮಗಳನ್ನು 2015–16ನೇ ಸಾಲನಿಂದ ಅಳವಡಿಸಲಾಗಿದ್ದು, ಹೊಸ ಪಠ್ಯಕ್ರಮಗಳ ಪ್ರಕಾರ ಪ್ರವೇಶ ಪಡೆದ ಡಿಪ್ಲೋಮಾ ವಿದ್ಯಾರ್ಥಿಗಳು 2018ನೇ ಸಾಲನಲ್ಲ ಡಿಪ್ಲೋಮಾ ವ್ಯಾಸಂಗವನ್ನು ಮುಗಿಸಲದ್ದು, ಆಸಕ್ತ ಅರ್ಹ ಡಿಪ್ಲೋಮಾ ಅಭ್ಯರ್ಥಿಗಳು ಇ.ಇ (ಲ್ಯಾಟರಲ್ ಎಂಟ್ರ) ವ್ಯಾಸಂಗ ಮುಂದುವರೆಸಲು, ಕರ್ನಾಟಕ ಪರೀಕ್ಷಾ ಪ್ರಾಧಿಕಾರ ನಡೆಸುವ 2018ರ ಸಾಲನ DCET ಪರೀಕ್ಷೆಗಳನ್ನು ತೆಗೆದುಕೊಳ್ಳಬೇಕಾಗಿರುತ್ತದೆ. ಆದ್ದರಿಂದ 2018ರ ಸಾಲನ ಡಿಸಿಇಟ ಪರೀಕ್ಷೆಗಳಗೆ 2015–16ನೇ ಸಾಲನಿಂದ ಡಿಪ್ಲೋಮೊ ವ್ಯಾಸಂಗದಲ್ಲ ಅಳವತಿಸಿರುವ "ಫಲತಾಂಶದ ಆಧಾರಿತ ಪಠ್ಯಕ್ರಮ (Outcome Based Education)" ಪದ್ಧತಿಯ ಹೊಸ ಪಠ್ಯಕ್ರಮಗಳನ್ನು ಅಳವಡಿಸಬೇಕಾಗಿರುತ್ತದೆ.

CDC-1

ಅದರಂತೆ, ವಿವಿಧ ತಾಂತ್ರಿಕ ಶಿಕ್ಷಣ ಪರಿಣಿತರ, ವಿವಿಧ ಔದ್ಯೋಗಿಕ ಕ್ಷೇತ್ರಗಳ ತಾಂತ್ರಿಕ ಪರಿಣಿತರು ಹಾಗೂ ರಾಷ್ಟ್ರೀಯ ತಾಂತ್ರಿಕ ಶಿಕ್ಷಕರ ತರಬೇತಿ ಮತ್ತು ಸಂಶೋಧನಾ ಸಂಸ್ಥೆ, ಬೆಂಗಳೂರು ಇವರೊಳಗೊಂಡ ಪಠ್ಯಕ್ರಮ ಪರಿಷ್ಕರಣಾ ಸಮಿತಿಯನ್ನು ರಚಿಸಿದ್ದು, ಸದರಿ ಸಮಿತಿಯು ಹೊಸ ಪಠ್ಯಕ್ರಮಗಳಲ್ಲ ವಿಧ್ಯಾರ್ಥಿಗಳು ಕಅತಿರುವ ತಾಂತ್ರಿಕ/ಜ್ಞಾನವನ್ನು ಪರಿಗಣಿಸಿ. 2018ರ ಸಾಅನಿಂದ ನಡೆಯುವ ಡಿಸಿಇಟ ಪರೀಕ್ಷೆಗಳಲ್ಲ ಅಳವಡಿಸಲು, ಈ ಕೆಳಗಿನಂತೆ ಹೊಸ ಪಠ್ಯಕ್ರಮವನ್ನು ಸಿದ್ದಪಡಿಸಿದ್ದು, ಸದರಿ ಪಠ್ಯಕ್ರಮವನ್ನು 2018ನೇ ಸಾಅನಿಂದ ನಡೆಸುವ ಡಿಸಿಇೞ ಪರೀಕ್ಷೆಗಳಗೆ ಅಳವಡಿಸಲು ಸರ್ಕಾರದ ಅನುಮೋದನೆ ನೀಡುವಂತೆ ಮತ್ತು ಕರ್ನಾಟಕ ಪರೀಕ್ಷಾ ಪ್ರಾಧಿಕಾರಕ್ಕೆ ಸೂಚಿಸುವಂತೆ ಪ್ರಸ್ತಾವನೆಯನ್ನು ಸಲ್ಲಸಿರುತ್ತಾರೆ.

