Seat No: _____ **Enrollment No: _____**

PARUL UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

M. Tech. Winter 2017 - 18 Examination

Semester: I **Date: 30/12/2017**
Subject Code: 03211103 **Time: 2:00pm- 4:30pm**
Subject Name: Highway Materials and Construction **Total Marks: 60**

Instructions:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 A) What are the desirable properties of borrow-pit soil for sub-grade of highway embankment of National highway? **(05)**

B) Give classifications of road aggregates based on various aspects? State the physical properties and their IRC specifications. **(05)**

C) Explain how bitumen is obtained from crude petroleum at refinery. Give its classification and uses. **(05)**

Q.2 **Answer the following questions**. (Attempt any three) (Each five mark) **(15)**

A) What are the objectives of bituminous mix-design? State the various methods of mix design.

B) Explain the procedure of preparation and testing of Marshall mould specimen.

C) Explain the determination of optimum bitumen binder content from various graphical plots. State the importance of OBC in bituminous mix design.

D) State the parameters related to strength and durability of cement-concrete mix.

Q.3 A) What is the purpose of soil stabilization? Explain construction steps of mechanical method of soil stabilization. Also state the other methods of soil stabilization. **(07)**

B) Explain the functions of prime coat, tack coat and seal coat in bituminous road construction. What is the rate of application as per IRC recommendation? **(08)**

OR

B) Describe the construction steps of cement-concrete road. Explain various types of joints and its function in cement concrete road. **(08)**

Q.4 A) State the various types of bituminous road construction commonly adopted. What are the quality-control measures should be necessary for bituminous concrete surface course for National Highway? **(07)**

OR

A) What are the requirements for effective and efficient drainage system? Write design steps for surface drainage system. **(07)**

B) What are the basic considerations for cement-concrete mix design by IRC method? **(08)**

Following are proportions of mix design based on saturated surface dry aggregates per m^3 of concrete:
Cement = 360 kg; Water = 200 kg; CA = 1150 kg; and FA = 710 kg.
Make the necessary adjustments if CA and FA having excess water 3% and 4% by weight. What would be the final proportions?