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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**  FIFTH SEMESTER B.TECH DEGREE EXAMINATION(S), MAY 2019 | | | | | |
| **Course Code: ME301** | | | | | |
| **Course Name: MECHANICS OF MACHINERY** | | | | | |
| Max. Marks: 100 | | |  | Duration: 3 Hours | |
| **PART A** | | | | | |
|  |  | ***Answer any three full questions, each carries 10marks.*** | | | Marks |
| 1 | a) | Kinematic chain definition (1 mark) conditions (2 marks) | | | (3) |
|  | b) | Sketch (3 marks) Proof (4 marks) | | | (7) |
| 2 | a) | Differences | | | (2) |
|  | b) | Inversion (2 marks) Different inversions(6 marks) | | | (8) |
| 3 | a) | Displacement diagram (2 marks) velocity diagram(1 mark) acceleration diagram(1 mark) | | | (4) |
|  | b) | Explanation(2 marks)  Derivation of formula of corioli’s component (3 marks)  Procedure to find the direction of Corioli’s acceleration(1 marks) | | | (6) |
| 4 | a) | Minimum two comparisions | | | (4) |
|  | b) | (i) Crank angle =81.73 degrees (4 marks)  (ii)Maximum velocity =3.18m/s (2 marks) | | | (6) |
| **PART B** | | | | | |
| ***Answer any three full questions, each carries 10marks.*** | | | | | |
| 5 | a) | Definition (1 mark)  Advantages(2 marks) | | | (3 ) |
|  | b) | Figure (2 marks)   1. Radius of nose = 10.7mm(1 mark)   Distance between centers = 21.3mm(1 mark)  Radius of circular flank = 52.6mm(1 mark)   1. Maximum acceleration during lift = 89.37m/s2(1 mark)   Maximum retardation during lift = 58.4m/s2(1 mark) | | | ( 7) |
| 6 | a) | Pressure angle (1 mark) Importance (1 mark) | | | (2) |
|  | b) | Displacement diagram (3 marks)  Cam profile (3 marks)  Velocity and acceleration(2 marks)  maximum velocity during rise = 1.917m/s  maximumaccelerationduring rise = 144.38m/s2  maximum velocity during return stroke = 1.534m/s  maximumaccelerationduring return stroke = 92.4m/s2 | | | (8) |
| 7 | a) | Naming of gear tooth profile (2 marks), Comparison (2 marks) | | | (4) |
|  | b) | Minimum no. of teeth on wheel = 51(1 mark)  Minimum no. of teeth on pinion = 17(1 mark)  Contact ratio = 1.78(4 marks) | | | (6) |
| 8 | a) | Interference( 2marks) methods to avoid interference(2 marks) | | | (4) |
|  | b) | Law of gearing(1 mark) derivation(5 marks) | | | (6) |
| **PART C** | | | | | |
| ***Answer any four full questions, each carries 10marks.*** | | | | | |
| 9 | a) | Functioning (3 marks) velocity ratio (1mark) | | | ( 4) |
|  | b) | (i) Speed of wheel if the annulus is fixed = 310 rpm(3marks)  (ii) Speed of annulus if wheel is fixed =147.6 rpm(3marks) | | | (6 ) |
| 10 | a) | Listing of gear trains (1 mark) Application (2 marks) | | | ( 3) |
|  | b) | Neat diagram (4 marks) Explanation (3 marks) | | | (7) |
| 11 | a) | Precision points(2 marks) Chebychev spacing(2 marks) | | | (4) |
|  | b) | Definition(1mark) Various steps(5 marks) | | | (6) |
| 12 | a) | Explanation of graphical method | | | (3) |
|  | b) | Two position(3.5 marks) three position(3.5marks) | | | (7) |
| 13 | a) | Definition and role (1 mark each) | | | (2) |
|  | b) | Finding precision point and angles (5 marks)  Finding lengths (3 marks)  Lengths of links = 1.73m,0.70m,1.78m and 1m | | | (8) |
| 14 | a) | Definition (1 mark each) | | | (4) |
|  | b) | Explanation (6 marks) | | | (6) |
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