|  |
| --- |
| **Scheme of Valuation/Answer Key**(Scheme of evaluation (marks in brackets) and answers of problems/key) |
| **APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**SIXTH SEMESTER B.TECH DEGREE EXAMINATION, MAY 2019 |
| **Course Code: EE364** |
| **Course Name: SWITCHED MODE POWER CONVERTERS** |
| Max. Marks: 100 |  | Duration: 3 Hours |
| **PART A** |
|  |  | ***Answer all questions, each carries5 marks.*** | Marks |
| 1 |  | Derivation of Input-output voltages in terms of duty ratio……3 marksDerivation of Input-output currents in terms of duty ratio……2 marks  | (5 ) |
| 2 |  | Linear power supply-3 mark. Drawbacks of linear power supply – 2marks | (5 ) |
| 3 |  | Circuit diagram of push pull converter ……1.5 marksSwitching waveforms….1 mark Explanation- 2.5 marks | (5) |
| 4 |  | amplitude modulation ratio ….2.5 marks frequency modulation ratio 2.5marks | (5) |
| 5 |  | Any five points – 5 x 1 = 5 marks | (5) |
| 6 |  | Relevant diagrams and waveforms….2 marks Explanation …..3 marks | (5) |
| 7 |  | Resonant converters – 3 marks. Applications in SMPC -2marks | (5) |
| 8 |  | Any five points – 5 x 1 = 5 marks | (5) |
| **PART B** |
| ***Answer any twofull questions, each carries10 marks.*** |
| 9 | a) | Circuit + waveform -3 mark, Derivation – 2 mark  | (5) |
|  | b) | I0 = 0.2083 A (1 mark) When Vd = 8 V , D =0.667 (1 mark), When Vd = 16 V , D =0.333(1 mark) L = 0.427 mH (2 mark) | (5) |
| 10 | a) | Relevant waveforms -2 mark + Derivation – 3 mark. | (5) |
|  | b) | D/(1-D) = 5/10, D= 0.333 (1.5 mark) iL1 = Id = 0.5 A, iL2 = I0 = 1A (1.5 mark) IC1 (rms) = 0.707A (2 mark) | (5) |
| 11 | a) | Circuit + relevant waveforms (3 mark), Explanation ( 3 mark) | (6) |
|  | b) | Necessity of electrical isolation….( 1 mark) , types of isolation transformer etc. (3 marks) | (4) |
|  |  |  |  |
| **PART C** |
| ***Answer any twofull questions, each carries10 marks.*** |
| 12 | a) | Circuit + relevant waveforms (3 mark), Explanation ( 3 mark) | (6) |
|  | b) | For Dmax = 0.7, N3/N1 = (1/Dmax) – 1 = 0.429 (1 mark)Maximum Voltage across the switch = Vd (1+( N1/N3))=3.333 Vd ( 3marks) | (4) |
| 13 | a) | Circuit + relevant waveforms (2 mark), Explanation ( 3 mark) | (5) |
|  | b) | Circuit + relevant waveforms (2 mark), Explanation ( 3 mark) | (5 ) |
| 14 | a) | Circuit + relevant waveforms (2 mark), Explanation ( 3 mark) | (5) |
|  | b) | Circuit + relevant waveforms (2 mark), Explanation ( 3 mark) | (5) |
| **PART D** |
| ***Answer any twofull questions, each carries 10 marks.*** |
| 15 | (a) | Concept of space vector Explanation 2 marks + space vector modulation Explanation- 3 mark | (5) |
|  | (b) |  Circuit + relevant waveforms (2 mark), Explanation ( 3 mark) | (5) |
| 16 | a) | Current mode control of inverterswith Explanation - 3 mark | (3) |
|  | b) | Relevant waveforms + Equivalent circuit in eachinterval of operation (4 mark),  Explanation (3 mark) | (7) |
| 17 | a) | Circuit diagram + Relevant waveforms - discontinuous current mode (3 mark),Explanation (4 mark) | (7 ) |
|  | b) | Compare zero voltage switching (ZVS) and zero current switching(ZCS)- 3 points (3 mark) | (3) |
| \*\*\*\* |