> ಪರೀಕ್ಷಾ ವಿಧಾನ : ಬಹು ಆಯ್ಕೆ ಪ್ರಶ್ನೆಗಳು. ಪರೀಕ್ಷೆ ಸಮಯ: 3 ಗಂಟೆಗಳು (180 ನಿಮಿಷಗಳು) ಗರಿಷ್ಠ ಅಂಕಗಳು: 180

ಅಂಕಗಳ ವಿಂಗಡನೆ:

ಎ) ಸಂಬಂದಿಸಿದ ಇಂಜಿನಿಯರಿಂಗ್ ವಿಷಯಗಳು: 100 ಅಂಕಗಳು.

ಜ) ಗಣಿತ ಮತ್ತು ವಿಜ್ಞಾನ ವಿಷಯಗಳು : 8೦ ಅಂಕಗಳು

(ಗಣಿತದಲ್ಲ 40 ಅಂಕಗಳು ಹಾಗೂ ವಿಜ್ಞಾನದಲ್ಲ 40 ಅಂಕಗಳು)

ಸದರಿ ಪ್ರಸ್ತಾವನೆಯನ್ನು ಕೂಲಂಕಷವಾಗಿ ಪರಿಶೀಅಸಿ, ಈ ಕೆಳಕಂಡಂತೆ ಆದೇಶಿಸಿದೆ.

ಸರ್ಕಾರದ ಆದೇಶ ಸಂಖ್ಯೇ: ಇಡಿ 23 ಏಪಿಇ 2018. ಬೆಂಗಳೂರು, ದಿನಾಂಕ: ೦3ನೇ ಏಪ್ರಿಲ್ 2018.

ಪ್ರಸ್ತಾವನೆಯಲ್ಲ ವಿವರಿಸಿರುವ ಅಂಶಗಳ ಹಿನ್ನೆಲೆಯಲ್ಲ. ಸರ್ಕಾರವು, 2018ನೇ ಸಾಅನಿಂದ ಡಿಮ್ಲೊಮಾ ಅಭ್ಯರ್ಥಿಗಳು ಜ.ಇ (ಲ್ಯಾಟರಲ್ ಎಂಟ್ರ) ವ್ಯಾಸಂಗಕ್ಕೆ ಪ್ರವೇಶ ಪಡೆಯಲು ಕರ್ನಾಟಕ ಪರೀಕ್ಷಾ ಪ್ರಾಧಿಕಾರ ನಡೆಸುವ DCET ಪ್ರವೇಶ ಪರೀಕ್ಷೆಯಲ್ಲ ಫಅತಾಂಶದ ಆಧಾರಿತ ಪಠ್ಯಕ್ರಮ (Outcome Based Education)" ಪದ್ಧತಿಯನುಸಾರ ಅನುಬಂಧ– 1 ರಿಂದ 11 ರಲ್ಲರುವಂತೆ ಹೊಸ ಅಳವಡಿಸಿಕೊಂಡು Diploma CET ಪ್ರವೇಶ ಪರೀಕ್ಷೆಗಳನ್ನು ನಡೆಸಲು ಪಠ್ಯಕ್ರಮಗಳನ್ನು ಅನುಮೋದನೆ ನೀಡಿ ಆದೇಶಿಸಲಾಗಿದೆ.

> ಕರ್ನಾಟಕ ರಾಜ್ಯಪಾಲರ ಆದೇಶಾನುಸಾರ ಮತ್ತು ಅವರ ಹೆಸರಿನಲ್ಲ,

> > (ಎಸ್.ವೆಂಕಟೇಶ್)

A Vanleatech

ಸರ್ಕಾರದ ಅಧೀನ ಕಾರ್ಯದರ್ಶಿ,

<u>ಶಿಕ್ಷ</u>ಣ ಇಲಾಖೆ (ತಾಂತ್ರಿಕ ಶಿಕ್ಷಣ).

<u>ಪತಿ:-</u>

1. ಪ್ರಧಾನ ಮಹಾಲೇಖಪಾಲರು(ಜಿ&ಎಸ್ಎಸ್ಎ) & (ಇ&ಆರ್ಎಸ್ಎ)ರವರ ಕಾರ್ಯದರ್ಶಿ. ಕರ್ನಾಟಕ, ಹೊಸ ಕಟ್ಟಡ. ಆಡಿಟ್ ಭವನ, ಅಂಚೆ ಪೆಟ್ಟಗೆ ಸಂಖ್ಯೆ 5398.ಬೆಂಗಳೂರು– 560 001.

