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| **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 marks  Switching 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) |
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