- 2. ಪ್ರಧಾನ ಮಹಾಲೇಖಪಾಲರು (ಎ&ಇ) ರವರ ಕಾರ್ಯದರ್ಶಿ, ಕರ್ನಾಟಕ, ಪಾರ್ಕ್ ಹೌಸ್ ರಸ್ತೆ, ಅಂಚೆ ಪೆಟ್ಟಗೆ ಸಂಖ್ಯೆ 5329, ಬೆಂಗಳೂರು 560 001.
- 3. ಕ್ರಾರ್ಯನಿರ್ವಾಕ ನಿರ್ದೇಶಕರು, ಕರ್ನಾಟಕ ಪರೀಕ್ಷಾ ಪ್ರಾಧಿಕಾರ, ಮಲ್ಲೇಶ್ವರಂ, ಬೆಂಗಳೂರು.
- ನಿರ್ದೇಶಕರು, ತಾಂತ್ರಿಕ ಶಿಕ್ಷಣ ಇಲಾಖೆ, ಬೆಂಗಳೂರು
 - 5. ಕಾರ್ಯದರ್ಶಿ, ತಾಂತ್ರಿಕ ಶಿಕ್ಷಣ ಪರೀಕ್ಷಾ ಮಂಡಳ, ಬೆಂಗಳೂರು.
 - 6. ಸರ್ಕಾರಿ, ಅನುದಾನಿತ ಮತ್ತು ಖಾಸಗಿ ಪಾಆಟೆಕ್ನಿಕ್ ಗಳ ಪ್ರಾಂಶುಪಾಲರಿಗೆ (ತಾಂತ್ರಿಕ ಶಿಕ್ಷಣ ನಿರ್ದೇಶಕರ ಮುಖಾಂತರ)
 - 7. ಶಾಖಾ ರಕ್ಷಾ ಕಡತ / ಹೆಚ್ಚಿನ ಪ್ರತಿ / ಒಡಿಜಿಸಿ



GOVERNMENT OF KARNATAKA (Department of Technical Education)

INDEX

LIST OF DCET CURRICULUM- PROGRAMME WISE

Sl.No	Programme Name	Group Code	Total Marks
1	Textile Technology	TX	100
2	Mechanical Engineering & Allied	ME	100
3	Environmental, PHE and WT&HS	EN	100
4	Electronics and Communications Engg.	EC	100
5	Electrical and Electronics Engg.	EE	100
6	Computer Science and Engineering	CS	100
7	Civil Engineering and Allied	CE	100
8	Chemical Engineering & Polymer Engineering	СН	100
9	Aeronautical Engineering	AE	100
10	Mining Engineering	MN	100
11	Engineering Mathematics(40Marks) and Applied Science (40Marks) [Common to All Programmes]		80

DCET Total Marks: 180

Test Duration: 3Hours

Maximum Marks: 180

Subjects	Marks	Remarks
Engineering Mathematics	40	Common to all Branches
Applied Science	40	Common to all Branches
Textile Technology/ Mechanical Engineering & Allied/ Environmental, PHE and WT&HS/ Electronics and Communications Engg./ Electrical and Electronics Engg./ Computer Science and Engineering/ Civil Engineering and Allied/ Chemical Engineering/ Aeronautical Engineering/ Polymer Engineering/ Mining Engineering	100	Separate Question Paper for all the Engineering Subjects as per the group to which they belong.
Number of Question	ns: 180 (M	(ultiple Choice)

(S. Venkatesh)

Under Secretary to Government

Higher Education (Technical Section)

ANNEXURE-V ELECTRICAL AND ELECTRONOICS

Each Module carries 20 marks

MODULE-1

Total Marks: 100

1.1.ELEMENTS OF ELECTRICAL ENGG:

Sources of electrical energy, Electrical current, e.m.f., voltage. Ohm's law, Electrical Resistance, Series-Parallel circuits. Laws of Resistance, Specific Resistance, temperature co-efficient. Work, Power and Energy, Joule's law of heat. Electric charge, Electric flux, Flux density, Electric field, Electric field intensity, Laws of electrostatics, dielectric constant and permittivity, Capacitance. Types of Capacitors, Capacitors in series and parallel, Energy stored in a capacitor. Faraday's laws of Electrolysis: Laws, Cell and a Battery. Lead - Acid Battery- Construction, Grouping of cells. Conductor, Resistor, Insulating and magnetic materials - properties and applications.

1.2. ELECTRICAL CIRCUITS:

Open, closed and short circuit; Linear, non linear circuits, passive active circuits, unilateral, bilateral circuits. Kirchhoff's laws, Star -delta Transformation, Thevinin's Theorem, Reciprocity Theorem. Superposition Theorem Maximum power transfer Theorem. Magnetic circuit, mmf, reluctance, · Absolute permeability and Relative permeability. Flux, MMF and Reluctance. Cork Screw Rule and Right Hand Thumb Rule, Faraday's laws of Electromagnetic Induction, Types of induced emfs and their application; Fleming's Right Hand Rule, Lenz's law; Self induced emf and Mutually induced emf and their application, Self inductance and Mutual inductance. Frequency, Amplitude, Cycle, Time period; Maximum value, RMS value, Average value, Form factor and Peak factor of a sinusoidal wave, Instantaneous value of Voltage and Current, phase and phase difference, Power and Power factor in AC circuits, Represent vectors in Rectangular, Trigonometric and Polar forms, Convert Rectangular form into Polar form and vice-versa. Current and Power in a pure resistive, pure inductive and pure capacitive circuit; Capacitive reactance, Inductive reactance, Impedance, Current, Power and Power factor of R-L, R-C. R-L-C series and parallel circuits, Resonance, resonant frequency and Q-factor. Star and Delta Connection in 3-ph system, Relation between line voltage and phase voltage in 3-ph Star, Relation between line voltage and phase voltage in 3-ph Delta system, 3-ph power.

1.3. ELECTRICAL MEASUREMENTS & MEASURING INSTRUMENTS

Characteristics of instruments, types of errors, classification of instruments, types of torques in instruments,

Construction and operation of moving coil, moving iron instruments, calibration and range extension of voltmeter, ammeter,

Construction and operation, types, errors, calibration, application of wattmeter and energy meter, measurement of power and energy.

Measurement of Resistance, Inductance and Capacitance. - Wheat stone bridge, Kelvin bridge, Maxwell's bridge, Schering Bridge.

Digital meters – operation and applications of Digital frequency meter, digital synchronoscope, digital non contact type tachometer, digital p.f.meter, digital trivectormeter, digital tong tester, digital LCR meter, digital multimeter and voltmeter.

Transducers, Sensors, Signal conditioning circuits and their application - strain gauges, LVDT, RVDT, Thermocouple, Pyrometer. Peizo-electric, Opto-sensor, Bolometer for measuring AF & RF power measurements

MODULE-II

2.1. DC MACHINES AND ALTERNATORS:

D.C. Generator - Principle, Construction and types, Materials used for construction-properties, Reasons for using these materials, slot insulation materials - properties. Functions of each part, Armature windings- Types of windings, Rules of lap & wave winding, application of lap & Wave windings. E.M.F equation, Armature reaction, De-magnetizing & cross - magnetizing effect, Commutation- methods of improving commutation. Characteristics- separately excited D.C. Generator; shunt Generator - critical resistance - conditions for voltage build up-failure to build up, Efficiency & voltage Regulation-Losses in D.C. Generator.

D.C Motor- Working principle –comparison of motor & Generator action. Back emf & voltage equation, Types of motors, Torque developed, Torque- speed relationship, Characteristics of D.C. Motors, Applications, Speed control, Starting Devices.

Alternator - Principle - Construction - Types. Armature winding, Emf equation, Armature Reaction and its Effects. Voltage regulation. O.C & S.C. tests, effective resistance, leakage reactance & synchronous reactance. Parallel operation, Excitation Systems, Hunting in alternators and its prevention. Cooling in alternators. Principle of working, construction and applications of the following motors - Universal motors, Reluctance motor, Two phase Four pole Permanent magnet Stepper motor, Servo motor, Brushless D.C. Motors and AC/DC Tacho-generator.

2.2. TRANSFORMERS AND AC MOTORS:

Transformers - Working principle, construction and classification. Emf Equation, Operation, Equivalent circuit of transformer, Regulation and Efficiency, Parallel operation, Three Phase transformers- working principle & construction, connections, Cooling of transformer, Auto transformer.

Induction Motors- working principle ,Types, construction ,Torque, slip, Equivalent circuit, Power output, losses, Starting and Speed control of Induction Motors.

Synchronous Motors- Working principle, construction, characteristics, hunting, starting, and applications.

Single Phase Induction Motors- Principle. Operation, types, characteristics, applications, linear induction motor, Magnetic Levitation, Induction Generators.

MODULE-III

3.1. ELECTRICAL POWER GENERATION

Conventional and non-conventional sources, Factors to be considered for selection of site, classification, functions of main component, comparison, advantages and disadvantages, environmental impacts of hydroelectric power plant, thermal power plant, nuclear power plant, diesel power plant, gas turbine power plant, Solar photovoltaic system, Wind power plant, Tidal power plant, Wave energy, Ocean thermal energy, Biomass power plant, Fuel cells, Hybrid PV systems, Urban waste to energy conversion, Power factor improvement.

3.2. TRANSMISION DISTRIBUTION AND UTILISATION

Transmission system: AC transmission and distribution system, standard transmission and distribution voltages, Advantages and limitations of High voltage transmission, various systems for power transmission and distribution, Transmission through overhead and UG system, Compare HVDC and HVAC system

Overhead lines: Main components, Classification, Line, Short transmission line - equivalent circuit, equations for receiving end voltage, efficiency, voltage regulation and power factor, Corona- definition, formation, factors affecting corona, advantages and disadvantages, methods to reduce corona. Meaning of skin effect. Transposition of conductors.

Underground cables: Classification of UG cables, general construction of a single core UG cable, construction of 3 core XLPE cables. Essential insulating material properties for UG cables. Laying of UG cables- list the methods.

HVDC transmission lines: main components, advantages, Types of HVDC links -

FACTS Controllers- Definition, Objectives, Basic types of FACTS controllers and their functions.

SUBSTATIONS- Meaning of substation, classification, comparison between outdoor and indoor substation, single line diagram MUSS, components of substation, Bus bar arrangement- list the typessingle bus with and without sectionalisation, double bus bar and ring main system. Importance of interconnecting in large power systems. Function of Load Dispatch Stations.

AC distribution system: Classification, connection schemes of distribution system, Meaning of Feeder, distributor and service main, characteristics of Feeder, distributor and service main. Concept of voltage drop in feeders/distributors - simple problem on DC distributor fed at one end. Distribution Automation

SCADA, components of SCADA and their functions and advantages

Electrical heating: Different types of domestic heating appliances, Advantages of electric heating, methods of electrical heating, temperature control methods of resistance heating. Arc heating- types, Induction heating-types, eddy current. Applications of eddy current heating. electric heating- principle and applications. Microwave heating-principle only.

Electric welding: Definition, types-resistance and arc welding, resistance welding list the types-spot welding and seam welding, Arc welding-list the types, AC arc welding machine, Mention the special types of welding-electron beam welding and laser welding.

Electro chemical process- Principles of electro deposition, laws of electrolysis, Electro plating, Factors affecting Electro plating, Factors governing Electro better electro deposition.

Refrigeration: types of refrigerants. State the properties of refrigerants. Vapour compression refrigerator, electric circuit of domestic refrigerator, necessity of thermostat, defrosting-types of defrosting, need for air conditioning, principle of air conditioning, electrical circuit for air conditioning unit, types of air conditioning system.

Illumination: Laws—solid angle, luminous flux and luminous intensity and illumination,, source of light- types of lamps, lighting schemes, Design of lighting scheme - utilization factor, depreciation factor, space to height ratio requirements of good illumination

3.3.SWITCHGEAR AND PROTECTION

Fundamentals of Protection- Sources and Types of faults & Hamful Effects of short circuit current, Symmetrical Faults on Three Phase Systems, Percentage reactance and Base KVA, Reactor, Use of current limiting reactors & their arrangements. Causes of over voltages, Lighting phenomena & over voltage due to lightning, Types of lightning arresters and surge absorbers- their Construction and principle of operation.

Fuse and Circuit Breaker - Features of Switchgear, different Switchgear equipment used for switching and interruption of current, Indoor type and Outdoor type Switchgear, Characteristics of Fuse elements, Types of Fuses, Fuse Element Materials, Important Terms of fuse, HRC fuses – construction, types, working, Merits, Demerits and applications, Are formation, are extinction, Trip Circuit Mechanism, Circuit Breaker-rating, terminologies, Classification, Construction, Working, Merits, Demerits, Applications and Maintenance Schedule of OCB (Plain oil), ACB(Axial blast, cross blast),SF6 (Sulpher Hexa Fluoride)CB Non Puffer Type, vacuum CB.

Protective Relays — Qualities of Protective Relaying, Necessity for Protection, Primary and Back up protection, Classification of protective Relaying, Important Terms, Construction and working of Induction type Non-directional over current relay. Static Type Over Current Relay, Comparison of Static Relays with Electro-Magnetic Relays, Microprocessor based Over Current Relay, Differential relay- Current differential and Voltage balanced Differential relay, Distance relays- Definite distance and Time-distance Impedance Relay. Numerical relay- working, Advantages and types, Testing Methods for Relays Protection of Alternators and Transformers- Protection of Alternators. Abnormalities & Faults Differential protection. Balanced Earth Fault Protection, Stator Inter Turn Protection Protection of Transformers- Abnormalities & Faults, Protective Systems for Transformers, Buchholz Relay, Earth Fault or Leakage Protection, Combined Leakage and Overload Protection, Circulating Current Scheme for Transformers Protection Protection of Feeders and Bus-Bars: Feeder

Protection- Abnormalities & Faults, Time Graded Over Current Protection, Differential Pilot Wire Protection, Distance Protection, Bus – Bar Protection- Abnormalities & Faults, Differential Protection of Bus –Bars, Substation and Maintenance: Indoor and outdoor type substation, various units of substation, Testing methods of Circuit Breakers. Testing methods of CT's & PT's, Maintenance Schedule of Relays, Types & importance of Neutral Earthing, Substation Earthing, Principle and applications of Peterson coil

MODULE-IV

4.1. ANALOG ELECTRONICS:

Semiconductors, P N junction Diodes, Zener diode, Varistor and Thermistor, Transistors and MOSFETs, Optoelectronic devices –photo diode, opto isolator, photo voltaic cell, LED, LDR, LCD, opto coupler. Rectifiers, filters and regulators, Amplifiers and Oscillator, CRT.OP-AMP and Timers.

4.2. DIGITAL ELECTRONICS:

IC Logic families, Digital Principles and Number system, Boolean Algebra, De Morgan's theorem, Logic Gates, Karnaugh's map, Adders, Multiplexer, De-Multiplexer, Encoders, Decoders, Flip flops, Shift Registers, Counters, Digital Interfacing, ADC and DAC, Memories

4.3. COMMUNICATION AND COMPUTER NETWORKS

Radio Communication: Elements of communication system, Forms and types of communication, Modulation methods

Electromagnetic spectrum: Relationship between frequency (f) and wavelength (λ), Need for modulation, Electromagnetic spectrum. Bandwidth, Modulation and demodulation circuits

Radio transmitter and Receiver-Transmitter-functions, FM transmitter, Receiver - Super heterodyne receiver.

Multiplexing: FDM- transmitting end, FDM- receiving end TDM-definition.

Transmission lines—types, Co-axial cable, characteristic impedance, characteristic impedance of co-axial cable, Standing Waves, Standing wave ratio, importance of SWR.

Radio wave propagation: ground wave, sky wave, space wave.

Fiber Optic Communication: Elements of fiber-optic communication system, Applications, Benefits, Light rays in a fiber optic cable, construction Mode-definition, classification, ILD optical transmitter, Photodiode optical receiver.

Microwave Techniques: Advantages, Problems faced in microwave communication, Wave guides, Cavity resonators, Microwave semiconductors –problems faced by conventional semiconductor components and their remedies. Microwave tubes, Microwave antennas.

Satellite Communication: Satellite orbits- geo synchronous orbit, Transponder, working, Satellite sub system, Satellite Earth Station. Applications.

GPS - GPS architecture, GPS receiver, Differential GPS, Applications of GPS, GIS - concept, applications.

Mobile and Data Communication: Mobile communication – Multi cell system, frequency reuse, Salient features of GSM, GSM services. GSM system architecture, GSM network area –definitions- cell, location area, MSC/VLR service area, PLMN, GSM operation-call from mobile station, call to a mobile station, Concept of GPRS, Compare 2G with 3G.

Data Communication - Concept, Applications, Modes of Transmission, channel capacity, bandwidth, baud rate, bit rate, Modem - need for modem, FSK-concept, working, PSK - concept, BPSK—concept. BPSK modulator. BPSK demodulator.

MODULE-V

5.1. POWER ELECTRONICS:

Power semiconductor devices- Structure, working, Characteristics, types and applications of Power diode, MOSFET, IGBT, SCR. LASCR, GTO, TRIAC, Turning on methods and commutation of SCR, ratings, reliability, protection & mounting of SCR.

CONVERTERS, CHOPPERS, INVERTERS. CYCLOCONVERTERS - Types, operation and application, advantages and disadvantages

Power supplies and stabilizers-SMPS, Buck, Boost, Buck-Boost and Fly back converter, power line disturbances, Relay type AC voltage stabilizer. AC servo voltage stabilizer, UPS- Battery size, voltage required, ON line and OFF line UPS

Power system applications- Static AC circuit breaker, interconnection of renewable energy sources and energy storage systems to the utility grid. Thyristor switched capacitors and thyristor switched inductors (Reactors),

Industrial applications -SWITCH mode welder. Voltage source series resonant inverters, solid state relay, speed control of shunt wound DC motor, son starting of Induction motor, static slip recovery system in induction motor(static scherbius drive), speed control of Induction Motor by Variable voltage frequency method

DOMESTIC APPLICATIONS-High frequency lighting system, SCR battery charger.

5.2. INDUSTRIAL DRIVES AND CONTROL

Concept of electric drive, Power modulators, Motors used in drives, types of loads, choice of drives, classification of drives, Multi quadrant operation of Drives, selection of drives for paper mill, cement mill, sugar mill, steel mill, Hoists and cranes centrifugal pumps and compressors, solar powered pump drives,

CONTROL SYSTEM- Open and closed loop systems,

COMPUTER BASED INDUSTRIAL CONTROL - Hierarchical levels of CIM, Microcontroller based DC Motor speed control, Fuzzy logic. Process control in thermal plant and cement plant ELECTRIC TRACTION- Traction systems. Tractive effort, nature of traction load, requirements of traction drives, Drives in traction, electric braking, current collection, Train lighting system

5.3.ELECTRICAL ESTIMATION AND COSTING

Estimation- purpose, factors considered, qualities of a good estimator. Specification- importance, factors considered, Standardization and its advantages. Overhead charges, stock incidental charges, contingencies, supervision charges, labour charges. Inspection/Inspectorate charges, transportation charges and miscellaneous charges. Tender/tender actue, quotation, comparative statement, purchase order and work order. Earthing -touch potential, step potential, necessity of earthing, Points to be earthed, earth resistance, types of earthing. Pine carthing. Plate earthing SERVICE MAINS- types of service mains- Over Head Service Mains, JG Service Mains, current ratings for Aluminium, copper conductors, Types of Towers, ACSR conductors and Number of Disc insulators in suspension string, strain string, span and height of towers for 66 KV. 10 KV, 220 KV transmission lines

5.4. ENERGY MANAGEMENT

Energy management and its importance, energy conservation and its need, Methodology of energy management, energy management secuniques, energy crisis, causes of energy crisis, Energy management software (EMS) variets tages of EMS, Describe Energy and facility management system (EFMS), purpose of ESMS, Methodology of EFMS Processes in EFMS, block diagram of EFMS components & applications of EFMS, Need of energy conservation

in India, ENERGY CONSERVATION ACT 2001, the national role of IRDEA (Indian renewable energy development agency) in energy conservation, Energy conservation in T&D lines., measures to optimize T&D losses, Energy conservation in industries, role of power factor improvement in energy conservation—energy conservation in domestic sector, industrial sector, agriculture sector, Energy efficiency—its significance, energy efficient devices, energy efficient motors, application s energy efficient motor, selection of electric drives, energy conservation in electric drive—energy efficient lighting sources, power quality, and its parameters, power quality measurable quantities, power quality problems and its remedies, pricing of electricity, Need for energy audit, scope and types of energy audit, Methodology, demand side management (DSM), need for DSM and benefits of DSM, DSM implementation strategy, DSM implementation of program.

(S.Venkatesh)

Under Secretary to Government Higher Education (Technical Section)

ANNEXURE-XI

ENGINEERING MATHEMATICS AND APPLIED SCIENCE

(COMMON TO ALL BRANCHES)

ENGINEERING MATHEMATICS

Max Marks: 40

Marks

LINEAR ALGEBRA

Unit-1: MATRICES & DETERMINANTS:

06 Mark

Basic concepts of Matrices(Addition, Subtraction and Multiplication), Determinants: Problems on finding unknown quantity in a 2nd and 3rd order determinants using expansion. Solving simultaneous linear equations using determinant method (Cramer's rule up to 3rd order).

Matrices: Minors, Cofactors, Adjoint and Inverse of matrices of 2nd order. Characteristic equation and roots of a square matrix.

ALGEBRA

Unit-2: VECTORS:

03 Marks

Magnitude of a vector. Position vector. Expression of vector in terms of position vectors. Vector in plane and in space in terms of unit vectors i, j and k respectively. Product of vectors. Scalar and vector product. Applications of dot and cross products i.e., Projection of vector on another vector, Area of parallelogram and area of triangle. Work done by a force and moment of force.

Unit-3: PROBABILITY:

01 Marks

Random Experiments, Sample Space, Events, Types of Events, Algebra of Events, Complementary event, the events A or B, A and B, A but not B, Mutually Exclusive Events, Exhaustive events, Simple problems.

TRIGONOMETRY

Unit-4: ALLIED ANGLES AND COMPOUND ANGLES:

06 Marks

Signs of Trigonometric ratios, Trigonometric ratios of Allied Angles in terms of θ . Formulae for Sin(A±B), Cos(A±B) & tan(A±B) and problems on them. Multiple and sub multiple angle formulae for 2A & 3A and simple problems. Transformation formulae on sum or difference into products & products into sum or difference and problems on them.

Unit-5: Complex numbers:

01 Mark

Definition of complex number in the form of a + ib. Conjugate of complex number. Algebra of complex numbers, modulus and principal value of argument of complex number. Polar form $Z = r(Cos\theta + iSin\theta)$.

INTRODUCTION TO CALCULUS

Unit-6: Limits:

03 Marks

Evaluation of limit of functions by factorization, rationalization, limits when $n \to \infty$. Problems on algebraic limits based on formula $\lim_{x\to a} \frac{x^n-a^n}{x-a} = n$. a^{n-1} . Problems on trigonometric limits based on formula $\lim_{\theta\to 0} \frac{\sin\theta}{\theta} = 1$

CO-ORDINATE GEOMETRY

Unit-7: Straight Lines:-

02 Marks

Problems on different forms of equations of straight lines such as:

$$y = mx + c$$
, $(y-y_1) = m(x-x_1)$, $(y-y_1) = \frac{y2-y1}{x2-x1}$. $(x-x1)$

Problems on equation of lines through a point and parallel or perpendicular to a given line. Finding Slope, X-intercept and Y- intercept of general equation ax + by + c = 0.

DIFFERENTIATION

Unit-8:

06 Marks

Problems on rules of differentiation: (Sum rule, product rule and quotient rule). Problems on function of a function and inverse trigonometric functions. Derivative of implicit functions, and parametric functions and problems. Successive differentiation up to second order and problems on them. Differentiation of Logarithmic functions of types u^{ν} , Where u and v are functions of x, Simple problems.

APPLICATIONS OF DIFFERENTIATION

Unit-9:

02 Mark

Equations of tangent and normal to the curve y = f(x) at a given point and problems. Derivative as a rate measure i.e.to find the rate of change of displacement, velocity, radius, area, volume using differentiation and problems on them.

INTEGRAL CALCULUS

Unit-10:

05 Marks

Rules of integration and problems. Problems on integration by the method of substitution and by parts.

DEFINITE INTEGRALS

Unit-11:

02 Mark

Simple problems on definite integrals. Problems on applications of definite integrals such as area and volume.

DIFFERENTIAL EQUATIONS

Unit-12:

03 Mark

Order and Degree of Differential Equations, Formation of differential equation by eliminating arbitrary constants up to second order. Problems on solution of linear differential equations of first order by variable separable method and integrating factor method.

APPLIED SCIENCE

Max. Marks: 40 Marks

UNIT-I MECHANICS:

07 Marks

Units: Unit, types of units, SI unit- Basic and Supplementary units, advantages

Measuring instruments: Vernier calipers-principle and least count. Screw gauge-principle,
ZE, ZC, pitch and least count- simple problems on vernier calipers and screw gauge.

Scalars and vectors: scalar and vector with example, resultant, equilibrium, equilibrant. Laws of vectors-parallelogram law of vectors, triangle law of vectors, Lami's theorem. Expression for magnitude and direction of resultant of two vectors acting at a point. Rectangular component of resolution of a vector-simple problems on laws of vectors.

Parallel forces: Types of parallel forces, moment of force, couple, moment of couple ,simple problems on moment of force.

UNIT-II PROPERTIES OF SOLIDS AND LIQUIDS:

07Marks

Properties of solids: Deforming force, elasticity and plasticity with examples, stress and its types with example, strain and its types with example, Hooke's Law, Modullie of elasticity and its types- simple problems on stress and strain.

Properties of Liquids: Thrust and pressure , expression for pressure at a point inside the liquid at rest-simple problems.

Surface tension: Cohesive and Adhesive forces with examples, surface tension, factors affecting surface tension, application of surface tension. Capillarity and its applications. Viscosity: viscosity, expression for co-efficient of viscosity, effect of temperature on viscosity of liquid and gas, applications of viscosity- simple problems on co-efficient of viscosity.

UNIT-III HEAT AND PROPERTIES OF GASES:

05 Mark

Concept of Heat and Temperature: Heat and Temperature, Specific Heat of substance,

Transmission of Heat: conduction ,convection and radiation with example, Applications of conduction and convection and radiation.

Gas laws: Boyle's law, Charle's law and Gay- Lussac's law (statement with expression), expression PV=nRT, C_p and C_v and its relation-simple problems on gas laws.

UNIT-IV WAVE MOTION:

08Marks

Simple Harmonic Motion: Periodic motion with example, SHM, expression for displacement of a particle executing SHM.

Wave: Wave motion, wave period , wave frequency, wave amplitude, wave length and wave velocity, , relation between wave frequency , wave length and wave velocity-problems on $V=n\lambda$. Mechanical waves and Non-Mechanical waves with examples, Longitudinal and Transverse waves with example.

Propagation of sound waves in air: Newton – Laplace's formula for velocity of sound in air and various factors affecting velocity of sound in air.

Vibrations: Free vibration ,forced vibration and resonance with example. Laws of transverse vibration of stretched string, expression for fundamental frequency of vibration of stretched string –simple problems on fundamental frequency.

Stationary waves: Stationary waves and its characteristics, beat, beat frequency, application of beats.

UNIT- V MODERN PHYSICS:

05 Mark

Electromagnetic waves: Electromagnetic waves and its properties, electromagnetic spectrum and its applications.

Laser: Laser, properties of laser and its applications.

Nano-technology: Nanotechnology, advantages and dis-advantages of nanotechnology.

Communication system: Basic elements of communication system, advantages and disadvantages of satellite communication system,

Optical fibre: Optical fibre-principle and its applications.

UNIT-VI INDUSTRIAL CHEMISTRY

08 Marks

Electrolysis: Electrolyte, types of electrolyte with example, electrolysis, Postulates of Arrhenius theory of electrolytic dissociation, Faraday's First and Second law of electrolysis-simple problems on Faraday's laws.

Corrosion: Corrosion, conditions for corrosion, preventive methods of corrosion. Batteries: Battery, classification and its application.

Fuel cells: Fuel cell, types and advantages of fuel cells.

Metallurgy: Definition of mineral, ore, flux, slag and alloys. Purpose of making alloys and its applications.

Polymers: polymers and its types, application of polymers.

Composite materials: Composite material and its types, advantages and dis-advantages of composite material.

pH Value: pH value of a solution, pH scale, application of pH in different fields.

(S. Venkatesh)

. I. Verketech

Under Secretary to Government Higher Education (Technical Section)